Changes in Earnings Synchronicity over the Last 30 Years : Preliminary Evidence from Japan*

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Abstract

This study investigates historical trends of earnings synchronicity for Japanese firms over the last 30 years. Using a sample of 717 Japanese firms from 1980 through 2011, we find that earnings synchronicity is prone to increase over time. Specifically, manufacturers show higher earnings synchronicity than non-manufacturers. We also document that earnings synchronicity is higher for large firms than medium and small firms. We further find that this tendency has been more prominent since 2008. Finally, we examine whether these trends are related to the globalization of Japan's accounting standards, which largely incorporate fair value to measure assets and liabilities. To examine the influences of fair value accounting, we compare earnings synchronicity of net income and comprehensive income. We find that the degree of comprehensive income explained by the market and industry factors is greater than that of net income. These findings imply that the recent tendency of higher earnings synchronicity can be explained by the convergence of Japanese accounting rules into IFRS, which is a fair value-oriented accounting regime. Our findings provide novel evidence that increases in earnings synchronicity are associated with accounting globalization.

Keywords: earnings synchronicity; Japan

1. Introduction

This study investigates whether earnings synchronicity has changed over time. Our inquiry is motivated by recent earnings quality research. By and large, the literature reports that earnings quality has changed over time. Specifically, the evidence shows that two earnings quality measures (earnings persistence and matching between concurrent revenues and expenses) have declined for a couple of decades, mainly because of accounting and economic factors. In this paper, we focus on earnings synchronicity as another earnings quality measure, and examine whether earnings synchronicity has increased over the past three decades in Japan.

Our sample consists of 717 Japanese firms from 1980 through 2011. Using this sample, we measure earnings synchronicity based on the adjusted R-square from the rolling regression of an individual firm's ROE change on market wide and/or industry wide ROE changes. We find that earnings synchronicity is likely to increase over time. Specifically, the tendency has become more prominent since 2008.

We predict that earnings synchronicity is related to Japanese firms' economic and information environments. The phenomena might be different from the industrial sector that each firm belongs to. Therefore, we separate

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the sample into manufacturers and non-manufacturers, and examine whether the two groups' earnings synchronicity show similar results to the full sample. We expect that earnings synchronicity of manufacturers tends to be higher than non-manufacturers, because manufacturers might mimic more competitors' products and strategies than non-manufacturers. Also, the spillover of technology and information through labor might be more useful for manufacturers than non-manufacturers. We find that manufacturing firms' earnings synchronicity is higher than non-manufacturing firms, which is consistent with our prediction.

As Brown and Kimbrough (2011) show, a large firm's business activities might induce similar strategies. This factor might lead to higher earnings synchronicity for larger firms. Therefore, we classify the total sample into low 30 % (Small), middle 40 % (Medium), and high 30% (Large) based on market value and observe how earnings synchronicity has varied over the past thirty years. Our findings show that earnings synchronicity is higher for large firms than medium and small firms. Specifically, after 2008 the tendency is more apparent.

In addition to economic and information environments, the changes in Japan's accounting rules may be related to the increase in earning synchronicity over time. For example, Lang et al. (2010) show that after the adoption of IFRS earning synchronicity increases. It might be that our findings are explained by accounting factors. In Japan, since the late 1990s, the convergence of Japan's accounting standards into IFRS has been accelerated. Specifically, the Accounting Standards Board of Japan (ASBJ) has dealt with the convergence of Japanese GAAP into IFRS to meet the EU's assessment on the equivalence of Japan's accounting standards in 2004 and has announced the achievements in the convergence of accounting rules with the IASB under their August 2007 Memorandum of Understanding (MoU), known as the Tokyo Agreement. These two decisions by the ASBJ accelerated the convergence of Japanese GAAP into IFRS, which may influence earnings synchronicity in Japan.

As part of convergence, fair value based measurements have been introduced into Japan's accounting standards and have had a certain impact on earnings. To focus on the fair value influence on earnings, we compare the synchronicity with regard to net income and comprehensive income based on a pooled sample from 2002 to 2010. We predict that comprehensive income might be better explained by market and industrial factors than net income. Our findings are consistent with our predictions. That is, the degree of comprehensive income explained by market and industry factors is greater than that of net income. These findings imply that the recent tendency of higher earnings synchronicity can be partially explained by the convergence of Japan's accounting standards into IFRS.

Our study contributes to the literature as follows. First of all, most prior studies regarding synchronicity focus on stock return synchronicity and there is scant research that deals with earnings synchronicity. Specifically, there is no research on Japanese data, at least as much as we know. In addition, we observe the changes in earnings synchronicity over three decades. There are no prior studies investigating the historical trends on earnings synchronicity. Also, we indicate that earnings synchronicity is related not only to Japanese firms' economic and information environments but also to accounting standards changes.

The remainder of this paper is organized as follows: Section 2 summarizes the literature. Section 3 describes the measurement of variables and section 4 presents sample selection. Section 5 contains our empirical results and section 6 presents robustness analysis. Section 7 concludes.

2. Prior Research

2.1 Earnings Quality

Recent empirical studies in Japan and the United States provide evidence that earnings quality has

significantly changed over the last few decades[1]. For example, DeAngelo et al. (2004) demonstrate that while few firms with high earnings are likely to pay a large dividend to stockholders, the majority of firms are not able to earn enough and pay no dividend. They see this phenomenon occur a great deal over the last two decades.

Fama and French (2004) find that ROA has a left skewed distribution and the total assets growth rate has become more right skewed in recent years. They interpret that these phenomena are attributed to a few firms with extremely high growth rates and poor performance, as a result of a significant increase in IPO. Burgstahler and Dichev (1997) also show that there is a remarkable left skewed earnings distribution in more recent periods.

Hayn (1995) and Collins et al. (1999) demonstrate that U.S. firms tend to report negative earnings rather than positive earnings in the time series. Elliott and Hanna (1996) show that firms repeatedly report enormous special losses in excess of 1% of the total assets and the frequency has increased. This tendency is consistent with the increase of corporate restructuring in the 1980s. In addition, they find that the distribution of special items is asymmetric, that is, the frequency of special losses is higher than that of special gains.

Collins et al. (1997) present evidence that the frequency of firms that report negative earnings and/or the proportion of one-time items to earnings has dramatically increased. Basu (1997), Givoly and Hayn (2000), Holthausen and Watts (2001), and Ryan and Zarowin (2003) show that the degree of conservatism has increased over time. Dichev and Tang (2008) find that as the contemporaneous correlation between revenues and expenses becomes weaker over time, earnings volatility has increased and earnings persistence has decreased. They observe that this trend has become more salient recently. Donelson et al. (2011) argue that these phenomena result from the increase in special items due to more intensive competition among firms.

From the perspective of the value relevance of the accounting information, Collins et al. (1997) find that although the incremental value relevance of earnings has decreased over time, it has been replaced by swelling the value relevance of the book values of equity. They report that the value relevance of earnings and book values have, on the whole, not decreased in the past 40 years. They further demonstrate that this shift in value relevance from earnings to book values results from the increase in the frequency and magnitude of one-time items and in the frequency of reporting negative earnings, the increase in the proportion of small-scale firms, and in the importance of intangible assets.

Francis and Schipper (1999) find that the explanatory power has decreased over time in regressing stock returns on earnings level and its change. On the other hand, they observe that the explanatory power increased in regressing stock price on the book values of assets and liabilities or earnings and the book values of equity.

In contrast, Brown et al. (1999) find that, after deflating both the dependent and independent variables by the beginning-of-year stock price, the extent to which the stock price could be explained by earnings and book values of equity has decreased over time. Lev and Zarowin (1999) also indicate that the extent to which stock returns and stock prices could be explained by earnings, cash flow, and book value of equity has decreased. They attribute these phenomena to fast changing business environments.

On the other hand, when Landsman and Maydew (2002) investigate abnormal stock price volatility and trading volume response to earning announcements over the past three decades and they find that these responses are likely to increase over time. Francis et al. (2002a, b) report that the short-term market reaction to earnings announcements has increased over time, because of the increasing amount of concurrent information disclosed in earnings announcements.

Focusing on the Japanese setting, we observe similar trends as in the U.S. For example, Usui (1999) finds that the value relevance of earnings and book values of equity, by and large, has not declined in the past 20 years, but

[1] See Schipper and Vincent (2003), Francis et al. (2006), and Dechow et al. (2010) for an insightful discussion on earnings quailty.

rather have been likely to increase. Furthermore, the value relevance of book values has increased even more than earnings because of the increase in the number of firms reporting negative earnings. Kimura and Asano (2005) and Otogawa and Takada (2005) observe Japanese firms that report large special items have significantly increased. Otogawa (2008) finds that earnings persistence for Japanese firms has decreased on average. Kagaya (2011) finds that the concurrent relationship between revenues and expences has decreased in Japan as well, although the degree is less than in Anglo-Saxon countries. Usui (2013) shows that, over the past 25 years, both short-term stock price responses and trading volume responses to earnings announcements are prone to increase, and that, specifically since 2000, stock trading volume has become concentrated immediately after earnings announcements.

In sum, prior studies find that the various earnings attributes have changed over time. However, there is no consensus about whether they are caused by changes in the economic environments surrounding firms or by the convergence of accounting standards that emphasize fair value mesurements.

2.2 Earnings Synchronicity

Synchronicity is referred to as the proportion to which firm-specific economic indices (such as stock return and accounting income) could be explained by market- and industry- common factors[2]. Earnings synchronicity is defined as the extent to which a firm's earnings performance is defined by market- and industry- level factors (Brown and Ball 1967; Gonedes 1973; Magee 1974). When a firm's earnings have high covariance with the earnings of its peer firms, it is defined as having high earnings synchronicity (Gong et al. 2013).

The concept of synchronicity itself is not especially novel in empirical research. For example, King (1966) indicates that, on average, 50% of the stock returns of individual firms could be explained by market factors and that another 10% could be explained by industry factors. Furthermore, when he separates the sample into 4 subsamples (June 1927-September 1935, October 1935-February 1944, March 1944-July 1952, August 1952-December 1960), the proportion of individual firms' stock prices that could be explained by market factors is likely to decrease in the latter period of 1927-1960. On the other hand, Brown and Ball (1967) find that approximately 35%-40% of individual firms' annual earnings could be explained by the average earnings of all firms in the whole economy, and that an additional 10%-15% could be explained by the average earnings of other firms in the same industry. They also show that in comparison to operating income, a higher proportion of net income could be explained by the average of all firms in the market and the average of other firms in the same industry.

Gonedes (1973) reports that market wide factors are statistically important determinants of individual firms' sales and net income[3]. When Magee (1974) uses narrower industry classifications (a four-digit rather than two-digit code), he finds that the proportion of individual firms' annual earnings explained by industry factors is almost the same level as those by market factors. Roll (1988) shows that the proportion of individual firms' monthly stock returns explained by market factors is approximately 30%, and that the explanatory power increases by only 5% with industry factors added. Furthermore, the proportion of stock returns explained by industry and market wide factors slightly increase when excluding the period of time that has news reported by the *Wall Street Journal* and such media. Therefore, he concludes that psychologically biased traders, and traders relying on private information that is different from public information, might have a large impact on the results.

After Roll (1988) finds that most stock returns are explained by firm-specific factors, studies that focus on

[2] Some prior studies use the terms co-movement and commonality instead of synchronicity.
[3] Gonedes (1973) calculates the average income of the market as a whole by using average and weighted average. He uses the level of and the first difference of sales and net income.

stock returns synchronicity (or stock return synchronicity) increase. For example, Morck et al. (2000) indicate that stock return synchronicity is significantly higher in developing countries with lower per capita GDP. Even after the factors that explain the economic structure of each country are controlled by the number of listed stocks, the dispersion of GDP growth rates, a country's geographical size, the degree of concentration in certain types of industries or companies, earnings synchronicity, and so on, this phenomena is still observed. Moreover, stock return synchronicity is likely to be higher in countries where private property rights are not respected, and in developed countries where public shareholders have weaker legal protection against corporate insiders. They conjecture that, in such countries, arbitrage transactions cause stock prices to insufficiently reflect individual firms' information, and that the influence of noise traders becomes strong. They also find that when analyzing the U.S. stock market from 1926 to 1995, the proportion of stock returns explainable by market factors has decreased chronologically. Durnev et al. (2003) find that the more firms' and industries' stock returns could not be explained by market factors, the stronger the relationship between current returns and future earnings is. Therefore, they conclude that firm specific return fluctuation reflects market efficiency. They also find that such relationships are likely to increase chronologically in the period from 1983 to 1995.

Piotroski and Roulstone (2004) investigate the influences of three informed market participants, namely financial analysts, institutional investors, and insiders (the firm's executives and directors), on stock return synchronicity. Stock return synchronicity is higher when active analysts issue eanings forecasts and subsequently revise their earnings forecast, and lower when stock buying and selling by insiders is active. However, they do not discover a consistent relationship between stock return synchronicity and increases or decreases in stock holdings by institutional investors. As a whole, they interpret that although all market participants influence the informational efficiency of a firm's stock price with respect to firm-specific information, the types of information conveyed by their trading varies. Specifically, financial analysts are quick to incorporate the industry and market level information into stock prices, and insiders are encouraged to incorporate firm specific information into stock prices.

Kim and Shi (2012) demonstrate that stock return synchronicity is significantly lower for firms with voluntary IFRS adoption than for firms with non-adoption. They also find that in regard to IFRS adopters stock return synchronicity significantly decreases from the pre-adoption period to the post-adoption period. That is, voluntary IFRS adoption encourages to the inclusion of firm specific information in stock prices. They further indicate that stock return synchronicity significantly decreases (increases) for voluntary IFRS adopters with high (low) analyst coverage and increases (decreases) for firms in countries with weaker (stronger) regulations of domestic accounting standards, governance, and investor protection.

In comparison to research focusing on stock return synchronicity, there are few studies that examine eanings synchronicity in recent years. Lang et al. (2010) find that earnings synchronicity significantly increases for IFRS adopters. Brown and Kimbrough (2011) focus on the impact of intangible investment on earnings synchronicity. They find that earnings synchronicity decreases for firms with high intangible asset concentration (the proportions of both intangible assets reported in the balance sheet and R&D assets, which are hypothetically calculated under certain assumptions). Thus, intangible investments enable discrimination among competing firms. Furthermore, the effect of separately identifiable intangible assets (patent rights, copyright, and the like) on earnings synchronicity is stronger than either goodwill or R&D assets. They also indicate that the impact of R&D assets on earnings synchronicity is stronger in industries where R&D innovations are effectively protected by patents and other legal regulations.

Gong et al. (2013) report that managers in firms with low earning synchronicity tend to disclose management earnings forecasts voluntarily, especially long-term earnings forecasts, to alleviate the information asymmetry between management and investors and the cost of acquiring information from outsiders. The negative

relationship between earnings synchronicity and managements' propensity to disclose long term earnings forecasts is weaker when earnings is reliably predicted by the firm's own historical earnings data and stronger for firms with higher institutional ownership and greater analyst coverage. They also find that the management forecast accuracy of firms with low earnings synchronicity is higher than investors' earnings expectations; therefore, stock price reaction to management earnings forecasts becomes stronger.

In this paper, we focus on earnings synchronicity as one of the mesurements of earnings quality and we examine whether earnings synchronicity has increased over time.

3. Measurement of Earnings Synchronicity

This paper focuses on the time series changes of earnings synchronicity. To measure earnings synchronicity, we use the adjusted R-square from the regression estimates of the following equation (1) in the first difference form, following Gonedes (1973) and Magee (1974)[4].

$$\Delta ROA_{i,t} = \alpha_0 + \alpha_1 \quad \Delta MKTROA_{i,t} + \alpha_2 \Delta INDROA_{i,t} + \varepsilon_{i,t} \qquad (1)$$

where $\Delta ROA_{i,t}$ is the first difference of return on assets for firm i in year t which is measured as reported net income, deflated by the beginning-of-year total assets. $\Delta MKTROA_{i,t}$ is the first difference of the weighted-average ROA recorded in year t by all firms as recorded in the database described in the following section. We exclude firm i and other firms classified in the same industry as firm i based on the Nikkei middle classification. $\Delta INDROA_{i,t}$ is the first difference of the weighted average ROA in year t of all firms contained in the same database and classified as being in the same industry group as firm i. For each firm-year, we use nine year data from t-8 to t to estimate the eqauation (1).

4. Samples and Data

From the Nikkei NEEDS business financial data provided by the Nihon Keizai Shinbun Digital Media Company, we first collect financial statements data during the period from 1980 to 2011. When consolidated financial statements are not available, parent-only financial statements are used. To be included in the final sample, we require all firms to have their fiscal year ending in March throughout the sample period. To calculate market and industry wide values for ROA, we require at least ten firms data to be available. We eliminate firms in the financial sector, such as banks, securities, insurance, and other finance industries. In addition, we obtain the data of stock price and the number of shares outstanding from the Japanese Daily Stock Return Data produced by the Financial Data Solutions Inc. After obtaining all the data necessary for our analyses, our full sample consists of 717 Japanese firms. Table 1 presents the sample distribution based on the Nikkei two-digit industrial codes.

Table 1

From Table 1, we see that the representative industries consist of electric and electronic equipment (12%), machinery (11%), wholesale trade (10%), and construction (9%). Our sample has a comparable distribution to

[4] Gonedes (1973) reports that the model in first-difference form estimated under the equity weighted index scheme is the most descriptively valid. Kim and Shi (2012) include lagged variables into their regression model to control potential autocorrelation problems.

firms included in the above database.

5. Empirical Results

5.1 Baseline Results

For each firm-year, we estimate the equation (1) using rolling nine year windows (*t-8* through *t*). As we calculate ROA by dividing earnings by the beginning-of-year total assets, and adopt the first difference form to estimate earnings synchronicity, the current year and previous ten year data are necessary to estimate it for each firm-year. Table 2 shows the descriptive statistics of estimation results over the period from 1990 to 2011. Panel A of Table 2 indicates that the mean and median earnings synchronicity, which is measured as $adj.R^2$ in equation (1), includes both market and industrial wide factors. The mean (median) value is 0.096 (0.049) in 1990 and 0.376 (0.186) in 2011. As a whole, earnings synchronicity is likely to increase with time. By regressing yearly mean earnings synchronicity on a time trend variable, we obtain the following result:

$$\text{Full sample: Mean Earnings Synchronicity}_t = \underset{(t=6.588)}{0.097} + \underset{(4.497)}{0.005}\ \text{TIME}_t \qquad adj.\ R^2 = 0.478$$

where TIME = 1, ..., 22, corresponding to the years from 1990 to 2011. The coefficient on TIME is 0.005, and significantly positive. This result suggest that the earnings synchronicity has on average increased over time.

Panel B (C) indicates the estimated results of equation (1) excluding industry wide factors (market wide variable). Although not shown, the time trend regressions exhibit the same results as Panel A.

Table 2
Fig.1

5.2 Results Based on Manufacturers and Non-manufacturers

Eanings synchronicity might be different among industries. Therefore, we separate the full sample into manufacuturers and non-manufacturers, and then examine whether the two groups' earnings synchronicity shows similar trends to each other. We expect that earnings synchronicity of manufacturers tends to be higher than non-manufacturers, because manufacturers might mimic more competitors' products and strategies than non-manufacturers. Also, the spillover of technology and information through labor might be more useful for manufacturers than non-manufacturers.

The results presented in Table 3 show that manufacturing firms' earnings synchronicity is higher than non-manufacturing firms, which is consistent with our prediction. Specifically, Fig. 2 shows that after 2008, the difference between the two groups is more prominent. We estimate the time trend regression separately for manufacturers and non-manufacturers:

$$\text{Manufacturers: Mean Earnings Synchronicity}_t = \underset{(t=6.829)}{0.124} + \underset{(3.810)}{0.005}\ \text{TIME}_t \qquad adj.\ R^2 = 0.392$$

$$\text{Non-Manufacturers: Mean Earnings Synchronicity}_t = \underset{(t=2.177)}{0.045} + \underset{(2.913)}{0.005}\ \text{TIME}_t \qquad adj.\ R^2 = 0.478$$

As the coefficients on TIME are significantly positive, the upward trend in earnings synchronicity is observed for both manufacturing and non-manufacturing firms.

Table 3
Fig.2

5.3 Results Based on Firm Size

As Brown and Kimbrough (2011) shows, large firms' business activities might induce similar strategies. This might lead large firms to have more earnings synchronicity. Therefore, we classify the full sample into low 30% (Small), middle 40% (Medium), and high 30% (Large) based on market values at the end of March 2011, and observe how earnings synchronicity varies over the past 30 years. As we expect, Table 4 shows that earnings synchronicity is higher for large firms than for medium and small firms. This finding is consistent with the result of Brown and Kimbrough (2011). Specifically, after 2008 the tendency is more salient. We estimate the time trend regression separately for large, middle, and small firms:

$$\text{Large Firms: Mean Earnings Synchronicity}_t = \underset{(t=8.430)}{0.153} + \underset{(4.524)}{0.006}\ \text{TIME}_t \quad adj.\ R^2 = 0.481$$

$$\text{Middle Firms: Mean Earnings Synchronicity}_t = \underset{(t=5.147)}{0.085} + \underset{(3.941)}{0.005}\ \text{TIME}_t \quad adj.\ R^2 = 0.409$$

$$\text{Small Firms: Mean Earnings Synchronicity}_t = \underset{(t=3.954)}{0.056} + \underset{(3.606)}{0.004}\ \text{TIME}_t \quad adj.\ R^2 = 0.364$$

As the coefficients on TIME are all significantly positive, the upward trend in earnings synchronicity is observed for large, middle, and small firms.

Table 4
Fig.5

5.4 Impact of Fair Value Measurement

By and large, we find that earnings synchronicity has increased over time. It is conceivable that the influence of fair value accounting has increased because of the convergence of Japanese accounting standards into IFRS. As is well known, market value is largely incorporated in measurement attributes under fair value accounting. Therefore, it is possible that earnings synchronicity increases under a fair value-oriented accounting regime. For example, Lang et al. (2010) find that after the adoption of IFRS, adopters' earnings synchronicity significantly increases. On the other hand, they find that there is little difference between the adopter and non-adopters for cash flow synchronicity. Therefore, they conclude that earnings synchronicity primarily arises from accruals.

Based on their assertion, we explore the reason why earnings synchronicity has recently increased in Japan. Specifically, we compare earnings synchronicity with regard to net income and comprehensive income. Japanese GAAP did not require firms to disclose comprehensive income until 2011. During the period from

2002 to 2011, we calculate as-if comprehensive income by adding change in unrealized gains and losses on available-for-sale securities, foreign translation adjustments, and deferred hedge gains and losses into net income.[5] In this section, the sample consists of 2,081 Japanese firms which have fiscal years ending in March throughout the above period. Because changes in stock prices and foreign currency rates are incorporated in comprehensive income, we predict that the synchronicity of comprehensive income might be more explained by market and industrial factors than that of net income.

Table 5

As we adopt the first difference form, we use nine years (2003-2011) net income or comprehensive income data to estimate equation (1) for each firm. Panel A of Table 5 shows the estimation results of equation (1). Panel B (C) reports the results of excluding industry (market) factors from equation (1). The mean (median) difference of earnings synchronicity between net income and comprehensive income is 0.105 (0.086) in Panel A, 0.100 (0.063) in Panel B, and 0.108 (0.063) in Panel C. The t-statistic (z-statistic) based on a t-test (Wilcoxon signed rank) indicates that earnings synchronicity is significantly different between net income and comprehensive income, that is, the degree of comprehensive income explained by the market and industry factors is significantly greater than net income. These findings imply that the recent tendency of higher earnings synchronicity can be explained by the convergence of Japanese accounting rules into IFRS, which is a fair value-oriented accounting regime.

6. Concluding Remarks

We examine whether earnings synchronicity has changed over time. As a whole, the literature reports that earnings quality, such as earnings persistence and matching between concurrent revenue and expenses, has changed over time. Specifically, the evidence shows that earnings quality has declined for a couple of decades, mainly because of changing economic environments and accounting rules. In this paper, we regard earnings synchronicity as one measure of earnings quality, and investigate whether the synchronicity has changed over the last three decades in Japan. We find that earnings synchronicity has increased over time. Specifically, the tendency has become prominent since 2008.

Next, we investigate whether earnings synchronicity is related to Japanese firms' economic and information environments. For example, the phenomena might be different among industries or between large firms and small firms. Separating our sample into manufacturers and non-manufacturers, we examine whether the two groups' earnings synchronicity show a similar trend to each other. We find that manufacturing firms' earnings synchronicity is higher than that for non-manufacturing firms. Moreover this gap has widened markedly since 2008.

Third, we classify the full sample into low 30% (Small), middle 40% (Medium), and high 30% (Large) based on market values, and observe how earnings synchronicity has changed over time. We find that earnings synchronicity is higher for large firms than for medium and small firms. This gap has also widened markedly since 2008. Thus, we find that earnings synchronicity has increased over time for all subsamples, although to a greater or lesser extent.

Finally, we examine whether accounting standards changes are related to time series increases in earnings

[5] We calculate as -if comprehensive income from 2002 because Japanese GAAP requires firms to measure available-for-sale securities at market value, and to directly record these valuation differences, including foreign translation adjustments, in the net aseets section of the balance sheet since March 2001.

synchronicity. In Japan, since the late 1990s, the convergence of Japan's accounting standards into IFRS has rapidly increased. These rule changes may have accelerated market value's impacts on reported earnings. To examine these influences, we compare the earnings synchronicity between net income and comprehensive income. We find that the degree of comprehensive income explained by market and industry factors is significantly higher than net income. These findings imply that the recent tendency of higher earnings synchronicity can be explained by the convergence of Japanese accounting rules into IFRS.

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Table 1 Sample distribution

Industry Code	Industry Name	Total Firm-years	%	Industry Code	Industry Name	Total Firm-Years	%
1	Foods	31	4	37	Mining	0	0
3	Textile Products	14	2	41	Construction	65	9
5	Pulp & Paper	6	1	43	Wholesale Trade	75	10
7	Chemicals	63	9	45	RetailTrade	0	0
9	Drugs	15	2	47	Banks	0	0
11	Petroleum	0	0	49	Securities	0	0
13	Rubber Products	10	1	51	Insurance	0	0
15	Stone, Clay & Glass Products	20	3	52	Credit & Leasing	0	0
17	Iron & Steel	30	4	53	Real Estate	12	2
19	Non ferrous Metal & Metal Products	41	6	55	Railroad Transportation	25	3
21	Machinery	82	11	57	Trucking	15	2
23	Electric & Electronic Equipment	83	12	59	Sea Transportation	12	2
25	Shipbuilding & Repairing	0	0	61	Air Transportation	0	0
27	Motor Vehicles & Auto Parts	38	5	63	Warehousing & Harbor Transportation	22	3
29	Transportation Equipment	7	1	65	Communication Services	0	0
31	Precision Equipment	13	2	67	Utilities - Electric	0	0
33	Other Manufacturing	16	2	69	Utilities - Gas	0	0
35	Fish & Marine Products	0	0	71	Services	22	3

Table 2 Earnings synchronicity based on full sample

Year	Mean	Std. Dev.	1st Q	Median	3rd Q	Obs.
Panel A. Market Factor and Industry Factor						
1990	0.096	0.299	-0.175	0.049	0.315	717
1991	0.105	0.305	-0.156	0.061	0.317	717
1992	0.135	0.313	-0.128	0.088	0.369	717
1993	0.140	0.317	-0.125	0.102	0.380	717
1994	0.137	0.315	-0.121	0.083	0.363	717
1995	0.132	0.302	-0.118	0.091	0.364	717
1996	0.132	0.310	-0.139	0.115	0.371	717
1997	0.112	0.312	-0.164	0.079	0.349	717
1998	0.077	0.297	-0.176	0.019	0.303	717
1999	0.109	0.295	-0.142	0.086	0.315	717
2000	0.136	0.323	-0.143	0.103	0.382	717
2001	0.169	0.324	-0.109	0.144	0.426	717
2002	0.230	0.351	-0.082	0.199	0.535	717
2003	0.212	0.351	-0.103	0.190	0.483	717
2004	0.192	0.341	-0.119	0.186	0.455	717
2005	0.169	0.338	-0.121	0.131	0.435	717
2006	0.146	0.331	-0.142	0.104	0.406	717
2007	0.142	0.330	-0.142	0.089	0.408	717
2008	0.150	0.338	-0.148	0.105	0.422	717
2009	0.232	0.370	-0.098	0.210	0.545	717
2010	0.224	0.371	-0.114	0.176	0.545	717
2011	0.222	0.376	-0.119	0.186	0.549	717

Table 2 (continued)

Panel B. Market Factor Only						
1990	0.054	0.204	-0.107	-0.014	0.160	717
1991	0.054	0.206	-0.115	-0.020	0.164	717
1992	0.089	0.231	-0.103	0.020	0.217	717
1993	0.115	0.252	-0.105	0.029	0.287	717
1994	0.095	0.233	-0.102	0.027	0.231	717
1995	0.099	0.235	-0.101	0.026	0.244	717
1996	0.121	0.246	-0.097	0.044	0.284	717
1997	0.101	0.242	-0.106	0.012	0.262	717
1998	0.064	0.215	-0.111	-0.013	0.173	717
1999	0.081	0.218	-0.102	0.021	0.210	717
2000	0.089	0.224	-0.103	0.023	0.238	717
2001	0.099	0.226	-0.098	0.043	0.239	717
2002	0.181	0.282	-0.076	0.123	0.376	717
2003	0.163	0.278	-0.094	0.090	0.385	717
2004	0.143	0.269	-0.099	0.066	0.335	717
2005	0.128	0.259	-0.098	0.053	0.298	717
2006	0.115	0.253	-0.103	0.031	0.287	717
2007	0.110	0.256	-0.106	0.017	0.278	717
2008	0.114	0.262	-0.108	0.023	0.274	717
2009	0.191	0.317	-0.098	0.086	0.438	717
2010	0.175	0.307	-0.101	0.077	0.423	717
2011	0.175	0.316	-0.109	0.053	0.437	717

Table 2 (continued)

Panel C. Industry Factor Only						
1990	0.081	0.234	-0.105	-0.007	0.211	717
1991	0.081	0.239	-0.111	-0.009	0.209	717
1992	0.098	0.248	-0.104	0.018	0.232	717
1993	0.121	0.251	-0.096	0.041	0.283	717
1994	0.121	0.250	-0.094	0.046	0.279	717
1995	0.114	0.244	-0.096	0.040	0.271	717
1996	0.112	0.242	-0.097	0.029	0.271	717
1997	0.090	0.231	-0.104	0.016	0.235	717
1998	0.066	0.218	-0.110	-0.017	0.185	717
1999	0.089	0.232	-0.108	0.011	0.227	717
2000	0.096	0.246	-0.108	0.010	0.222	717
2001	0.097	0.253	-0.111	0.003	0.250	717
2002	0.123	0.274	-0.107	0.017	0.283	717
2003	0.108	0.269	-0.110	0.002	0.253	717
2004	0.112	0.267	-0.108	0.016	0.265	717
2005	0.104	0.265	-0.116	0.007	0.253	717
2006	0.089	0.258	-0.116	-0.016	0.232	717
2007	0.086	0.255	-0.119	-0.008	0.220	717
2008	0.088	0.259	-0.117	-0.017	0.211	717
2009	0.187	0.316	-0.082	0.059	0.422	717
2010	0.185	0.318	-0.087	0.065	0.428	717
2011	0.197	0.321	-0.090	0.076	0.439	717

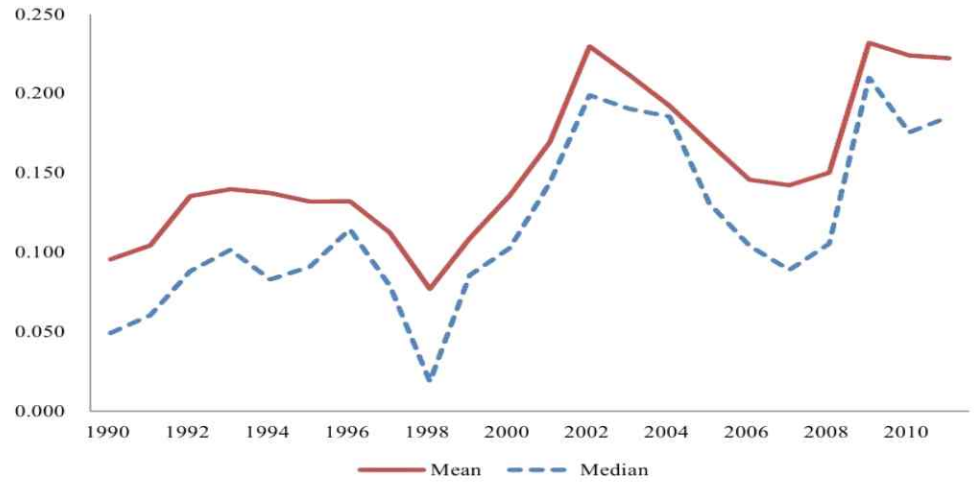

Fig. 1 The increase of earnings synchronicity

Table 3 Earnings synchronicity based on manufacturing and non-manufacturing firms

Year	Manufacturing Firms			Non-Manufacturing Firms		
	Obs.	Mean	Median	Obs.	Mean	Median
1990	469	0.127	0.088	248	0.037	-0.025
1991	469	0.135	0.097	248	0.046	0.003
1992	469	0.173	0.161	248	0.064	0.010
1993	469	0.181	0.175	248	0.061	0.008
1994	469	0.177	0.154	248	0.063	-0.010
1995	469	0.165	0.145	248	0.069	-0.001
1996	469	0.162	0.156	248	0.077	0.023
1997	469	0.145	0.123	248	0.051	0.003
1998	469	0.102	0.065	248	0.030	-0.041
1999	469	0.147	0.133	248	0.037	-0.003
2000	469	0.176	0.151	248	0.060	-0.027
2001	469	0.188	0.162	248	0.134	0.089
2002	469	0.239	0.219	248	0.212	0.173
2003	469	0.212	0.209	248	0.210	0.185
2004	469	0.198	0.191	248	0.183	0.179
2005	469	0.185	0.164	248	0.139	0.110
2006	469	0.160	0.125	248	0.119	0.091
2007	469	0.157	0.109	248	0.115	0.060
2008	469	0.160	0.120	248	0.133	0.081
2009	469	0.293	0.294	248	0.116	0.048
2010	469	0.295	0.300	248	0.090	0.008
2011	469	0.294	0.310	248	0.087	0.010

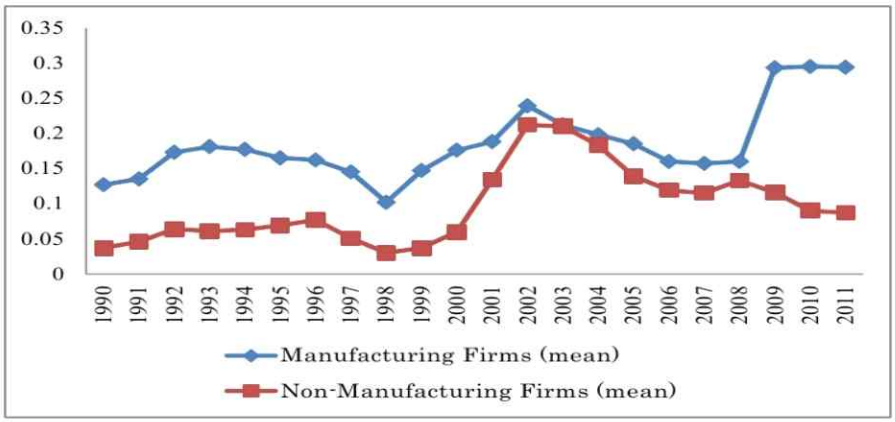

Fig. 2 Average of yearly based earnings synchronicity (manufacturing firms and non-manufacturing firms)

Table 4 Earnings synchronicity based on firm size

Year	Small Firms			Medium Firms			Large Firms		
	Obs.	Mean	Median	Obs.	Mean	Median	Obs.	Mean	Median
1990	215	0.067	0.039	287	0.077	0.041	215	0.149	0.106
1991	215	0.065	0.016	287	0.092	0.041	215	0.161	0.110
1992	215	0.080	0.011	287	0.129	0.097	215	0.199	0.178
1993	215	0.109	0.084	287	0.112	0.044	215	0.209	0.193
1994	215	0.083	0.034	287	0.106	0.057	215	0.233	0.260
1995	215	0.071	0.027	287	0.121	0.071	215	0.208	0.185
1996	215	0.064	0.028	287	0.118	0.115	215	0.219	0.225
1997	215	0.055	0.011	287	0.097	0.085	215	0.190	0.198
1998	215	0.031	-0.039	287	0.061	0.004	215	0.145	0.118
1999	215	0.075	0.031	287	0.095	0.060	215	0.161	0.143
2000	215	0.077	-0.028	287	0.128	0.103	215	0.206	0.176
2001	215	0.117	0.067	287	0.169	0.146	215	0.221	0.211
2002	215	0.160	0.098	287	0.241	0.214	215	0.284	0.281
2003	215	0.173	0.156	287	0.222	0.219	215	0.237	0.226
2004	215	0.152	0.129	287	0.190	0.197	215	0.236	0.236
2005	215	0.115	0.064	287	0.164	0.149	215	0.229	0.202
2006	215	0.088	0.022	287	0.144	0.118	215	0.206	0.185
2007	215	0.084	0.040	287	0.133	0.088	215	0.213	0.173
2008	215	0.107	0.082	287	0.130	0.081	215	0.221	0.181
2009	215	0.167	0.121	287	0.200	0.145	215	0.340	0.364
2010	215	0.154	0.081	287	0.194	0.134	215	0.333	0.400
2011	215	0.136	0.059	287	0.191	0.130	215	0.351	0.388

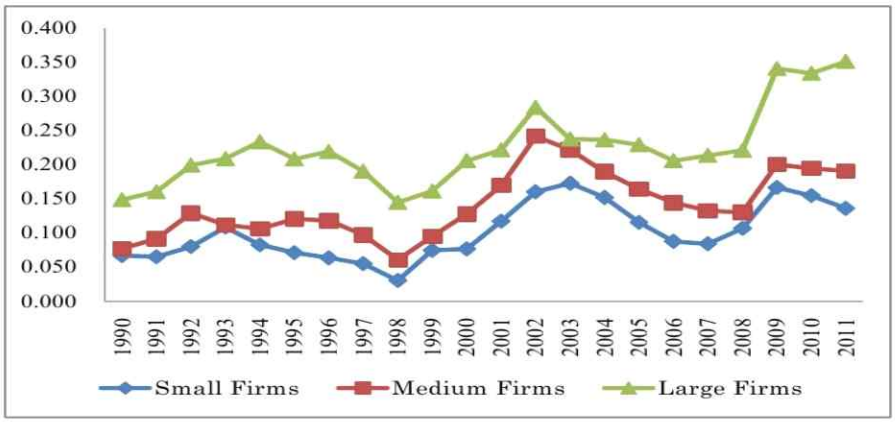

Fig. 3 Earnings synchronicity based on firm size

Table 5 Earnings sinchronicity in terms of net income and comprehensive income

	Mean	Std.Dev.	1st Q	Median	3rd Q	Obs.	Positive	Negative	t-stat.	z-stat.
Panel A. Market Factor + Industry Factor										
Net Income	0.175	0.357	-0.144	0.114	0.470	2081				
Comprehensive Income	0.280	0.373	-0.050	0.267	0.611	2081				
Differnce (CI-NI)	0.105	0.316	-0.094	0.086	0.290	2081	1285	796	15.149	13.979
Panel B. Market Factor Only										
Net Income	0.138	0.294	-0.112	0.017	0.342	2081				
Comprehensive Income	0.238	0.326	-0.064	0.154	0.520	2081				
Differnce (CI-NI)	0.100	0.237	-0.039	0.063	0.235	2081	1367	714	19.253	17.622
Panel C. Industry Factor Only										
Net Income	0.143	0.292	-0.106	0.033	0.343	2081				
Comprehensive Income	0.251	0.331	-0.059	0.184	0.538	2081				
Differnce (CI-NI)	0.108	0.272	-0.050	0.063	0.258	2081	1363	718	18.188	16.694