Analyst responses to stock-index adjustments: Evidence from MSCI Taiwan Index additions

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ABSTRACT

Using data from MSCI Taiwan Index adjustments, we study analyst responses to stock additions from 1999 to 2007. The empirical results show that the magnitudes of changes in analysts' earnings-per-share forecasts are similar to those of their two benchmarks for new additions to the index. Therefore, in our sample we find no significant information effect from the additions. We also find that the absolute forecast errors made by analysts are smaller for new additions and those foreign analysts are more accurate than local analysts. This finding demonstrates that new additions to the index exhibit significant performance improvements.

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1. Introduction

Many studies exist that examine the price and volume effects of stock-index adjustments. For example, Harris and Gurel (1986), Shleifer (1986), Wurgler and Zhuravskaya (2002) and Chen, Noronha, and Singal (2004, 2006) examine the change in the composition of the S&P 500 index. Some studies focus on non-US stock indices. For instance, Chakrabarti, Huang, Jayaraman, and Lee (2005) use a common set of country indices—the MSCI country indices and further document that stock returns and volumes exhibit "index effects" in international markets. Greenwood (2005) finds similar effects in the Nikkei 225 Index. Shu, Yeh, and Huang (2004) analyze price relations for Taiwanese-listed firms that are added to or deleted from the MSCI free indices. However, few studies showed how stock additions and deletions to major indices are related to analysts' forecasts until Denis, McConnell, Ovtchinnikov, and Yu (2003) present their results. Denis et al. (2003) analyze earnings per share (EPS) forecasts for companies that are newly added to the S&P 500 index and also compare post-addition realized earnings to the pre-addition forecast. They find that companies that are newly added to the index experience significant increases in EPS forecasts and apparent improvements in realized

earnings. This finding indicates that an addition to the S&P 500 is not an information-free event.

The nature of stock markets varies from one country to another. The US stock market is a developed market and the major investors are institutional. The Taiwanese stock market, unlike the US market, is an emerging market and the main investors are individuals.[2] Emerging markets can be relatively risky because they carry additional political, economic, and currency risks. They certainly are not for those who value safety and security above all else. An investor in emerging markets should be willing to accept volatile returns—there is a chance for large profit at the risk of large losses. An upside to emerging markets is that their performance is generally less correlated with developed markets. As such, they can play a role in diversifying a portfolio (and thus reducing overall risk). Market size, liquidity, and industry grouping among other factors determine the members of the S&P 500. The S&P 500 is designed to be a leading indicator of US equities and to reflect the risk/return characteristics of the large cap universe.[3] The MSCI Taiwan Index is a free float-adjusted market capitalization weighted index whose purpose is to track the equity market performance of large- and mid-cap securities listed on the Taiwan Stock Exchange and the GreTai Securities

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Market. The screening factors for MSCI index members are size, liquidity, and minimum free float. Contrary to the S&P 500, the MSCI does not target a specific number of securities for its indices. Therefore, an addition does not automatically lead to a deletion. The difference between Taiwan and US stock markets and the features of adjusted stock indices might generate different results in analysts' forecasts when stocks are added or deleted. This study examines whether earnings forecasts by analysts of the MSCI Taiwan Index differ from the earnings forecasts by analysts of the S&P 500. The study also examines whether the earnings forecasts of analysts differ between newly added stocks and their matched stocks.

Additionally, this study analyzes the differences between foreign analysts and local ones of the MSCI Taiwan Index. The study classifies an analyst as a "local (foreign) analyst" if he or she works for a local (foreign) firm regardless of whether the country location of the analyst is the same as the firm he or she reports on. To examine whether local and foreign analysts have the same earnings forecasts, this study uses absolute forecast error as a proxy for "forecast accuracy" to test for the accuracy of local and foreign analysts. To the best of our knowledge, the results of the study represent the first documentation so far of whether local or foreign analysts outperform one another in their forecast accuracy on index changes. The results can provide more information for investors and management to make better decisions.

The empirical results show that for firms newly added to the MSCI Taiwan Index, the magnitudes of changes in analysts' EPS forecasts are similar to those of their two benchmarks. Therefore, in our sample there is no significant information effect from MSCI Taiwan Index additions. The absolute forecast errors analysts make for "all other firms" and "industry, size, and liquidity (ISL) matched firms" are larger than those analysts make for "newly added firms." This finding demonstrates that newly added firms in the MSCI Taiwan Index lead to greater monitoring of investors and that they respond with a greater effort to improve their performance. Our finding is similar to the finding of Chang (2003) in that analysts working for foreign institutions have the advantage of belonging to more sophisticated and resourceful organizations.

The paper proceeds as follows. Section 2 reviews the literature. Section 3 presents the data and method used in this study. Section 4 displays the changes in analysts' EPS forecasts. Section 5 tests for differences in absolute forecast errors and Section 6 concludes.

2. Literature review

2.1. The price and volume effects of changes on stock-index adjustments

The literature that studies the effects of trading volume and return changes on the additions and deletions of stocks to major stock indices is sizable. Harris and Gurel (1986), Shleifer (1986), Dhillon and Johnson (1991), and Wurgler and Zhuravskaya (2002) find strong price effects for S&P 500 additions. Kaul, Mehrotra, and Morck (2000) and Okada, Isagawa, and Fujiwara (2006) find similar effects in the Toronto Stock Exchange TSE 300 and Nikkei 225 indices respectively.

Harris and Gurel (1986) find strong effects for S&P 500 additions, but unlike the permanent volume effect, the price effect reverses over time. Therefore, they summarize that these effects are due to price pressures. Shu et al. (2004) analyze price–volume relation for Taiwanese-listed firms that are added to or deleted from the MSCI free indices in the sampling period from May 17, 1999, to May 21, 2001. They find additions (deletions) to the MSCI free indices have positive (negative) abnormal returns in the run-up window from the announcement day up to one day before the changes were implemented. Significant reversals in the change days follow these returns. Shankar and Miller (2006) find that newly added firms to the S&P 600 index experience a significant price increase at announcement. However, the price and volume effects are temporary and are fully reversed within 60 days. Okada et al. (2006) find that the stock prices

of newly added firms rise on the announcement date. They continue to rise until the day before the effective change date, and then decline beginning on the change date. Hence, their results also support the temporary price-pressure hypothesis.

On the other hand, Shleifer (1986) finds more permanent price changes and attributes them to the downward sloping demand curve for stocks—the fact that stocks are imperfect substitutes for one another. Wurgler and Zhuravskaya (2002) observe that stocks with no close substitutes experience a higher rise in returns on additions to the S&P 500, their finding strongly corroborates evidence for the downward sloping demand curve view. Kaul, Mehrotra, and Morck (2000) also report results consistent with the downward sloping demand curve but based on weight changes in the Toronto Stock Exchange—the TSE 300. Dhillon and Johnson (1991) argue that there might be an information effect in the addition or deletion of stocks of a major index. Chakrabarti et al. (2005) document the effect of changes in a common set of country indices—the MSCI country indices. They indicate that developing countries (including Taiwan) have significantly positive abnormal returns of 4.84% in the run-up window and 4.57% in the post-announcement day permanent window.

Chen et al. (2004, 2006) study the price effects of changes to the S&P 500 and witness asymmetric price responses. Consistent with prior work, they find permanent price increases for firms added to the S&P 500. However, the authors find that the firms deleted from the index do not experience permanent negative price effects. They ascribe the possible reason for the asymmetric price responses to the effects arising from the changes in investors' awareness.

Unlike the above studies, Denis et al. (2003) calculate the cumulative excess returns and examine earning expectations and realized earnings around the time period in which stocks are newly added to the S&P 500. The analytical result shows that addition to the S&P 500 appears to have an association with an increase in investors' earnings expectations and with an improvement in the actual earnings relative to comparable companies. This result indicates that addition to the S&P 500 is not an information-free event. Therefore, this paper extends the work of Denis et al. (2003) by using adjustments to the MSCI Taiwan Index to study the EPS forecast changes and absolute forecast errors of analysts.

2.2. The performances of local and foreign analysts

Does distance influence the quality of information that investors get? A large number of papers find local investors have an information advantage (Brennan & Cao, 1997; Hau, 2001). However, some papers suggest that foreign investors who participate in a market can be better informed than local investors (Froot, O'Connell, & Seasholes, 2001; Seasholes, 2000). These studies provide mixed conclusions regarding whether local or foreign investors have an information advantage.

In contrast with investors' information advantage, Bae, Stulz, and Tan (2008) directly examine analysts' forecast accuracy. They observe whether analysts that are residents in a country make more precise earnings forecasts for firms in that country than analysts who do not reside in that country. They find local analysts have a significant information advantage over foreign analysts for a large sample of countries. The result is the same as Malloy (2005) who observes US analysts who are closer to the headquarters of firms have an information advantage.

However, Bacmann and Bolliger (2001) investigate the relative performances of local and foreign financial analysts in Latin American emerging markets. They find that foreign financial analysts outperform local analysts in these markets. Foreign analysts produce more timely and accurate forecasts. They observe a significant price reaction after analysts' downward forecast revisions. Chang (2003) compares the stock recommendations of local, foreign, and expatriate analysts for Taiwanese firms. He finds a local advantage in that expatriate

analysts outperform foreign analysts, but he also finds that expatriate analysts outperform local analysts working for domestic firms. But the evidence on the performances of local and foreign analysts is mixed.

Bae et al. (2008) define an analyst as a "local analyst" if the country location of the analyst is the same as that of the firm he or she covers regardless of whether an analyst is working for a local research firm or a research firm from a foreign country. Unlike the analyst definition of Bae et al. (2008),[4] we define an analyst as a "local (foreign) analyst" if the analyst is working for a local (foreign) firm regardless of whether the country location of the analyst is the same as the firm he or she reports on. The average number of local (foreign) analysts per firm is 1.18 (3.07) with a median of 1 (2), a maximum of 5 (15), and a minimum of 1 (1) during our sample period.

3. Data and method

3.1. Sample description

We use adjustments in the MSCI Taiwan Index to study the earnings forecast changes of analysts over the period of May 17, 1999, to May 4, 2007.[5] We examine whether their forecasts are different for newly added firms and matching firms. Our matching firms are listed firms in Taiwan Stock Exchange that are not in the MSCI Taiwan Index. Also, we analyze whether local and foreign analysts have the same earnings forecasts or not. MSCI Taiwan Index has undergone composite stocks adjusted for many times in this period. During the sample period, the index comprises 106 firms. The sample excludes newly added firms that are spin-offs or have engaged in mergers or takeovers around their additions.

To compare the differences in earnings forecast changes of analysts for newly added firms and the matched firms, we adopt two benchmarks for the matched firms. First, we include all Taiwan listed companies in the I/B/E/S database that we can compute a current/one-year-ahead median EPS forecast for the same pre-announcement and post-announcement time periods as for the newly added firms.[6]

The second benchmark is composed of Taiwan listed companies matched with the newly added firms on the basis of industry, market capitalization, and liquidity. The log market capitalization is a proxy for size. The definition of liquidity is the annual trading volume divided by the number of shares outstanding. Each newly added stock is matched with its appropriate industry, size, and liquidity.[7] We regard the first criterion set as "all other firms," while the second criterion is all "ISL matched firms." We obtain EPS forecasts and actual EPS for the current-year and one-year-ahead from the I/B/E/S database. The price, market value, and turnover rate of stocks are from the TEJ (Taiwan Economic Journal). Information about announcement dates for MSCI Taiwan Index adjustments comes from the UDN (United Daily News) data.

3.2. Analyst earnings forecasts

When is a forecast a current-year forecast or a next fiscal-year forecast? We adopt the concept of Denis et al. (2003) that if the

index addition announcement occurs at least three months prior to the firm's fiscal year-end, then the forecast is in the current-year. For example, if a company's fiscal year-end is December 31, 2000, and the index addition announcement occurs before October 2000, then the earnings forecast is the current-year forecast, and the earnings forecast for 2001 is the one-year-ahead forecast. On the other hand, if the announcement takes place after October 2000. The earnings forecast for fiscal year 2001 is the current-year forecast and the earnings forecast for 2002 is the one-year-ahead forecast.[8]

For the newly added firms and the matching firms, we compute the earnings forecast changes using the following procedure. To compute the pre-announcement and post-announcement median EPS forecasts of an index addition for a given company, the event window has to be four months prior to the announcement month of an index addition and four months following the announcement month respectively. For each individual analyst, we use the pre-announcement EPS forecast that is closest to the announcement month of an index addition. From these individual analysts' forecasts, we determine the median pre-announcement EPS forecast. To calculate the post-announcement EPS forecast for each continuing analyst, we use the first post-announcement EPS forecast of an index addition. From these individual analysts' forecasts, we determine the median post-announcement EPS forecast.[9] The average number of analysts per firm is 2.67 with a median of 1, a maximum of 16, and a minimum of 1.

We calculate the raw forecast changes by subtracting the pre-announcement EPS forecast from the post-announcement EPS forecast as[10]

$$\Delta FE_i = FE_{i,+} - FE_{i,-}, \tag{1}$$

where ΔFE_i is the EPS forecast change for firm i, $FE_{i,-}$ is the pre-index-addition EPS forecast for firm i, and $FE_{i,+}$ is the post-index-addition EPS forecast for firm i.

For a stock with a NT$ 100 price per share and a stock with a NT$ 10 price per share, a NT$ 1 per share change in earnings forecast can have different implications. Also, for a stock with an EPS of NT$ 1 and a stock with an EPS of NT$ 10, a NT$ 1 per share change in the earnings forecast can also have different implications. Hence, we standardize the EPS forecast changes by stock prices and EPS.

$$\Delta PFE_i = \left(FE_{i,+} - FE_{i,-} \right) / P_{i,-}, \tag{2}$$

where ΔPFE_i is the change in the EPS forecast for firm i standardized by stock price, the definitions of $FE_{i,+}$ and $FE_{i,-}$ are as stated for Eq. (1), and $P_{i,-}$ is the firm i stock price as of the end of the month prior to the announcement month.

To standardize by EPS for companies that have positive pre-announcement EPS forecasts,[11] we divide the EPS forecast change by the pre-announcement EPS forecast as

$$\Delta EFE_i = \left(FE_{i,+} - FE_{i,-} \right) / FE_{i,-}, \tag{3}$$

where ΔEFE_i is the change in the EPS forecast for firm i standardized by EPS and the definitions of $FE_{i,+}$ and $FE_{i,-}$ are as stated for Eq. (1).

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[4] We do not have the data on the country locations of analysts, hence we use the properties of broker age firms that analysts work for and divide them into local or foreign analysts.

[5] The update speed of the IBES database for non-U.S. firms is slow, we do not have complete earnings forecast data for Taiwan stocks after 2007 at the time of running the empirical results.

[6] The first criterion for our research is consistent with Denis et al. (2003).

[7] The second criterion for Denis et al. (2003) is that each company in the I/B/E/S database first sorted into one of the 12 Fama–French industry portfolios. Each industry portfolio is divided into three portfolios on the basis of market capitalization with one-third of the firms in each market-value portfolio. Within each industry and market-value portfolio, firms are sorted into three liquidity portfolios where liquidity is defined as the five-year average of annual trading volume divided by the number of shares outstanding. This sorting procedure results in 108 portfolios. Each newly added stock is matched with its appropriate industry, size, and liquidity portfolio. We have not adopted this classification in this paper due to data limitation.

[8] We replicate our analysis using analysts' annual earnings forecasts for the current and next fiscal year that the I/B/E/S database reports as current-year forecasts and one-year-ahead forecasts. The results are similar to those of Denis et al. (2003).

[9] We replicate our analysis by using mean analysts' forecasts, the results are similar to median analysts' forecasts.

[10] Our research adopts the formula of Denis et al. (2003) to explore analyst response to stock-index adjustments.

[11] To avoid the effects reverse, we only consider positive pre-announcement EPS forecasts.

Table 1A

Changes in analysts' EPS forecasts for firms added to the MSCI Taiwan Index and the matched firms.

MSCI Taiwan Index added firms.

Earnings per share forecasts are taken from the I/B/E/S database for a sample of 50 firms added to the MSCI Taiwan Index over the period of 1999 to 2007. The pre-announcement median EPS forecast is subtracted from the post-announcement median forecast to calculate the current-year and one-year-ahead EPS forecasts changes. Local and foreign analysts are determined by the local or foreign brokerage firms where they work. The "mean difference" is the average of differences between mean foreign analysts' change in EPS forecast and the mean local analysts' change in EPS forecast. The p-values in parentheses test whether the numbers above are significantly different from zero.

	1	2	3	4	5
Sample	Sample size	Mean ΔEPS forecast for MSCI Taiwan Index added firms	Mean ΔEPS forecast for MSCI Taiwan Index added firms' foreign analysts	Mean ΔEPS forecast for MSCI Taiwan Index added firms' local analysts	Mean difference (col. 3–col. 4)
Panel A: changes in current-year EPS forecasts					
EPS forecast change	50	NT$ −0.1302 (0.162)	NT$ −0.0539 (0.459)	NT$ −0.0272 (0.879)	NT$ −0.0267 (0.889)
EPS forecast change standardized by EPS	50	−7.79%[2*] (0.024)	−4.55% (0.183)	−3.37% (0.557)	−1.18% (0.858)
EPS forecast change standardized by price	50	−0.67%[*] (0.098)	−0.35% (0.233)	−0.34% (0.675)	−0.01% (0.984)
Panel B: changes in one-year-ahead EPS forecasts					
EPS forecast change	44	NT$ −0.2272[2*] (0.030)	NT$ −0.1043 (0.290)	NT$ −0.2474 (0.280)	NT$ 0.1431 (0.561)
EPS forecast change standardized by EPS	44	−6.19%[2*] (0.013)	−2.82% (0.109)	−6.98% (0.231)	4.46% (0.488)
EPS forecast change standardized by price	44	−0.81%[2*] (0.029)	−0.27% (0.328)	−0.84% (0.296)	0.57% (0.496)

[2*] = significant at 5% level and [*] = significant at 10% level.

3.3. Absolute forecast error

We use "absolute forecast error" as a proxy to examine possible biases in the forecasts.[12] We compute absolute forecast errors for the newly added firms and their two benchmarks. The absolute forecast error is the absolute value difference between the analysts' median EPS forecast preceding the month of announcement that a company will be added to the index and the realized EPS for the same fiscal period and the same firm.

The error can be formularized as

$$FError_i = \left| RE_{i,+} - FE_{i,-} \right|, \tag{4}$$

where $FError_i$ is the absolute raw forecast error value for firm i, $RE_{i,+}$ is the realized EPS for the same fiscal period for firm i, and $FE_{i,-}$ is as defined in Eq. (1). The bigger the absolute forecast error values are, the less accurate they are.

In the same way, different stock prices and different earnings have different implications for forecast errors. Therefore, we standardize the forecast errors by stock prices and EPS.

$$\Delta PFError_i = \left| \left(RE_{i,+} - FE_{i,-} \right) / P_{i,-} \right|, \tag{5}$$

where $\Delta PFError_i$ is the EPS absolute forecast error for firm i standardized by the stock price.

To standardize by EPS, for companies that have a positive pre-announcement EPS forecast, we divide the forecast errors by the pre-announcement EPS forecasts as

$$\Delta EFError_i = \left| \left(RE_{i,+} - FE_{i,-} \right) / FE_{i,-} \right|, \tag{6}$$

where $\Delta EFError_i$ is the EPS absolute forecast error for firm i standardized by EPS.

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[12] The values of forecast errors have similar amounts of positive and negative values. In order to avoid the effects offsetting between positive and negative forecast errors, we follow the method used by Conroy and Harris (1995), Guay, Haushalter, and Minton (2003), and Gu and Wang (2005) by taking the absolute value of forecast errors. Our research still uses the concept of Denis et al. (2003) to examine the possible biases.

4. Changes in analysts' EPS forecast

The MSCI Taiwan Index contains 50 newly added firms that are eligible for further analysis. Tables 1A–1D list the mean (of the median) changes in current-year and one-year-ahead EPS forecasts for firms newly added to the MSCI Taiwan Index and for the matched firms. Tables 1A–1C respectively show mean forecast revisions for the newly added firms, "all other firms," and "ISL-matched firms." Tables 1A–1C also list mean forecast revisions of foreign and local analysts of newly added firms, "all other firms," and "ISL-matched firms."

Panel A of Tables 1A–1C shows the current-year mean forecast revisions for all the three firm types. For the newly added firms, raw mean forecast revision is slightly and insignificantly negative at NT$ −0.1302 (p-value = 0.162). For the matched firms, the mean is NT$ −0.1723 (p-value = 0.678) for "all other firms." And for the "ISL-matched firms", the mean is NT$ −0.0923 (p-value = 0.491). The analytical results seem consistent with Denis et al. (2003) and previous studies by showing that analysts systematically revise their forecasts downwards as the fiscal year progresses. For "ISL-matched firms," the raw forecast revisions of foreign analysts are larger than that of local analysts (p-value for the difference is 0.091).

Panel A of Tables 1A–1C also displays mean standardized EPS forecast change results for all three types of firms. The results demonstrate that analysts systematically revise their forecasts downwards as the fiscal year progresses for all the companies as well. For instance, when forecast revisions are standardized based on the pre-announcement EPS forecast, the mean is −7.79% (p-value = 0.024) for the newly added firms, −7.32% (p-value = 0.060) for "all other firms" (1059 have a positive pre-addition EPS forecast), and −8.62% (p-value = 0.124, 47 have a positive pre-addition EPS forecast) for the "ISL-matched firms." The mean standardized forecast revisions by foreign analysts are smaller than that by local analysts for "all other firms" (p-value for the difference is 0.036).

Further, for comparison this study subtracts the current-year raw and standardized mean EPS forecast changes for newly added firms' two benchmarks from those of the newly added firms. The results are illustrated in Panel A of Table 1D. Compared with "all other firms," the magnitude of mean forecast revisions is slightly smaller for the newly added firms, although the revisions are not statistically significant. Compared with the "ISL-matched firms," the magnitude of

Table 1B
All other firms.
Earnings per share forecasts are taken from the I/B/E/S database for a sample of 1094 firms with EPS forecasts that are contemporaneous with the EPS forecasts of newly added firms as "all the firms" as one criterion. The pre-announcement median EPS forecast is subtracted from the post-announcement median forecast to calculate the current-year and one-year-ahead EPS forecast changes. Local and foreign analysts are determined by the local or foreign brokerage firms where they work. The "mean difference" is the average of differences between mean foreign analysts' change in EPS forecast and the mean local analysts' change in EPS forecast. The p-values in parentheses test whether the numbers above are significantly different from zero.

	1	2	3	4	5
Sample	Sample size	Mean ΔEPS forecast for all other firms	Mean ΔEPS forecast for all other firms' foreign analysts	Mean ΔEPS forecast for all other firms' local analysts	Mean difference (col. 3–col. 4)
Panel A: changes in current-year EPS forecasts					
EPS forecast change	1094	NT$ −0.1723 (0.678)	NT$ −0.1089[3*] (0.001)	NT$ −0.2276 (0.745)	NT$ 0.1187 (0.865)
EPS forecast change standardized by EPS	1059	−7.32%[*] (0.060)	2.83% (0.640)	−14.06%[3*] (0.008)	16.89%[2*] (0.036)
EPS forecast change standardized by price	1071	−0.33% (0.691)	−0.48%[3*] (0.001)	−0.30% (0.827)	−0.18% (0.900)
Panel B: changes in one-year-ahead EPS forecasts					
EPS forecast change	818	NT$ 0.0472 (0.847)	NT$ −0.1126[*] (0.060)	NT$ 0.3591 (0.568)	NT$ −0.4717 (0.455)
EPS forecast change standardized by EPS	806	−2.14% (0.487)	−1.92% (0.570)	0.23% (0.955)	−2.15% (0.684)
EPS forecast change standardized by price	811	−0.23% (0.656)	−0.53%[2*] (0.038)	0.52% (0.678)	1.05% (0.413)

[3*] = significant at 1% level, [2*] = significant at 5% level and [*] = significant at 10% level.

mean forecast revisions also appears slightly smaller for the newly added firms, but does not differ between the two groups. Foreign and local analysts do not produce significantly different forecasts between newly added firms and all the matched firms.

Panel B of Tables 1A–1C exhibits the one-year-ahead raw and standardized mean forecast revisions for all three types of firms. The results here are similar to those for the current-year forecast revisions. The magnitude of the changes in raw EPS forecasts of foreign analysts discloses larger changes than that of the local analysts for the "ISL-matched firms." The result also differs significantly from zero.

Panel B of Table 1D shows the one-year-ahead raw and standardized differences of mean changes in EPS forecasts for newly added firms and the benchmarks. The results show that the magnitude of raw and standardized mean forecast revisions for the newly added firms and their benchmarks have no significant difference. The results

indicate that analysts do not obviously reduce their earnings to revise the scope for firms that are newly added to the MSCI Taiwan Index. Therefore, in our sample there appears to be no significant information effect associated with additions to the MSCI Taiwan Index. This finding is interesting in that it differs from the results of Denis et al. (2003). The possible reasons are twofold. The MSCI Taiwan Index's does not have a long existence and thus does not have international characteristics. Second, the market structure and the nature and frequency of index adjustments are different between the MSCI Taiwan Index and S&P 500.

5. Absolute forecast errors of analysts

Tables 2A–2D list the results of the absolute forecast errors of analysts for all companies. Panels A and B of Table 2 show the results for current-

Table 1C
ISL-matched firms.
Earnings per share forecasts are taken from the I/B/E/S database for a sample of 48 firms with EPS forecasts that are matched to the appropriate industry, size, and liquidity with the contemporaneous EPS forecasts of newly added firms as "ISL-matched firms" as a second criterion. The pre-announcement median EPS forecast is subtracted from the post-announcement median forecast to calculate the current-year and one-year-ahead EPS forecasts changes. Local analysts and foreign ones are determined by the local or foreign brokerage firms where they work. The "mean difference" is the average of differences between mean foreign analysts' change in EPS forecast and the mean local analysts' change in EPS forecast.
The p-values in parentheses test whether the numbers above are significantly different from zero.

	1	2	3	4	5
Sample	Sample size	Mean ΔEPS forecast for ISL-matched firms	Mean ΔEPS forecast for ISL-matched firms' foreign analysts	Mean ΔEPS forecast for ISL-matched firms' local analysts	Mean difference (col. 3–col. 4)
Panel A: changes in current-year EPS forecasts					
EPS forecast change	48	NT$ −0.0923 (0.491)	NT$ −0.2128 (0.114)	NT$ 0.1556 (0.375)	NT$ −0.3684[*] (0.091)
EPS forecast change standardized by EPS	47	−8.62% (0.124)	−9.03% (0.109)	−4.39% (0.574)	−4.64% (0.620)
EPS forecast change standardized by price	48	−0.75%[2*] (0.049)	−0.73%[*] (0.091)	−0.25% (0.612)	−0.48% (0.451)
Panel B: changes in one-year-ahead EPS forecasts					
EPS forecast change	42	NT$ −0.2061[*] (0.085)	NT$ −0.2343 (0.112)	NT$ 0.0558 (0.468)	NT$ −0.2901[*] (0.080)
EPS forecast change standardized by EPS	41	−11.98% (0.309)	−14.67% (0.298)	6.32% (0.312)	20.99% (0.172)
EPS forecast change standardized by price	42	−0.66%[*] (0.098)	−0.73% (0.149)	0.31% (0.422)	−1.04% (0.101)

[2*] = significant at 5% level and [*] = significant at 10% level.

Table 1D

Comparison with the matched firms.

Earnings per share forecasts are taken from the I/B/E/S database for newly added firms and the matched firms over the period of 1999 to 2007. The pre-announcement median EPS forecast is subtracted from the post-announcement median forecast to calculate the current-year and one-year-ahead EPS forecasts changes. Local analysts and foreign ones are determined by the local or foreign brokerage firms where they work. Here, the "mean difference" is the average of differences between the newly added firms' mean change in EPS forecast and the mean of their criterion sample's changes in EPS forecasts. The p-values in parentheses test whether the numbers above are significantly different from zero.

Sample	Comparison with all other firms			Comparison with ISL-matched firms		
	1	2	3	4	5	6
	ΔEPS forecast mean difference for added and all other firms	ΔEPS forecast mean difference for added and all other firms' foreign analysts	ΔEPS forecast mean difference for added and all other firms' local analysts	ΔEPS forecast mean difference for added and ISL-matched firms	ΔEPS forecast mean difference for added and ISL-matched firms' foreign analysts	ΔEPS forecast mean difference for added and ISL-local analysts matched firms' local analysis
Panel A: changes in current-year EPS forecasts						
EPS forecast change	NT$ 0.0421	NT$ 0.0550	NT$ 0.2004	NT$ −0.0379	NT$ 0.1589	NT$ −0.1828
	(0.921)	(0.492)	(0.781)	(0.814)	(0.293)	(0.463)
EPS forecast change standardized by EPS	−0.47%	−7.38%	10.69%	0.83%	4.48%	1.02%
	(0.927)	(0.287)	(0.171)	(0.897)	(0.489)	(0.915)
EPS forecast change standardized by price	−0.34%	0.13%	−0.04%	0.08%	0.38%	−0.09%
	(0.710)	(0.697)	(0.984)	(0.874)	(0.455)	(0.923)
Panel B: changes in one-year-ahead EPS forecasts						
EPS forecast change	NT$ −0.2744	NT$ 0.0083	NT$ −0.6065	NT$ −0.0211	NT$ 0.1300	NT$ −0.3032
	(0.300)	(0.943)	(0.363)	(0.892)	(0.457)	(0.209)
EPS forecast change standardized by EPS	−4.05%	−0.90%	−7.21%	5.79%	11.85%	−13.30%
	(0.298)	(0.811)	(0.305)	(0.628)	(0.402)	(0.118)
EPS forecast change standardized by price	−0.58%	0.26%	−1.36%	−0.15	0.46%	−1.15
	(0.361)	(0.482)	(0.359)	(0.788)	(0.418)	(0.196)

year and one-year-ahead absolute forecast errors. Tables 2A–2D also show the results of absolute forecast errors of foreign and local analysts for all companies.

Table 2A displays current-year and one-year-ahead absolute forecast errors for the newly added firms. The results show that the mean absolute forecast errors of foreign analysts are smaller than those of local analysts, although the difference is not statistically significant. Table 2B shows current-year raw and standardized absolute forecast errors for "all other firms." this category indicates that the mean absolute forecast errors of foreign analysts are smaller than those of local analysts (p-value for the difference = 0.026 for raw, p-values for the difference = 0.007, and 0.023 for standardized). For one-year-ahead raw and standardized absolute forecast errors, the values of foreign

analysts remain smaller than those of local analysts, although the difference is not statistically significant. Table 2C shows that there is no significant difference in the mean absolute forecast errors between foreign and local analysts for the "ISL-matched firms."

Table 2D lists the mean absolute forecast error differences between the newly added firms and their benchmarks. The values for the newly added stocks are smaller than those of "all other firms." For instance, the current-year raw mean absolute forecast error for all analysts of "all other firms" is NT$ 3.1562, which is more than double the raw mean absolute forecast error of all of the analysts for the newly added firms (p-value for the difference = 0.067). Also, the current-year standardized absolute forecast errors for all analysts, local, and foreign of newly added firms are all smaller than those of

Table 2A

EPS absolute forecast errors for firms added to the MSCI Taiwan Index and the matched firms.

MSCI Taiwan Index added firms.

Earnings per share forecasts and actual EPS are taken from the I/B/E/S database for a sample of 42 firms added to the MSCI Taiwan Index over the period of 1999 to 2007. The absolute forecast error is the absolute difference between the median EPS forecast preceding the month of announcement that a company will be added to the index and the realized EPS for the same fiscal period and the same firm. The EPS absolute forecast error is calculated for current-year and one-year-ahead EPS forecasts. Local analysts and foreign ones are determined by the local or foreign brokerage firms where they work. The "mean difference" is the average of differences between mean foreign analysts' EPS absolute forecast error and the mean local analysts' EPS absolute forecast error. The p-values in parentheses test whether the numbers above are significantly different from zero.

Sample	1	2	3	4	5
	Sample size	Mean absolute forecast error for MSCI Taiwan Index added firms	Mean absolute forecast error for MSCI Taiwan Index added firms' foreign analysts	Mean absolute forecast error for MSCI Taiwan Index added firms' local analysts	Mean difference (col. 3–col. 4)
Panel A: current-year EPS absolute forecast errors					
Absolute forecast error	42	NT$ 1.4166	NT$ 1.4138	NT$ 1.7888	NT$ −0.3750
					(0.622)
Absolute forecast error standardized by EPS	42	0.3672	0.3532	0.4865	−13.33%
					(0.272)
Absolute forecast error standardized by price	42	5.76%	5.73%	8.25%	−2.52%
					(0.624)
Panel B: one-year-ahead EPS absolute forecast errors					
Absolute forecast error	36	NT$ 2.2694	NT$ 2.4233	NT$ 2.2773	NT$ 0.1460
					(0.870)
Absolute forecast error standardized by EPS	36	0.5872	0.5237	0.6572	−0.1335
					(0.488)
Absolute forecast error standardized by price	36	7.30%	7.08%	7.99%	−0.91%
					(0.726)

Table 2B

All other firms.

Earnings per share forecasts and actual EPS are taken from the I/B/E/S database for a sample of 968 all other firms over the period of 1999 to 2007. The absolute forecast error is the absolute difference between the median EPS forecast preceding the month of announcement that a company will be added to the index and the realized EPS for the same fiscal period and the same firm. The EPS absolute forecast error is calculated for current-year and one-year-ahead EPS forecasts. Local analysts and foreign ones are determined by the local or foreign brokerage firms where they work. The "mean difference" is the average of differences between mean foreign analysts' EPS absolute forecast error and the mean local analysts' EPS absolute forecast error. The p-values in parentheses test whether the numbers above are significantly different from zero.

	1	2	3	4	5
Sample	Sample size	Mean absolute forecast error for all other firms	Mean absolute forecast error for all other firms' foreign analysts	Mean absolute forecast error for all other firms' local analysts	Mean difference (col. 3–col. 4)
Panel A: current-year EPS absolute forecast errors					
Absolute forecast error	968	NT$ 3.1562	NT$ 1.2969	NT$ 4.4851	NT$ −3.189[2]* (0.026)
Absolute forecast error standardized by EPS	937	0.9117	0.6197	1.1054	−0.485[3]* (0.007)
Absolute forecast error standardized by price	953	8.50%	5.24%	10.77%	−5.53%[2]* (0.023)
Panel B: one-year-ahead EPS absolute forecast errors					
Absolute forecast error	562	NT$ 2.6066	NT$ 2.4049	NT$ 3.1792	NT$ −0.7743 (0.311)
Absolute forecast error standardized by EPS	552	1.0131	0.9814	1.2078	−0.2264 (0.412)
Absolute forecast error standardized by price	561	9.88%	9.40%	10.28%	−0.88% (0.617)

[3]* = significant at 1% level and [2]* = significant at 5% level.

"all other firms." Compared with "ISL-matched firms," the absolute forecast errors for analysts of newly added firms are smaller, but the mean differences show no statistically significant difference.

For one-year-ahead raw and standardized absolute forecast errors, the values for the newly added firms remain smaller than those for their benchmarks. For instance, the mean differences in absolute forecast errors standardized by EPS between newly added firms and "all other firms" differ significantly from zero with p-values of 0.075 or less. In comparison with "ISL-matched firms," the absolute forecast errors standardized by EPS for all analysts and foreign analysts of the newly added firms are still smaller with p-values for the differences of 0.049 and 0.033 respectively.

These results show that in comparison with "all other firms" and "ISL-matched firms," firms that are newly added to the MSCI Taiwan Index display significant improvements in performance. This improvement might occur because addition to the index leads to greater

monitoring by investors that the firm responds to with a greater effort. Regarding whether local versus foreign analysts are more accurate, the results display the forecasts of foreign analysts as more accurate than those of local analysts. This result is consistent with Chang (2003) who argues that analysts working for foreign institutions have the advantage of belonging to more sophisticated and resourceful organizations.

6. Conclusions

Regarding the study of analyst earnings forecasts around the date of the addition to the index, Denis et al. (2003) find companies that are newly added to the S&P 500 experience significant increases in EPS forecasts and apparent improvements in performance. However, the natures of stock markets vary from one country to another and the features of adjusted stock indices are diverse. For the Taiwan

Table 2C

ISL-matched firms.

Earnings per share forecasts and actual EPS are taken from the I/B/E/S database for a sample of 41 ISL-matched firms over the period of 1999 to 2007. The absolute forecast error for ISL-matched firms reported in the I/B/E/S with EPS forecasts that are matched appropriately to industry, size, and liquidity with the contemporaneous EPS forecasts of newly added firms as a second criterion. The EPS absolute forecast error is calculated for current-year and one-year-ahead EPS forecasts. Local analysts and foreign ones are determined by the local or foreign brokerage firms where they work. The "mean difference" is the average of differences between mean foreign analysts' EPS absolute forecast error and the mean local analysts' EPS absolute forecast error. The p-values in parentheses test whether the numbers above are significantly different from zero.

	1	2	3	4	5
Sample	Sample size	Mean absolute forecast error for ISL-matched firms	Mean absolute forecast error for ISL-matched firms' foreign analysts	Mean absolute forecast error for ISL-matched firms' local analysts	Mean difference (col. 3–col. 4)
Panel A: current-year EPS absolute forecast errors					
Absolute forecast error	41	NT$ 1.5293	NT$ 1.9288	NT$ 1.1907	NT$ 0.7381 (0.421)
Absolute forecast error standardized by EPS	40	0.5007	0.5471	0.7139	−0.1668 (0.637)
Absolute forecast error standardized by price	41	5.27%	6.64%	4.70%	1.94% (0.458)
Panel B: one-year-ahead EPS absolute forecast errors					
Absolute forecast error	34	NT$ 2.1267	NT$ 2.5226	NT$ 2.1584	NT$ 0.3642 (0.732)
Absolute forecast error standardized by EPS	33	1.0740	1.1725	1.1336	0.0389 (0.933)
Absolute forecast error standardized by price	34	7.50%	8.74%	7.72%	1.02% (0.735)

[2]* = significant at 5% level and [*] = significant at 10% level.

Table 2D

Comparison with the matched firms.

Earnings per share forecasts and actual EPS are taken from the I/B/E/S database for newly added firms and the matched firms over the period of 1999 to 2007. The EPS forecast preceding the month of announcement is subtracted from the realized EPS for the same fiscal period and the same firm to calculate the current-year and one-year-ahead EPS absolute forecasts errors. Local analysts and foreign ones are determined by the local or foreign brokerage firms where they work. Here, the "mean difference" is the average of differences between the newly added firms' mean absolute EPS forecast error and the mean of their criterion sample's absolute EPS forecast errors. The *p*-values in parentheses test whether the numbers above are significantly different from zero.

Sample	Comparison with all other firms			Comparison with ISL-matched firms		
	1	2	3	4	5	6
	EPS absolute forecast error mean difference for added and all other firms	EPS absolute forecast error mean difference for added and all other firms' foreign analysts	EPS absolute forecast error mean difference for added and all other firms' local analysts	EPS absolute forecast error mean difference for added and ISL-matched firms	EPS absolute forecast error mean difference for added and ISL-matched firms' foreign analysts	EPS absolute forecast error mean difference for added and ISL-matched firms' local analysts
Panel A: current-year EPS absolute forecast errors						
Absolute forecast error	NT$ −1.7396*	NT$ 0.1169	NT$ −2.2963*	NT$ −0.1127	NT$ −0.5150	NT$ 0.5981
	(0.067)	(0.777)	(0.087)	(0.875)	(0.593)	(0.413)
Absolute forecast error standardized by EPS	−0.5445[3*]	−0.2665[3*]	−0.6189[3*]	−0.1335	−0.1939	−0.2274
	(0.000)	(0.004)	(0.002)	(0.261)	(0.159)	(0.515)
Absolute forecast error standardized by price	−2.74%	0.49%	−2.52%	0.49%	−0.91%	3.55%
	(0.366)	(0.871)	(0.618)	(0.874)	(0.807)	(0.446)
Panel B: one-year-ahead EPS absolute forecast errors						
Absolute forecast error	NT$ −0.3372	NT$ 0.0184	NT$ −0.9019	NT$ 0.1427	NT$ −0.0992	NT$ 0.1189
	(0.555)	(0.978)	(0.373)	(0.830)	(0.906)	(0.914)
Absolute forecast error standardized by EPS	−0.4259[3*]	−0.4577[3*]	−0.5506*	−0.4868[2*]	−0.6488[2*]	−0.4764
	(0.002)	(0.001)	(0.075)	(0.049)	(0.033)	(0.238)
Absolute forecast error standardized by price	−2.58%*	−2.32%	−2.29%	−0.20%	−1.66%	0.27%
	(0.096)	(0.189)	(0.377)	(0.915)	(0.493)	(0.931)

[3*] = significant at 1% level, [2*] = significant at 5% level, * = significant at 10% level.

and US stock markets, the differences might generate different results in analysts' forecasts when stocks are added to or deleted from major stock indices. As a result, this study uses adjustments in composite stocks of the MSCI Taiwan Index to examine changes in EPS forecasts and the forecast accuracy of local and foreign analysts.

For firms newly added to the MSCI Taiwan Index, the magnitude of the changes in EPS forecasts of the analysts is similar to those of their two benchmarks. Therefore, in our sample there is no significant information effect from MSCI Taiwan Index additions. The absolute forecast errors made by analysts for "all other firms" and "ISL-matched firms" are larger than those made by analysts for "newly added firms." This finding demonstrates that newly added firms on the MSCI Taiwan Index exhibit significantly improved performance. This improvement might occur because addition to the index leads to greater monitoring by investors that the firm responds to with a greater effort. Regarding whether local versus foreign analysts are more accurate, the analytical results display that the forecasts of foreign analysts are more accurate than those of local analysts in Taiwan. This result is consistent with Chang (2003) who argues that analysts working for foreign institutions have the advantage of belonging to more sophisticated and resourceful organizations.

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