

IFRS vs. Japanese GAAP Tested with Value Relevance Methodology

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Abstract: *This study is one of the first empirical evaluations of voluntary IFRS adoption in Japan, and it shows that the earnings announcements of Nikkei 225 firms using IFRS have higher value relevance than earnings announcements of Nikkei 225 firms using Japanese GAAP (earning announcements from 2008-2022). This study uses value relevance methodology that relates surprise earnings (calculated with Bloomberg-compiled analyst earnings expectations) to abnormal returns over the 12 months before the announcement, a methodology evolved from the seminal work of Ball and Brown (1968). Another finding here is the strength of qualitative variables to measure surprise earnings. Japan represents a unique opportunity to compare IFRS to a local standard in a large, developed economy using similar companies except for the accounting standard. These results provide essential data to the IFRS literature, stakeholders navigating the Japanese accounting environment, and other jurisdictions weighing the benefits of IFRS.*

Keywords: *IFRS, Voluntary IFRS Adoption, Japanese GAAP, Information Content, Value Relevance, Ball and Brown (1968)*

Abstrak: *Penelitian ini merupakan salah satu evaluasi empiris adopsi IFRS sukarela yang pertama di Jepang, dan menunjukkan bahwa pengumuman laba perusahaan Nikkei 225 yang menggunakan IFRS memiliki relevansi nilai yang lebih tinggi dibandingkan pengumuman laba perusahaan Nikkei 225 yang menggunakan GAAP Jepang (pengumuman laba tahun 2008-2022). Penelitian ini menggunakan metodologi relevansi nilai yang menghubungkan laba kejutan (dihitung dengan ekspektasi pendapatan analis yang disusun Bloomberg) dengan keuntungan abnormal selama 12 bulan sebelum pengumuman, sebuah metodologi yang dikembangkan dari karya penting Ball dan Brown (1968). Temuan lain di sini adalah kekuatan variabel kualitatif untuk mengukur laba kejutan. Jepang mewakili peluang unik untuk membandingkan IFRS dengan standar lokal di negara maju dan besar dengan menggunakan perusahaan serupa kecuali untuk standar akuntansi. Hasil ini memberikan data penting bagi literatur IFRS, pemangku kepentingan yang menavigasi lingkungan akuntansi Jepang, dan yurisdiksi lain yang mempertimbangkan manfaat IFRS.*

Kata kunci: *IFRS, Adopsi IFRS Sukarela, GAAP Jepang, Konten Informasi, Relevansi Nilai, Ball and Brown (1968)*

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1. Introduction

1.1 Overview of IFRS

The increasing use of International Financial Reporting Standards (IFRS) over the last two decades is a monumental development in accounting that has produced enthusiasm in the financial and accounting communities about the prospect of one worldwide accounting standard that might increase efficiency (IFRS Foundation, 2023), transparency (Imhanzenobe, 2023), comparability (De George et al., 2016), and accounting quality (Agana et al., 2023) in the global financial markets. These potential benefits have contributed to the large-scale adoption of IFRS – IFRS is now required in 145 of the world's 167 accounting jurisdictions, and IFRS is permitted in 13 of those 167 jurisdictions (IFRS Foundation, 2022). Even non-adopting countries such as the United States (US), India, China, and Japan have taken notable steps towards converging their local accounting standards with IFRS. The US has tried to converge US GAAP standards with IFRS, notably in revenue recognition (Yeaton, 2015; Tysiac, 2014) and leases (Soobrian, 2018). India and China have largely converged with IFRS standards (Hoogervorst, 2018). Japan, which is the focus of this article, allows companies to report in IFRS, and there are now only minor differences between Japanese GAAP and IFRS (Gu, 2021).

In summary, the IFRS literature notes the benefits of comparability and flexibility and the drawbacks of flexibility (interestingly, a double-edged sword) and the loss of control in developing and enforcing accounting standards. Several researchers address the advantage of one comparable standard. Ramanna and Sletten (2014) find that adopting countries benefit from one standard (regardless of the quality of the standard). Some of the IFRS research argues that the flexible nature of IFRS enables firms to represent accounting transactions more accurately. IFRS is notably a principle-based system (Majaski, 2019), whereas many versions of local GAAP follow rule-based systems, which must, by definition, contain many rules (Williams, 2020)¹. Regarding

¹ Williams (2020) is a dissertation work by the same author of this article, and this article is continued research based on Williams (2020).

US GAAP, regulators have struggled to write a rule for every accounting situation (De Gregorio, 2018; de Vroe, 2019). The principle-based system of IFRS is a possible way to avoid these pitfalls. A company has the best understanding of its transactions; thus, providing that company with guiding principles and flexible rules could aid the company in providing the most accurate, quality financial statements. The Literature Review here will point to a preponderance of the evidence that the flexible nature of IFRS has enhanced accounting quality, and the empirical results of this article will also support that IFRS increases accounting quality.

There are drawbacks to IFRS, and presumably, those disadvantages have prevented its worldwide implementation; notably, the flexibility of IFRS can be a disadvantage (De George et al., 2016). In the best circumstances, it seems that IFRS needs strong enforcement environments for flexible standards to increase quality. Christensen et al. (2015) suggest that the standards are less important than the incentives for producing quality financial statements. Ahmed et al. (2013) finds that even in strong enforcement environments, the flexible nature of IFRS can lower the quality of financial statements with delayed loss recognition, income smoothing, and increased earnings aggressiveness (as cited in De George et al., 2016). The loss of control to set and enforce accounting standards is also an important disadvantage of IFRS adoption. For example, IFRS adoption in the US would mean that the Financial Accounting Standards Board (FASB) would no longer set its accounting standards and that the SEC would enforce standards created by a different entity, which could limit the country's ability to adjust to a changing economy and instill confidence in the financial markets (De Gregorio, 2018). The US is not alone in this desire. Ball (2015) suggests that large, populous countries, such as China, the US, and India, are more likely to concede to internal influences to support local economies rather than external pressures to conform to a world standard.

This study centers on the use of IFRS in Japan, and the results are directly applicable to stakeholders navigating the Japanese accounting environment; however, the results here have larger implications, such as the continued global implementation of IFRS and the continued convergence of IFRS with various local accounting

standards. Interestingly, Indonesia, which is of notable interest to the readers of this publishing journal, has achieved close to full convergence with IFRS (Wahyuni et al., 2020) and, by extension, has a vested interest in the value relevance of IFRS and its continued global use. Recent studies have shown that IFRS implementation in Indonesia has improved accounting quality (Wahyuni et al., 2020; Lestari & Takada, 2015); additionally, Widodo (2012) found higher value relevance of Indonesian accounting statements during a period of convergence with IFRS compared to a period of minimal convergence steps. These results bode well for increased economic efficiency and development in Indonesia. Positive IFRS results in Japan would also bode well for development and trade in the Asia Pacific Region (and could encourage countries like Indonesia, China, Japan, and India to adopt IFRS fully). In addition to overall value relevance in Japan, this study will discuss industry-specific sentiments about IFRS adoption. The pre-IFRS literature in Japan notes IFRS reluctance in the manufacturing industry; thus, the analysis and results here could also inform manufacturers in Indonesia.

Similarly, the results here suggest that healthcare firms find favor in IFRS over Japanese GAAP, which could have parallels in the Indonesian economy. While the IFRS story in Indonesia is substantially underway, it is not finished. While Indonesian accounting standards and IFRS are very similar (Wahyuni et al., 2020), Indonesia has not fully adopted IFRS (IFRS Foundation, 2017), nor has it ceded its right to interpret IFRS standards or issue local standards as necessary (Wahyuni et al., 2020). In fact, in recent years, the Indonesian Accounting Standard Board (Dewan Standar Akuntansi Keuangan/DSAK) has stepped in to clarify interpretations of accounting standards (Wahyuni et al., 2020). Perhaps more intervention by Indonesian regulators will be necessary if IFRS fails to improve value relevance, or perhaps less if IFRS results from Japan and other jurisdictions continue to show the strength of IFRS.

1.2. IFRS in Japan

Japan is in the midst of an accounting experiment that could weigh heavily on the future of IFRS. In 2005, Japan started on a path to converge Japanese GAAP with IFRS (Yorihiko, 2011), and in 2010, Japan allowed the optional use of IFRS (Tsunogaya et

al., 2012). The growth of IFRS in Japan has been rapid; Figure 1 shows an increase in the number of Nikkei 225 firms using IFRS, starting with one firm reporting earnings in 2010 and 82 firms reporting earnings in 2021². However, in 2011, the decision about mandatory adoption in Japan was indefinitely postponed as business parties in Japan became nervous about the impending change. Nonetheless, voluntary IFRS adoption continued, and Japan now represents an exceptional testing opportunity for the success of IFRS. Research by Williams (2020) found that Japan was the only large, developed economy that provided a same-year, unbiased comparison between IFRS and the local GAAP standard. Of the other countries that allow optional IFRS, Switzerland is the other large, developed economy; however, larger companies in Switzerland highly favor IFRS over Swiss GAAP (Williams, 2020); thus, Japan is a unique IFRS testing opportunity.³

There has been limited research on the effect of Japanese IFRS implementation. Research by Williams (2020) was the first known empirical test comparing IFRS with Japanese GAAP in Japan. The second published empirical test of Japanese accounting statements was conducted by Gu (2021), and that article also notes a dearth of much-needed research in Japan. This represents an unfortunate gap in the literature and a potentially valuable source of accounting scholarship.

2. Literature Review

2.1 Overview of IFRS Literature

The results of IFRS implementation have been impressive, and, with notable caveats, the literature shows an overall superiority of IFRS over local accounting standards. A meta-study by De George et al. (2016) in the *Review of Accounting Studies* examines 64 articles related to IFRS that were published in influential peer-reviewed

² Figure 1 does not include 2022 data because, as of the time of writing this article, 2022 financial reporting was incomplete.

³ The 13 jurisdictions with optional IFRS are ‘Belize, Bermuda, Cayman Islands, Guatemala, Honduras, Japan, Madagascar, Nicaragua, Panama, Paraguay, Suriname, Switzerland, and Timor-Leste’ (IFRS Foundation, 2022). Japan and Switzerland represent the only large, developed economies, and IFRS companies in Switzerland were found to be biased by company size (Williams, 2020).

journals. De George et al. (2016) concludes that market-based studies (value relevance of earnings to stock price, stock price itself, liquidity, trading volume) show the superiority of IFRS for both voluntary and mandatory adoption. De George et al. (2016) also concludes that direct measure studies (income smoothing, timeliness of loss recognition, quality of specific accounting numbers) show IFRS superiority when studying voluntary adoption; however, direct measure studies that study mandatory adoption show mixed results. Thus, De George et al. (2016) find IFRS superiority in most categories and mixed results in one category. Mandatory adoption can be noted as a possible caveat to IFRS superiority.

Several credible studies analyze more than one accounting jurisdiction and conclude IFRS's superiority. Li and Yang (2016) examined 26 countries that started mandatory IFRS in 2005 and found that IFRS improved earnings quality and market efficiency. Lang and Stice-Lawrence (2015) studied 87,608 annual reports from 42 countries with mandatory IFRS and found that IFRS increased the quality and comparability of disclosures. Barth et al. (2014) studied 15 countries that reconciled local GAAP to IFRS after mandatory adoption in 2005 and found value relevance in the IFRS reconciliations – in other words, the IFRS statements provide value over and above that provided by the local GAAP statements. Landsman et al. (2012) studied 21,703 earnings announcements in 27 countries and found more valuable information content in IFRS earnings announcements.

With all of the positive IFRS outcomes, it begs the question of why the entire world is not already using IFRS. Well, each accounting jurisdiction makes its own choice based on the demands it faces, and there are examples of negative results of IFRS implementation. Williams (2020) confirms a consensus in the research on IFRS superiority, but Williams (2020) identifies three categories of exceptions to IFRS superiority: mandatory adoption, enforcement, and familiarity.

Regarding mandatory adoption, several researchers make the obvious point that firms that willingly choose IFRS do so with the expectation of better outcomes; the results show superior outcomes for voluntary adopters and some negative outcomes for mandatory adopters. Christensen et al. (2015) assert that firms that voluntarily adopt

IFRS have calculated that IFRS will result in better outcomes for that firm; that study finds that German firms that chose to adopt IFRS voluntarily before 2005 experienced better outcomes (higher value relevance, lower earnings management, more timely loss recognition) than firms that were forced to switch to IFRS in 2005 mandatorily. Gu (2021) cites Vroom's Expectancy Theory to explain that firms will choose to adopt IFRS with the expectation of the rewards that come from better accounting outcomes. Gu (2021) finds that voluntary adopters of IFRS in Japan have higher accounting quality. Daske et al. (2008) studied 51 countries and found that the positive effects of IFRS are stronger for voluntary adopters than mandatory adopters. The mixed findings of mandatory adoption remain as a caveat to IFRS superiority, and they will be noted as a limitation in this article: The success of voluntary IFRS in Japan does not necessarily support mandatory IFRS in Japan.

Enforcement is a critical point in IFRS implementation, and the IFRS literature is flush with analyses of enforcement's role in successful (or unsuccessful) IFRS adoption. Ball et al. (2003) note that quality accounting standards without sound enforcement mechanisms will not necessarily lead to quality financial statements. Van Tendeloo and Vanstraelen (2005) cite weak investor protection in Germany because voluntary IFRS adopters from 1999-2001 did not improve earnings management. The weak investor protection in Germany cited by Tendeloo and Vanstraelen (2005) may have been behind the results of a study by Lin et al. (2012) that found increased earnings management, decreased value relevance, and less timely loss recognition after German firms using US GAAP were mandated to switch to IFRS. Daske et al. (2008) find that IFRS has positive benefits but only in countries with strong enforcement and transparency incentives.

Williams (2020) suggests that some findings of the inferiority of IFRS may have been due to users being unfamiliar with IFRS financial statements. Williams (2020) supports a belief in efficient markets. However, the study notes that there are likely fluctuations in the level of market efficiency as investors, regulators, and creditors become more comfortable with a new accounting standard. Before 2007, foreign IFRS companies listed in the US were required to file Form 20-F, which reconciled IFRS with

US GAAP (Chen & Sami 2009), and multiple studies concluded that because Form 20-F added value, IFRS was less value-relevant than US GAAP (Harris & Muller, 1999; Chen & Sami, 2004, 2008, 2009, 2013). However, Williams (2020) surmised that this effect dissipated as investors became more familiar with IFRS. Chen and Sami (2009) finds that there is no trading volume reaction in the firm's local market, no trading volume reaction for firms with higher institutional holdings, and no trading volume reaction for firms that had used IFRS in prior years, which suggests that investors glean less information from Form 20-F filings as their familiarity with IFRS increases. Additionally, a study by Ricketts et al. (2018) shows that the 2007 elimination of the Form 20-F requirement for IFRS firms did not decrease the accuracy of analyst forecasts, which suggests that financial professionals, who are more familiar with IFRS, can glean the same amount of value in IFRS without the need for a reconciliation to US GAAP.

2.2 Accounting Research in Japan

After experiencing astounding economic growth after World War II (Burnand 2019), Japan is currently the world's third-largest economy, and foreign trade amounts to 36.1% of GDP; however, Japan's economy faltered in 1991, and it has continued to stagnate since then (Nielsen, 2020). Japan's path toward convergence with international accounting standards has been closely related to efforts to increase Japan's capital markets' international appeal and enhance the Japanese economy (Tsunogaya et al., 2012).

The Nikkei 225 is the leading index in Japan (Chen, 2022a), and the index is known to reflect recession and expansion accurately and to accurately measure the value of the Japanese economy (FXCM, 2018); thus, the methodology for this article will use the Nikkei 225. Firms on the Nikkei 225 must meet minimums for market capitalization, market capitalization for tradable shares, tradeable shares, net assets, and number of shareholders (FXCM, 2018). Additionally, the Nikkei 225 attempts to proportionally represent Japan in six main sectors: Technology, Consumer Goods, Materials, Capital Goods, Transportation and Utilities, and Financials. (FXCM, 2018). The homogeneity of the Nikkei 225 firms minimizes bias in comparing firms; furthermore, because the

Nikkei 225 is reflective of the Japanese economy, the results of this study will be reasonably applicable to the overall accounting environment in Japan.

Thanks to convergence efforts in 2005, the Accounting Standards Board of Japan (ASBJ) and the IASB have successfully eliminated the major differences between Japanese GAAP and IFRS (Kashiwazaki et al., 2019). However, the literature on Japanese accounting discusses a few important differences, and those differences might drive differences in the value of information content. Fair value accounting is the most cited difference (Gu, 2021; Kashiwazaki et al., 2019; Ozu et al., 2018; Tsunogaya et al., 2012); additionally, amortization of goodwill (Gu, 2021; Amano, 2020; Kashiwazaki et al., 2019; Ozu et al., 2018; Ban & Takeuchi, 2018) and research and development costs (Amano, 2020; Kashiwazaki et al., 2019) are discussed in the literature. In these three areas, it seems that IFRS allows more flexibility, which could help preparers of financial statements more accurately define value in given circumstances. Alternatively, this flexibility could, intentionally or unintentionally, distort value. Ultimately, this article will not make precise conclusions about the true drivers of value differences in IFRS versus Japanese GAAP; instead, this article will conclude that there is more valuable information content in IFRS statements vs. Japanese GAAP statements based on empirical testing.

2.2.1 Review of IFRS Literature in Japan

Currently, there are only two studies of the empirical results of IFRS implementation in Japan: Williams (2020) and Gu (2021), and both of these studies note IFRS's superiority in Japan. Other studies focus on the expected benefits, beneficiaries, and drawbacks of IFRS adoption in Japan. Williams (2020) was the first empirical study comparing IFRS to Japanese GAAP in Japan. That study found that financial statements of Japanese companies using IFRS contained more valuable information content than financial statements of Japanese companies using Japanese GAAP. Williams (2020) was based on the market variables stock price and trading volume. This article replicates Williams (2020), updated with recent data. Williams (2020) tests correlations of abnormal returns with surprise earnings (using six different estimates of surprise earnings). The study finds that the correlation coefficients are stronger for the IFRS

firms than for the Japanese GAAP firms. Williams (2020) used a bootstrapping method to develop a confidence interval for all correlation coefficients. Williams (2020) finds that the confidence intervals for IFRS and Japanese GAAP firms overlap and concludes that the higher correlation coefficients for IFRS firms may or may not persist in future periods. Williams (2020) notes the need for future research in Japan with more data. Williams (2020) also notes a surprising strength in the correlation of qualitative earnings variables with abnormal returns, which will be an essential part of the methodology of this article.

Gu (2021) was the second empirical test comparing IFRS to Japanese GAAP in Japan. That study found that IFRS firms in Japan exhibited higher accounting quality compared to Japanese GAAP firms in Japan. Gu (2021) studies matched samples of listed companies in Japan from 2010 to 2014 for 4,414 firm-years and found that IFRS firms in Japan exhibit less income smoothing and more conditional conservatism compared to Japanese GAAP firms in Japan. Conditional conservatism means that firms are slower (and more conservative) when recognizing positive news and faster (and more conservative) when recognizing bad news (Basu, 1997, as cited in Lara et al., 2020).

Gu (2021) notes several gaps in the IFRS literature that are specifically relevant to Japan: There is a need to evaluate the success of voluntary IFRS adoption in Japan because it has implications for other countries with voluntary IFRS as well as countries that have not adopted IFRS; large non-adopting countries such as China, India, and the US may be especially interested in empirical results in Japan because Japan is the largest country to allow voluntary IFRS currently.

Other literature has concentrated on the expected benefits of IFRS in Japan, and increased comparability is the most noted benefit (Tsunogaya et al., 2012; Takeda & Watanabe, 2015; Sato & Takeda, 2017). The literature notes that the expected beneficiaries of IFRS adoption are firms with stronger incentives to provide investors with information because of more foreign shareholders (Takeda & Watanabe, 2015; Sato & Takeda, 2017), firms that seek capital internationally (Tsunogaya et al., 2012), and large and overseas-listed companies (Ozu et al., 2018).

The primary expected disadvantage of IFRS in Japan, as noted in the literature, is the flexibility in IFRS. Ozu (2018) explains that many Japanese companies seem comfortable with an informal circle of business relationships where the necessary parties already know things like the fair value of assets, and these companies would be uncomfortable with the market volatility of fair-value measurements. Specifically, Tsunogaya et al. (2012) notes that manufacturing companies are concerned about the flexible fair-value accounting in IFRS and explain that the Japanese accounting environment respects conservative values and bureaucratic control rather than the professional judgment associated with IFRS. Later work by Tsunogaya (2016) also finds less enthusiasm for IFRS among manufacturing companies. It seems that these studies illuminate a sentiment that many companies were fearful of change from a known, controlled environment based on conservative values.

2.3 The Value of Information Content

Information content literature (generally referred to as value relevance literature) posits that there is valuable information contained in financial statements, and the value of the information can be observed in the relationship between accounting information and stock performance (Barth et al., 2023). Two seminal studies, Ball and Brown (1968) and Beaver (1968) showed the value of financial statements and demonstrated methodologies for finding information content that are still the foundation of contemporary research methods. Value relevance methodologies are commonly used in IFRS research, and IFRS standards are generally found to have higher information content (Imhanzenobe, 2022). This article uses contemporary adaptations of the Ball and Brown (1968) methodology, which measures the strength of the relationship between surprise earnings and abnormal returns, and the following sections will explain the contemporary value relevance methodologies with supporting studies; in summary, the contemporary value relevance studies use regression analysis to calculate abnormal returns with a market model based on annual earnings announcements, and surprise earnings is measured a variety of ways.

2.3.1 Regression Analysis, Market Models, and Annual Earnings

Regression analysis is generally used in the contemporary versions of Ball and Brown (1968) (such as Barth et al., 2014; Lin et al., 2012; Jarva & Lantto, 2012; Barth et al., 2008; Hung & Subramanyam, 2007, Bartov et al., 2005, and Harris & Muller, 1999). The value relevance literature consistently calculates abnormal stock returns using some type of market model and uses that abnormal return as a dependent variable (such as Li & Yang, 2016; Kim & Shi, 2012; Barth et al., 2012; Landsman et al., 2012, Horton & Serafeim, 2010, Daske et al., 2008, Auer, 1996, and Hung & Subramanyam, 2007). Annual earnings announcements remain the standard as independent variables in event studies in value relevance research (such as Lang & Stice-Lawrence, 2015; Barth et al., 2012; Landsman et al., 2012; Horton & Serafeim, 2010; Barth et al., 2008, Daske et al., 2008, Bartov et al., 2005, and Hung & Subramanyam, 2007). Basu (1997) notes that periods shorter than one year would be less effective in calculating timeliness (as cited in Ball & Shivakumar 2008) because earnings information is incorporated into price many months before the information is announced.

2.3.2. Refining the Independent Variable – Surprise Earnings

Surprise earnings is the common independent variable in regression analysis for value relevance studies, but the proper calculation of surprise earnings is debatable. The key question is how to measure the valuable, surprising, or informative component of earnings. Overall, the literature does not favor any particular method as long as the method is a rigorous effort to calculate the surprising component of earnings.

The literature supports an adjustment to naïve income to calculate surprise income. Kothari (2001) notes that the valuable part of company income to capital market researchers is its relative performance instead of its absolute performance. Ball and Brown (2014) reflect that they chose wisely in 1968 by focusing on surprising earnings as independent variables, and they suggest that analyst-adjusted expectations of income could have been an accurate way to quantify the surprising component of income. However, the necessary data on analyst expectations was unavailable in 1968. Williams (2020) decided to use analyst expectations and cites investors' confidence in analyst expectations gathered by Bloomberg L.P. Because of the literary and empirical support

for analyst expectations. This article will utilize analyst expectations as the critical test in the methodology. Naïve measures of surprising income can be used as a baseline comparison (Ball & Brown, 1968), and naïve earnings will be used as such in this methodology. Drift-adjusted models embody a middle option between highly specified (and perhaps over-specified) income expectations from analysts and unspecified naïve income (used by Brown and Kennelly, 1972 and Barth et al., 2008). Drift-adjusted models will be used as part of this methodology.

Once a way of measuring earnings surprise has been established (perhaps analyst-adjusted, drift-adjusted, or naïve), a researcher can choose between expressing the earnings surprise as either a qualitative or a magnitude variable. Qualitative variables are sometimes casually expressed as good news or bad news. Good news means that earnings have exceeded expectations, and bad news means that earnings have missed expectations. Conversely, magnitude variables indicate the amount (usually as a percentage) by which earnings have exceeded or missed expectations. Ball and Brown (1968) used qualitative earnings variables; however, the contemporary information content literature uses magnitude variables (Nichols & Wahlen, 2004; Chen & Sami, 2004, 2008, 2009, and 2013; Barth et al., 2014). Work by Williams (2020) finds a surprising strength in qualitative variables but finds no direct support in the literature for using qualitative variables in contemporary studies. Hence, Williams (2020) notes this as a possible contribution to the literature.

Williams (2020) finds indirect support for qualitative variables in two forms: One, some literature reminds readers that the relationship between earnings and price is small and/or unstable (Ball & Shivakumar, 2008; Lev, 1989; Bamber, 1986). Two, some literature shows a non-linear relationship between earnings and price (Griffin, 1976; Freeman & Tse, 1992; Hayn, 1995; Basu, 1997; Bartov et al., 2005). Williams (2020) suggests that a small, non-linear relationship may be more suited to a general, qualitative classification rather than a precise magnitude classification. Both qualitative variables and magnitude variables will be studied in this methodology.

2.3.3. Meaningful Correlation Coefficients and Meaningful Differences in Correlation Coefficients

As mentioned in the section above, the correlation coefficients found in this research are generally not strong effects, so it is important to note why the literature has used these weak correlations to draw essential conclusions; additionally, it is important to discuss how researchers have concluded that one accounting standard is better based on a comparison of two correlation coefficients. The answer to the first issue is that the value of earnings was established in 1968 and has now become a given premise in capital market research (Kothari, 2001); this premise endures even when the literature finds the statistical correlation between earnings and price to be weak (Ball & Shivakumar, 2008; Lev, 1989; Bamber, 1986).

The answer to the second issue is twofold: One, much of the literature simply states that a stronger correlation between earnings and price for one accounting standard supports the conclusion that that accounting standard has superior information content, such as Barth et al., (2008) and Jarva and Lantto (2012). Two, some of the literature attempts to test the persistence of that conclusion, but there is no standard method of conducting such a test. One method is a bootstrapping methodology supported by IFRS literature and based on sound statistical theory. The bootstrapping process involves resampling (with replacement) the same sample thousands of times to develop a distribution of outcomes that can be used as a confidence interval (Marin, 2019). Bootstrapping can determine a p-value for sample differences (Gignac, 2015), which is beneficial for comparing two accounting statements. Barth et al. (2012) and Lin et al. (2012) are two IFRS studies that use bootstrapping to test the persistence of their conclusions. Because bootstrapping is used in the IFRS literature and because of its statistical rigor, bootstrapping will be used in this study.

3. Theoretical Framework, Hypothesis Development, and Research

Method

The hypotheses tested here, the theoretical underpinnings and literary support, and the research method will be summarized in this section. The first hypothesis tests for

statistically significant correlations between earnings and returns (which is a necessary formality before proceeding to the second hypothesis), and the second hypothesis will inform the key conclusion of comparing IFRS to Japanese GAAP.

The first set of hypotheses tests if there is a statistically significant correlation between surprise earnings and abnormal returns.

- $H_01: \text{Correlation } (R) \text{ of Surprise Earnings vs. Abnormal Return} = 0$
- $H_a1: \text{Correlation } (R) \text{ of Surprise Earnings vs. Abnormal Return} \neq 0$

Six different metrics for earnings (summarized below) will use Hypothesis 1 to test for a statistically significant correlation between the IFRS and Japanese GAAP firms. A significance level of 5% will be used.

The second set of hypotheses tests if the correlation (R) for the IFRS firms is higher than the correlation (R) for the Japanese GAAP firms.

- $H_02: \text{Correlation } (R)_{IFRS} - \text{Correlation } (R)_{\text{Japanese GAAP}} = 0$
- $H_a2: \text{Correlation } (R)_{IFRS} - \text{Correlation } (R)_{\text{Japanese GAAP}} \neq 0$

Each of the six metrics for earnings will use Hypothesis 2 to determine if the IFRS firms have a higher correlation than the Japanese GAAP firms. To determine the persistence of the result, a bootstrapping procedure will be used for each test, with a significance level of 5%. Additionally, this methodology will conduct two earnings variable ranking tests to determine standards for assessing Hypothesis 2. Lastly, two tests for industry biases will be conducted to inform the conclusions. Further explanation, theoretical underpinnings, data source, and expected results are as follows.

As discussed in the Literature Review, the current methodologies based on Ball and Brown (1968) are termed value relevance studies. Contemporary value relevance studies agree on using regression analysis to compare surprise earnings with abnormal price returns, using a market model to calculate abnormal price returns, and using annual earnings announcements. Pearson Correlation Coefficients, commonly used in empirical research (Cozby & Bates, 2015), will be used in this methodology, and abnormal returns will be calculated with the Capital Asset Pricing Model (CAPM), which calculates residual returns after considering risk-free returns, overall market

movements, and company betas (Kenton, 2022). The risk-free return data is sourced from Bloomberg L.P., which uses the rate for a long-term government bond in Japan at the time of earnings announcement. Company betas are sourced from Bloomberg L.P. Overall market movements are based on the prior 12 months of returns of the Bloomberg-assigned relative benchmark, which in this case is the Tokyo Stock Exchange.

However, the contemporary methodologies for measuring surprise earnings are varied and must be considered carefully. Thus, this study will test several (a total of six) measures of earnings surprise and present all of the resulting conclusions. Surprise earnings are calculated by comparing the company's most recent 12 months of earnings with either the company's prior year earnings (naïve earnings), the average return in the studied companies that year (drift-adjusted earnings), or Bloomberg BEST analyst estimates for that year (analyst-adjusted earnings). Both magnitude and qualitative variables will be measured and tested for each of the three methods.

To determine which of these six earnings methods should be used to make conclusions, this methodology will conduct two earnings variable ranking tests to assess the strength of each of the six surprise earnings calculations. The first empirical test will test the correlation between surprise earnings and abnormal performance for each of the six earnings measures in the full Nikkei 225 sample, regardless of the accounting standard used. If, for example, the drift-adjusted magnitude variable has a stronger correlation with abnormal returns in the entire sample compared to the analyst-adjusted qualitative variable, then that will serve as evidence that the drift-adjusted magnitude variable is a better measure of surprise earnings and that that measure of earnings should be used to determine the superiority of one accounting standard over the other. The second earnings variable ranking test is a chi-square test of independence. In 1968, Ball and Brown used this test to test whether positive earnings surprises were independent of positive stock returns and likewise with negative earnings and negative returns. This test will use qualitative variables for earnings and qualitative variables for returns. If, for example, the p-value for the chi-square test is lower for the analyst-adjusted qualitative variable and higher for the drift-adjusted qualitative variable, then that will

serve as evidence that analyst-adjusted earnings should be used to determine the superiority of one accounting standard over the other.

The contemporary studies also lack a clear consensus for determining a substantial difference in the value relevance of one accounting standard versus the other; however, the bootstrapping method is reasonably supported in the literature discussed above and will thus be used in this methodology to determine if there is a substantial difference in the respective correlation coefficients. This article uses SPSS to conduct bootstrapping by resampling the same data 1,000 times with replacement; this study uses a 95% confidence interval, which equates to the interval created by 95% of the 1,000 resamples. By resampling with replacement, bootstrapping shows conceivable variety in data taken in similar circumstances. For example, future data from the Nikkei 225 firms might be considered a similar circumstance. Thus, if the bootstrapping procedure indicates that the given results will persist in 95% of similar circumstances, that is strong evidence that the result will be consistent with the future years in Japan. The following sections will discuss sample data, the data source, and tests for industry biases.

The data for this article will consist of all earnings announcements of firms on the Nikkei 225 from 2008 through mid-2022. As discussed in the literature review, Nikkei 225 firms can be reasonably considered similar except for accounting standards, and the Nikkei 225 can be used as a proxy for the Japanese economy. The years 2008 and 2009 are included in this study to gather more Japanese GAAP data from many of the same companies in a close period to the start of voluntary IFRS.

The data source for this study is Bloomberg Professional Service, which is commonly known as Bloomberg Terminal (Chen, 2022b) and is commonly referred to as Bloomberg or Bloomberg L.P. Bloomberg L.P. is an industry leader in business media (Dun & Bradstreet, 2023) and a major provider of historical and real-time prices, volume, and earnings (Chen, 2022b). Bloomberg L.P. provides the most comprehensive financial research tools available to the public (Chen, 2022b), and it is considered among the most important resources in the financial industry (Kolakowski, 2021). All

of the historical information on earnings, analyst estimates, industry classification, and stock returns in this study will be provided by Bloomberg L.P.

There is a notable concern with industry biases in the data for this study. While all Nikkei 225 firms are expected to have similar market capitalization, net assets, and tradable shares, the firms that choose IFRS could vary in industry classification. As mentioned in the Literature Review, manufacturing firms may be especially wary of switching to IFRS, and there could be other biases in industry classification. Following Williams (2020), this methodology will use a test of proportional difference and a chi-square proportional difference to test for a difference of firms that choose IFRS. Both tests will measure if the proportion of each industry is similar for the IFRS firms compared to the overall Nikkei 225.

The results of the two hypotheses are expected to align with the results of Williams (2020) and the overall IFRS literature. The overall IFRS literature suggests greater information content for IFRS over local standards, and Williams (2020) found that to be the case in the first empirical study of IFRS in Japan. However, Williams (2020) specifically noted concerns with the persistence of the results, given that the bootstrapping procedure failed to show a statistically significant superiority of IFRS. Thus, this study will serve as continued, peer-reviewed research to inform the future of IFRS's Japanese (and global) use.

4. Results and Discussion

4.1 Data

Table 1 shows the accounting standard usage of Nikkei 225 firms from 2008 to 2022 by earnings announcement year (the same data illustrated in Figure 1). The left column is the year in which the earnings period ended. Table 1 shows that IFRS usage has increased yearly, while Japanese GAAP and US GAAP usage has decreased. However, Japanese GAAP remains the most prevalent accounting standard on the Nikkei 225. Note that as of the writing of this article, there were only 194 earnings announcements for 2022. Thus, the apparent decrease in IFRS earnings announcements in 2022 is simply because the data for company announcements in the fiscal year ending

in 2022 are incomplete. From 2008 to 2022, there were 3,372 company listings on the Nikkei 225; however, largely because of unannounced 2022 data, a total of 3,336 earnings announcements are listed in Table 1.

4.2 Tests for Industry Biases

Table 2 shows the proportion difference test that compares the industry proportions of the Nikkei 225 firms to the industry proportions of IFRS firms used in this study. This test was conducted to assess if the firms that choose IFRS are biased in favor of any particular industries. Table 2 shows a statistical difference in the proportion of healthcare firms in the IFRS data compared to that of all Nikkei firms. Healthcare firms represent 15.6% of the IFRS sample but only 4.7% of the Nikkei firms; the p-value for the proportional difference is 0.011 (1.1%), below a standard 5% significance level, and indicates that the difference is notably more than a random fluctuation.

The results of the chi-square goodness of fit test are shown in Table 3. The very low p-value indicates that there is, in fact, a difference between the industry proportions in the IFRS firms compared to the proportions in the entire Nikkei 225. As such, the conclusions of this study must be viewed with the qualification that those conclusions are based on a different representation of industries. The most notable difference is a greater industry representation of Health Care firms in the IFRS sample. Financials and Communication Services both have high Chi-Square test statistics, and those industries could be notable differences that would make the conclusions related to IFRS firms less applicable to the entire Nikkei 225. Considering the results in Table 2 and Table 3, this study's conclusions must note that the superior value relevance of IFRS may, in part, be because IFRS is more favorable for healthcare and communication services firms and less favorable for financial firms.

4.3 Earnings Variable Ranking Tests

The results in Tables 4, 5, 6, and 7 provide insight into the best measure of surprise earnings. As mentioned in the methodology, the measure of surprise earnings is important because of a lack of consensus in the literature. Table 4 tests the strength of the correlation between each measure of surprise earnings and the abnormal return in the entire sample of Nikkei 225 firms (regardless of the choice of accounting standard).

The results in Table 4 indicate that the analyst surprise qualitative variable has the strongest correlation with abnormal earnings, with a correlation coefficient (R) of 0.285 and a statistically significant p-value of less than 0.001. Thus, according to Table 4, this measure of surprise earnings is the best way to explain the variation in abnormal stock returns, and the naïve magnitude variable is the worst way to explain the variation in abnormal stock returns. A key result is that the three qualitative variables perform better than the three magnitude variables. Surprisingly, the naïve qualitative variable performs better than the drift-adjusted qualitative variable – correlation coefficient (R) of 0.235 compared to 0.188, respectively.

Tables 5, 6, and 7 show that abnormal returns depend on all three surprise earnings measures. Tables 5, 6, and 7 test the independence between abnormal returns and the qualitative earnings variables; the very low p-values indicate that the assumption of independence between the two variables can be rejected and that the two variables are dependent. Note that these results could be used to support the rejection of the null Hypothesis 1 and support the conclusion that there is, in fact, a correlation between surprise earnings and abnormal return (however, the key test for Hypothesis 1 will be illustrated in Table 8). The lower the p-value, the more dependent abnormal stock returns are on that measure of surprise earnings. According to Table 7, analyst-adjusted qualitative surprise earnings show the strongest rejection of independence between earnings and price with a p-value of 1.37×10^{-40} , indicating that analyst-adjusted earnings are the best way to predict abnormal returns. Table 5 shows that the qualitative measure of naïve surprise earnings is the second-best predictor of abnormal returns with a p-value of 3.48×10^{-29} . Table 6 shows that drift-adjusted qualitative surprise earnings are the third-best predictor of abnormal returns. Note that the magnitude variables are not tested in the chi-square test of independence.

4.4 Correlation Results

Table 8 illustrates the key results of this study. The Japanese firms using IFRS show higher value relevance for both analyst-adjusted measures of earnings surprise. If the analyst variables are the basis for deciding Hypothesis 1, the null of no correlation between surprise earnings and abnormal returns is rejected with p-values below 0.1%

for all four analyst variables. Additionally, if the analyst variables are the decision basis for Hypothesis 2, then the results in Table 8 show that the null hypothesis for Hypothesis 2 should be rejected and that IFRS financial statements have higher correlations than Japanese GAAP financial statements. The correlation coefficient (R) for the IFRS analyst magnitude variable and the analyst qualitative variable are 0.219 and 0.330, respectively, compared to 0.157 and 0.251 for Japanese GAAP. The performance of the naïve and drift-adjusted variables is mixed; the naïve qualitative variable is stronger for IFRS, and the other three variables are stronger for Japanese GAAP. Notably, the qualitative variables perform well compared to the magnitude variables. Each of the six qualitative variables is stronger than the respective magnitude variable. Also notable is the strength of the naïve qualitative variable for IFRS; the correlation coefficient (R) of 0.339 is the strongest of any earnings metric for either accounting standard.

Table 9 is also very important to the results of this study, and it shows that the conclusions in this study must be qualified. Table 9 develops 95% confidence intervals using the bootstrapping procedure discussed in the methodology. Note that Table 8 has already shown a definitive difference for both analyst variables in the population of Nikkei 225 earnings announcements from 2008-2022, and the bootstrapping results do not invalidate that result. However, the bootstrapping results suggest possible outcomes if similar firms were to be tested in future periods and/or in different jurisdictions.

The key result in Table 9 is that the confidence intervals for IFRS and Japanese GAAP overlap for both analyst variables. For example, the analyst magnitude variable for IFRS is 0.219 (higher than the respective Japanese GAAP variable of 0.157), but the confidence interval is 0.145 to 0.395. This confidence interval overlaps with the confidence interval for the respective GAAP variable, which is 0.110 to 0.235. Thus, in at least 5% of similar data sets, the correlation coefficient (R) could be higher for Japanese GAAP. This overlapping result is the same for the analyst qualitative variables.

5. Conclusion, Implication, and Limitation

The key conclusion illustrated in Table 8 is that IFRS financial statements in Japan have superior value relevance compared to Japanese GAAP statements in Japan. Null Hypothesis 1 is rejected; a statistically significant correlation exists between surprise earnings and abnormal returns. Null Hypothesis 2 is also rejected; the correlation coefficient (R) for IFRS firms is higher than for Japanese GAAP firms. This conclusion is based on earnings estimates using analyst expectations. This conclusion comes with the caveat that IFRS may be more favorable for healthcare firms. A second conclusion is the impressive strength of qualitative earnings surprise variables in explaining the variation in abnormal returns. The key implication is that the use of voluntary IFRS has increased the value of information content in Japan, which shows IFRS success in Japan and bodes well for the global use and proliferation of IFRS. Noted limitations are that the key conclusion may not persist in different periods/jurisdictions and that the key conclusion is biased by voluntary adoption. Future research opportunities identified are further analysis of qualitative variables and continuing research in Japan.

5.1 Superior Value Relevance of IFRS in Japan

The central conclusion is the superior value relevance of the IFRS firms, and the results in Table 8 support that conclusion. Based on the literature review and the earnings variable ranking tests, the decision of superior information content should be based on analyst variables; both are stronger for the IFRS firms than the Japanese GAAP firms; thus, this study concludes that IFRS financial statements have superior information content.⁴ This conclusion is supported by the results of Williams (2020) and Gu (2021). Thus, the third empirical study of IFRS in Japan concludes that IFRS has better outcomes than Japanese GAAP.

The results of the bootstrapping procedure illuminate a possible limitation of the persistence of this conclusion, but that does not diminish the conclusion here. This study

⁴ As discussed, the tests for industry biases showed a statistically significantly higher proportion of healthcare firms that chose IFRS, which suggests that the results could be partly due to IFRS being a better standard for healthcare firms. Indications that IFRS could be more favorable for communication services firms and less favorable for financial firms could also be factors in this conclusion.

examines every Nikkei 225 firm using IFRS since 2008 and every Nikkei 225 firm using Japanese GAAP since 2008 and finds better value relevance in that population of IFRS firms than the population of Japanese GAAP firms. The Nikkei 225 firms are representative of the Japanese economy, and thus, so are conclusions based on testing the Nikkei 225. This is an important finding for the future of IFRS in Japan and the IFRS literature overall. In 2018, then chairman of IASB, Hans Hoogervorst, noted that Japanese accounting regulators choose to 'let the market decide' which accounting standard is better (Hoogervorst, 2018), and this study shows that the market finds stronger value relevance in IFRS compared to Japanese GAAP.

5.2 Notable Strength of Qualitative Variables

A potentially important conclusion from this research is the strength of qualitative variables in measuring surprise earnings because qualitative variables are rarely used in the literature. The regression ranking test in Table 4 shows that all three qualitative variables are superior to the three magnitude variables. Additionally, the critical results in Table 8 show that all tested qualitative variables are stronger than the respective magnitude variables for both IFRS and Japanese GAAP firms. This finding is surprising because the contemporary value relevance literature is almost entirely based on magnitude variables that more precisely measure surprising earnings. Williams (2020) also found strong qualitative variables while studying the Nikkei 225; additionally, Williams (2020) found that qualitative variables performed better when studying IFRS firms vs. Japanese GAAP firms on the Tokyo Stock Exchange and Williams (2020) found a surprising strength in qualitative variables when studying firms on the London Stock Exchange before and after IFRS implementation in the United Kingdom. This finding may be due to the imperfect/low correlation between surprise earnings and abnormal returns and a possible non-linear relationship between surprise earnings and abnormal returns.

As examined in the Literature Review, the relationship between earnings and price has been found to be imperfect. Before 1968, earnings were considered meaningless numbers regarding price (Ball & Brown, 1968; Kothari, 2001). While that sentiment has changed, the literature does not claim that there is a perfect or even a strong

relationship between the two variables. Williams (2020) remarked that it is surprising that contemporary researchers have not looked at qualitative variables since quantitative variables provide only a small amount of explanatory value. Thus, Williams (2020) identified the use of qualitative variables as a promising area of future research, and the findings in this study confirm that conclusion by demonstrating that a qualitative, general statement of whether earnings have beaten or missed expectations provides more valuable information content than precise magnitude variables.

Also, as noted in the literature review, several studies find a non-linear relationship between surprise earnings and price. A non-linear relationship would explain an imperfect or low correlation. However, the past literature has failed to find the same type of non-linear relationship. Freeman and Tse (1992) found an S-shape relationship, Hayn (1995) and Basu (1997) found higher significance in losses and profits, respectively, and Griffin (1976) found that the higher magnitude data determined the correlations. This study and the result found by Williams (2020) suggest that a non-linear relationship that varies from study to study might be more successfully described with a qualitative variable. In other words, a qualitative earnings variable may be the best price predictor and essential for future value-relevance research.

5.3. Persistence Limitation of IFRS Superiority

The conclusion of IFRS value relevance superiority in this study is clear and definitive. The value relevance of IFRS firms is, in fact, higher than that of Japanese GAAP firms using the described methodology. However, the bootstrapping procedure illuminates the limitation that the results may have occurred randomly and that the same results may not persist in future periods and/or in similar accounting jurisdictions. The fact that both analyst variables show overlapping 95% confidence intervals suggests that similar studies would reach the opposite conclusion more than 5% of the time based on random chance. This limitation warrants future research to monitor ongoing results in Japan to see if more extended periods show different insights. But once again, this limitation does not diminish the conclusion of this study – the results so far show value relevance superiority for IFRS firms using this methodology. Additionally, this study

is future research recommended by Williams (2020); thus, the first study after Williams (2020) confirms superior value relevance in IFRS financial statements in Japan.

5.4. The Bias Limitation in Voluntary Adoption

The critical limitation of this study is that there is no evidence that the mandatory adoption of IFRS would benefit all or most firms. The firms in this study adopted IFRS voluntarily, and it stands to reason that these voluntary adopters are more likely to benefit from IFRS than those who choose Japanese GAAP. Some studies suggest inferior outcomes associated with the mandatory adoption of IFRS, such as Ahmed et al. (2013) and Lin et al. (2012), and some studies find decreased positive benefits of IFRS when adoption is mandatory, such as Daske et al. (2008) and Christensen et al. (2015). Thus, successful voluntary adoption does not necessarily support a move to mandatory adoption. Nonetheless, the conclusions in this study are valuable because they show that some companies benefited from better information content by being allowed to choose IFRS.

5.5. Future Research of Qualitative Variables

The finding of strong qualitative variables represents an important area for future research. Qualitative variables are generally not used in contemporary studies, but perhaps they should be. The literature shows that the relationship between earnings and returns is important but imperfect, and several studies have demonstrated non-linear associations between surprise earnings and abnormal returns. Thus, qualitative variables may become helpful in providing more insight when magnitude variables show weak correlations or when non-linear relationships complicate conclusions. Qualitative variables could be particularly useful if the type of non-linear relationship varies from study to study; in such cases, qualitative variables might help researchers arrive at more consistent conclusions.

5.6. Continuing Research in Japan

Williams (2020) cited continued research in Japan as the most important future research relevant to that study. Gu (2021) and this article have followed Williams (2020), but more research is necessary. Research using different methodologies and data might strengthen these initial studies or illuminate other, more important questions.

Japan represents a critical judgment point for IFRS accounting as it is the only environment that allows for a fair comparison of two accounting standards used by similar, large companies in the same period in a developed economy. The accounting world needs data from this unique accounting environment; additionally, Japanese regulators need data as they ponder the mandatory adoption of IFRS. Japanese firms need data to choose the best accounting standards for their company and investors. Proponents of worldwide IFRS will carefully note the success of IFRS in Japan; success in Japan could bring more IFRS to the world, which might bring more comparability and efficiency to the global economy.

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Appendix

Table 1.
Accounting Standard Usage of Nikkei 225 Firms from 2008 to 2022 by Earnings
Announcement Year

Year	Japanese GAAP Firms	US GAAP Firms	IFRS Firms	Totals
2008	198	27	0	225
2009	199	26	0	225
2010	198	25	1	224
2011	197	23	3	223
2012	196	22	6	224
2013	190	20	14	224
2014	182	16	27	225
2015	178	15	32	225
2016	170	14	41	225
2017	160	13	51	224
2018	150	8	67	225
2019	144	7	73	224
2020	142	8	75	225
2021	135	7	82	224
2022	121	7	66	194
Total:	2560	238	538	3336

Table 2.
Comparability Test Between Full Nikkei 225 Sample and Sub-Sample of IFRS Firms Based
on GICS Sectors: Proportion Difference Test

GICS Sector	GICS Sector Code	IFRS Count	IFRS %	Nikkei Count	Nikkei %	Proportion Difference	Standard Error	Z Statistic	P-Value
Energy	10	6	1.1%	42	1.2%	-0.1%	0.046	-0.028	0.977
Materials	15	41	7.6%	508	15.1%	-7.4%	0.044	-1.678	0.093
Industrials	20	152	28.3%	972	28.8%	-0.6%	0.039	-0.146	0.884
Consumer Discretionary	25	75	13.9%	435	12.9%	1.0%	0.043	0.241	0.809
Consumer Staples	30	54	10.0%	258	7.7%	2.4%	0.044	0.541	0.589
Health Care	35	84	15.6%	158	4.7%	10.9%	0.043	2.540	0.011
Financials	40	7	1.3%	295	8.7%	-7.4%	0.046	-1.623	0.105
Information Technology	45	58	10.8%	322	9.5%	1.2%	0.044	0.281	0.779
Communication Services	50	61	11.3%	148	4.4%	6.9%	0.044	1.581	0.114
Utilities	55	0	0.0%	75	2.2%	-2.2%	0.017	-1.306	0.191
Real Estate	60	0	0.0%	89	2.6%	-2.6%	0.017	-1.553	0.120
No GICS Data	N/A	0	0.0%	70	2.1%	-2.1%	0.017	-1.218	0.223
Total:		538		3372					

Table 3.
Comparability Test Between Full Nikkei 225 Sample and Sub-Sample of IFRS Firms Based on GICS Sectors: Chi-Square Goodness of Fit Test

GICS Sector	GICS Sector Code	IFRS Observed	IFRS %	Nikkei Count	Nikkei %	IFRS Expected	Chi-Square Statistic
Energy	10	6	1.1%	42	1.2%	6.7	0.073
Materials	15	41	7.6%	508	15.1%	81.1	19.791
Industrials	20	152	28.3%	972	28.8%	155.1	0.061
Consumer Discretionary	25	75	13.9%	435	12.9%	69.4	0.451
Consumer Staples	30	54	10.0%	258	7.7%	41.2	4.003
Health Care	35	84	15.6%	158	4.7%	25.2	137.111
Financials	40	7	1.3%	295	8.7%	47.1	34.108
Information Technology	45	58	10.8%	322	9.5%	51.4	0.854
Communication Services	50	61	11.3%	148	4.4%	23.6	59.194
Utilities	55	0	0.0%	75	2.2%	12.0	11.966
Real Estate	60	0	0.0%	89	2.6%	14.2	14.200
No GICS Data	N/A	0	0.0%	70	2.1%	11.2	11.168
Totals:		538		3372			292.982
Chi-Square P-Value:							4.729E-57

Table 4.
Ball & Brown Ranking Test with Full Nikkei 225 Sample: Regression Analysis Comparing the Strength of Various Earnings Calculation Methods as the Independent Variable and Abnormal Return as The Dependent Variable

Independent Variable	Rank	R	R²	Adj. R²	Std. Error Estimate	Coefficient (Un-Std.)	P-Value	Sample Size
Analyst Surprise Qualitative	1	0.285**	0.081	0.081	0.256	0.154	< 0.001	3299
Naïve Qualitative	2	0.235**	0.055	0.055	0.260	0.127	< 0.001	3317
Drift Adj. Qualitative	3	0.188**	0.035	0.035	0.263	0.101	< 0.001	3317
Analyst Surprise Magnitude	4	0.158**	0.025	0.025	0.264	0.011	< 0.001	3299
Drift Adj. Magnitude	5	0.129**	0.017	0.016	0.265	0.006	< 0.001	3317
Naïve Magnitude	6	0.123**	0.015	0.015	0.265	0.006	< 0.001	3317

**Statistically significant at the 1% level

Table 5.
Ball & Brown Ranking Test with Full Nikkei 225 Sample: Chi-Square Test for Independence
Between Native Earnings Qualitative Variable and Abnormal Return Qualitative Variable

Naïve Actuals	Positive Return	Negative Return	Total:
Positive Earnings	995	893	1888
Negative Earnings	474	955	1429
Total:	1469	1848	3317
Naïve Expected	Positive Return	Negative Return	
Positive Earnings	836	1052	
Negative Earnings	633	796	
Naïve Test Statistic	Positive Return	Negative Return	
Positive Earnings	30.18	23.99	
Negative Earnings	39.88	31.70	
	Chi-Square Test Statistic:		125.75**
	P-Value for Test Statistic:		3.48E-29

**Statistically significant at the 1% level

Table 6.
Ball & Brown Ranking Test with Full Nikkei 225 Sample: Chi-Square Test for Independence
Between Drift-Adjusted Earnings Qualitative Variable and Abnormal Return Qualitative
Variable

Drift Actuals	Positive Return	Negative Return	Total:
Positive Earnings	919	823	1742
Negative Earnings	550	1025	1575
Total:	1469	1848	3317
Drift Expected	Positive Return	Negative Return	
Positive Earnings	771	971	
Negative Earnings	698	877	
Drift Test Statistic	Positive Return	Negative Return	
Positive Earnings	28.21	22.42	
Negative Earnings	31.20	24.80	
	Chi-Square Test Statistic:		106.63**
	P-Value for Test Statistic:		5.36E-25

**Statistically significant at the 1% level

Table 7.

Ball & Brown Ranking Test with Full Nikkei 225 Sample: Chi-Square Test for Independence Between Analyst-Adjusted Earnings Qualitative Variable and Abnormal Return Qualitative Variable

Analyst Actuals	Positive Return	Negative Return	Total:
Positive Earnings	826	612	1438
Negative Earnings	636	1225	1861
Total:	1462	1837	3299
Analyst Expected	Positive Return	Negative Return	
Positive Earnings	637	801	
Negative Earnings	825	1036	
Analyst Statistic	Positive Return	Negative Return	
Positive Earnings	55.89	44.48	
Negative Earnings	43.19	34.37	
	Chi-Square Test Statistic:		177.94**
	P-Value for Test Statistic:		1.37E-40

**Statistically significant at the 1% level

Table 8.

Ball & Brown Contemporary Value Relevance with Various Earnings Methods Tested as a Predictor of Abnormal Return Comparing IFRS Firms and Japanese GAAP Firms on Nikkei 225 from 2008 to 2022 Earnings Announcements

	Earnings Calculation Method				Analyst	Analyst
	Naive Mag.	Naive Qual.	Drift Adj. Mag.	Drift Adj. Qual.	Surprise Mag.	Surprise Qual.
IFRS Correlation Coefficient (R)	0.092*	0.339**	0.074	0.163**	0.219**	0.330**
IFRS R²	0.85%	11.49%	0.55%	2.66%	4.80%	10.89%
IFRS Significance	3.40%	< 0.1%	8.70%	< 0.1%	< 0.1%	< 0.1%
IFRS Sample Size	538	538	538	538	538	538
JGAAP Correlation Coefficient (R)	0.122**	0.214**	0.131**	0.196**	0.157**	0.251**
JGAAP R²	1.49%	4.58%	1.72%	3.61%	2.46%	6.30%
JGAAP Significance	< 0.1%	< 0.1%	< 0.1%	< 0.1%	< 0.1%	< 0.1%
JGAAP Sample Size	2511	2511	2511	2511	2511	2511

**Statistically significant at the 1% level

*Statistically significant at the 5% level

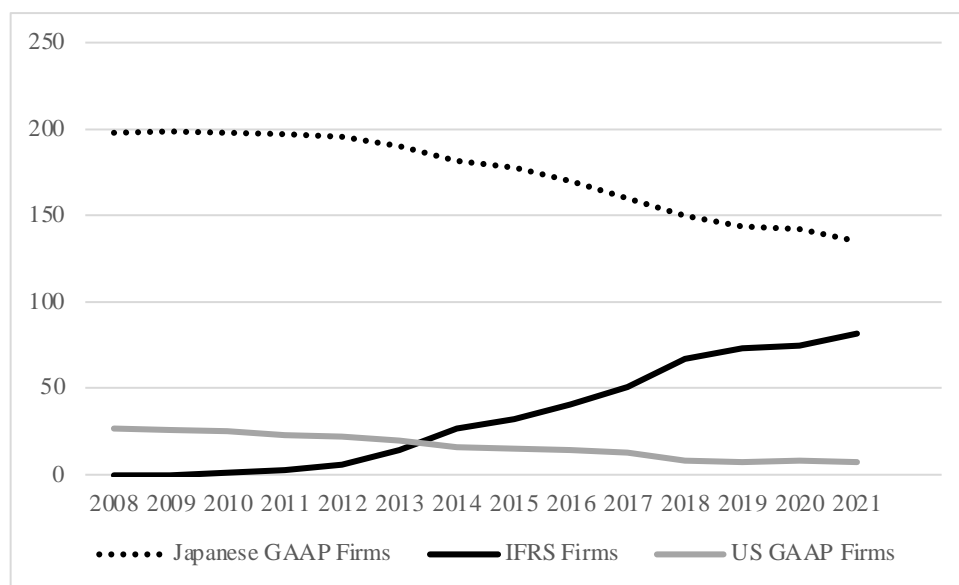
Table 9.
Ball & Brown Contemporary Value Relevance with Various Earnings Methods Tested as a Predictor of Abnormal Return with Bootstrapping Confidence Intervals Comparing IFRS Firms and Japanese GAAP Firms on Nikkei 225 from 2008 to 2022

	Earnings Calculation Method																	
	Naive Mag.			Naive Qual.			Drift Adj. Mag.			Drift Adj. Qual.			Analyst Mag.			Analyst Qual.		
	R	Lower 95%	Upper 95%	R	Lower 95%	Upper 95%	R	Lower 95%	Upper 95%	R	Lower 95%	Upper 95%	R	Lower 95%	Upper 95%	R	Lower 95%	Upper 95%
IFRS Correlation	0.092*	0.012	0.203	0.339**	0.273	0.404	0.074	-0.002	0.178	0.163**	0.082	0.242	0.219**	0.145	0.395	0.330**	0.250	0.404
IFRS R²	0.85%			11.49%			0.55%			2.66%			4.80%			10.89%		
IFRS Significance	3.40%			< 0.1%			8.70%			< 0.1%			< 0.1%			< 0.1%		
IFRS Sample Size	538			538			538			538			538			538		
JGAAP Correlation	0.122**	0.094	0.178	0.214**	0.179	0.245	0.131**	0.104	0.194	0.196**	0.163	0.231	0.157**	0.110	0.235	0.251**	0.218	0.285
JGAAP R²	1.49%			4.58%			1.72%			3.61%			2.46%			6.30%		
JGAAP Significance	< 0.1%			< 0.1%			< 0.1%			< 0.1%			< 0.1%			< 0.1%		
JGAAP Sample Size	2511			2511			2511			2511			2511			2511		

**Statistically significant at the 1% level

*Statistically significant at the 5% level

Figure 1
Accounting Standard Usage of Nikkei 225 Firms from 2008 to 2021 by Year



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