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The market reaction to analyst stock recommendation and earnings forecast consistency: International evidence

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ABSTRACT

Using a large international sample from 81 counties, this paper examines the incremental effects of recommendation–forecast consistency on the market reactions to revisions in stock recommendations and earnings forecasts. We define analysts' stock recommendations and earnings forecasts as consistent if both are above or below their respective consensus, and inconsistent otherwise. We hypothesize and find that recommendation-forecast consistency adds incremental positive effects to the market reaction to analysts' stock recommendation revisions and their earnings forecast revisions for our international sample. Moreover, the incremental positive effects exist in both strong and weak investor protection countries, with the effects being greater in strong-investor protection countries than in weak-investor protection countries. Finally, International Financial Reporting Standards (IFRS) adoption significantly enhances these incremental positive effects.

1. Introduction

This study examines whether recommendation-forecast consistency provides incremental effects on the market reactions to revisions in analysts' stock recommendations and earnings forecasts for a large sample from 81 countries. While prior literature consistently shows a positive market reaction to analysts' earnings forecast revisions (e.g., Brown & Hugon, 2009; Jung, Keeley, & Ronen, 2019; Stickel, 1991), empirical evidence on the relation between analyst recommendation revisions and stock returns does not document uniform results (e.g., Altınkılıç, Hansen, & Ye, 2016; Drake, Rees, & Swanson, 2011; Womack, 1996). Moreover, Bradshaw (2004), Ke and Yu (2009), and Simon and Curtis (2011) suggest that analysts do not effectively decipher their earnings forecasts into stock recommendations due to economic incentives, optimism, and behavioral biases, and then demonstrate that analysts' stock recommendation and earnings forecast signals are often inconsistent with each other in the United States (US).

Based on these findings, Brown and Huang (2013 hypothesize that a consistent recommendation-forecast pair reflects fewer economic/behavioral biases and, thus, provides more superior information than an inconsistent pair. To examine this question, Brown and Huang (2013) define a consistent recommendation-forecast pair as an analyst's stock recommendation and his/her earnings forecast issued on the same day both being above or below the respective peer consensus. Then, the authors measure the incremental effects of recommendation-forecast consistency first through its interaction with ana-

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lyst recommendation revisions and second through its interaction with earnings forecast revisions on the stock returns. Brown and Huang (2013) find that such interaction effects are significant and positive for their sample of US firms, indicating that recommendation-forecast consistency provides incremental effects on the market reaction to analysts' stock recommendation revisions and earnings forecast revisions in the US.

To our knowledge, prior studies have not scrutinized the market reaction to recommendation–forecast consistency outside of the US. In this study, following the prior studies that used US models in the international context (e.g., Basu, Hwang, & Jan, 1998; Haw, Hu, Lee, & Wu, 2012), our first research objective is to extend Brown and Huang (2013) models and examine whether the effects of recommendation-forecast consistency as documented in the US can be generalized to a non-US setting. This reconnaissance is important because investors and financial analysts have become more globally oriented with real-time access to financial statements, market data, and media information, indicating potential similarities in the information environments between US and non-US countries. Moreover, the findings from prior studies indicate similarities in analyst behaviors between US and non-US countries (Balboa, Gomez-Sala, & Lopez-Espinosa, 2009; Barniv, Hope, Myring, & Thomas, 2010; Bradshaw, 2004; Bradshaw, Richardson, & Sloan, 2006; Moshirian, Ng, & Wu, 2009).[1] In sum, these similarities lead us to predict similar incremental effects of recommendation-forecast consistency on the market reactions to analyst recommendation revisions and earnings forecast revisions for our international sample.

We then examine whether market reaction to analysts' recommendation-forecast consistency is influenced by the differences in investor protection (IP) across countries. Prior literature documents significant differences in the effects of IP on financial analysts, including that the extent of investors' demand for analyst research, the extent of analyst coverage, and the quality of analyst research outputs differ for strong-IP and weak-IP countries (e.g., Barniv et al., 2010; DeFond & Hung, 2007; Kerl & Pauls, 2014). Based on these studies, we expect the market reaction to recommendation-forecast consistency to be greater in strong-IP than weak-IP countries.

We also examine the influence of the adoption of International Financial Reporting Standards (IFRS) on the market reaction to recommendation-forecast consistency, because IFRS adoption represents significant accounting standard changes and has triggered extensive studies across countries (for a recent review, see De George, Li, & Shivakumar, 2016). Based on prior literature that documents the positive effects of IFRS on the informativeness of analysts' stock recommendations and that of various earnings forecast attributes (Charitou, Karamanou, & Kopita, 2018; Hodgdon, Tondkar, Harless, & Adhikari, 2008; Houqe, Easton, & Van Zijl, 2014), we expect that IFRS adoption enhances the associations between the consistent recommendation-forecast pairs and future stock returns.

Following Brown and Huang (2013)'s definition of the recommendation-forecast consistency, 55.3 % of the recommendation–forecast pairs are consistent in our international sample, with 53.6 %, 52.9 %, and 64.6 % of the buy, hold, and sell recommendations being consistent with analysts' earnings forecasts, respectively. Specifically, we document the following three major findings for our international sample. First, the recommendation-forecast consistency has incremental effects on market returns through its significant interactions with stock recommendation revisions and with earnings forecast revisions in our international sample, before and after controlling for analyst and forecast characteristics which affect market responses. Second, the incremental effects of the recommendation-forecast consistency on market returns exist in strong-IP and weak-IP countries, and the effects are greater in strong-IP countries than in weak-IP countries. Third, the incremental effects are more significant in IFRS adopting countries subsequent to IFRS adoption than in these countries prior to the adoption and in non-IFRS adopting countries.

Our study provides several contributions to the literature. First, it extends Brown and Huang (2013) by providing international evidence on the incremental benefits of recommendation–forecast consistency to the informativeness of analyst stock recommendation revisions and earnings forecast revisions. We demonstrate that consistent recommendation–forecast pairs are important *ex ante* signals regarding firm valuation because they result in stronger market reactions than inconsistent pairs in our large international sample. We partition the sample and show the extent to which these effects differ for strong-IP and weak-IP countries. Thus, our study adds to the literature on the usefulness of analyst research across countries and to the literature on country regimes. The results help to facilitate a better understanding of the relation between earnings forecasts and stock recommendations, and also provide important implications for investors and researchers by suggesting the use of the consistency signal to identify more informative analyst research outputs in the international setting. Moreover, our findings add to the literature on IFRS by noting an additional benefit of IFRS adoption that has not been previously explored: the ability of IFRS to enhance the incremental benefits of recommendation–forecast consistency.

We organize the reminder of the paper in five sections. Section 2 reviews previous literature, provides rationales for our study, and discusses our research hypotheses. Section 3 describes the research design. Section 4 describes the data, sample, and major descriptive statistics. Section 5 discusses the results of the hypotheses testing, and section 6 concludes.

[1] For example, extensive research finds that US analysts' stock recommendations are optimistically biased (e.g., Bradshaw et al., 2006). Balboa et al. (2009) confirm the positive bias in analyst recommendations in 8 developed stock markets and Moshirian et al. (2009) confirm the bias in 13 emerging countries. Similarly, Bradshaw (2004) document that analysts' earnings forecasts are negatively associated with their stock recommendations in the US and Barniv et al. (2010) provide similar findings in 22 countries.

2. Related studies and hypothesis development

Conceptually, analysts formulate their forecasts of a firm's future earnings and then incorporate those forecasts into valuation models (e.g., the residual income model) to estimate the firm's value. When the firm's estimated value is above or below its current stock price, analysts will then issue a buy or sell recommendation, respectively. Therefore, analysts' earnings forecasts and stock recommendations should be linked in a predictable manner, and both should positively affect future returns (Bradshaw, 2004). However, empirical evidence discussed in the literature below shows mixed results on the relations between forecasts and recommendations and on the effects of each of these two attributes on future stock returns.

Francis and Soffer (1997) show that recommendation and forecast signals transport separate information in the US. Consequently, Bradshaw (2004), Chen and Chen (2009), Drake et al. (2011), Ke and Yu (2009), and Simon and Curtis (2011) demonstrate that analyst recommendation and earnings forecast signals are generally inconsistent with each other in the US. Specifically, Bradshaw (2004) document that in the US, stock recommendations are either unrelated or negatively related with estimates from residual income valuation models that use analysts' earnings forecasts. Barniv et al. (2010) show similar findings in an international sample with 22 countries. Ke and Yu (2009) suggest that analysts may not effectively translate their earnings forecasts into stock recommendations due to their economic incentives and behavioral biases in the US.[2] On the other hand, Brown, Call, Clement, and Sharp (2015), Brown, Call, Clement, and Sharp (2016) survey financial analysts in the US and Canada who report that their earnings forecasts are the second most useful input (among 11 determinants) for determining stock recommendations and 77.3 % of the analysts agree that earnings forecasts are very useful for this purpose.

2.1. Analyst recommendations, earning forecasts and market reaction

Literature on analyst recommendations found that the effects of analyst recommendations on future stock returns are influenced by several factors, including recommendation biases, optimism, rewards, and reputation (Bradshaw et al., 2006; Dugar & Nathan, 1992; Irvine, 2004; Jackson, 2005; Lin & McNichols, 1998).[3] As a result, the evidence on the relations between analysts' *level* stock recommendations and future market returns, as well as the evidence on the relations between analysts' recommendation *revisions* and future returns, are mixed.[4] For example, Womack (1996) shows that size-adjusted prices increase, on average, by 3.0 % for upgrades to buy recommendations and drop by 4.7 % for downgrades to sell recommendations in the three-day event-period window. Howe, Unlu, and Yan, (2009) find that changes in aggregate analyst recommendations predict future market excess returns.[5] In contrast, the findings in Drake et al. (2011) imply negative effects of recommendation revisions on future stock returns. The findings in Altınkılıç et al. (2016) that analysts' recommendation revisions predict future long-term returns for 1997–2002, but not during the high-frequency algorithmic trading period of 2003–2010, indicate that the relation between these two variables is not consistent over time.

Literature on analyst earnings forecasts, on the other hand, has consistently showed a positive market response to analysts' earnings forecast *revisions*.[6] For example, Brown and Hugon (2009), Francis and Soffer (1997), Jung et al. (2019), and Stickel (1991) document a positive relation between forecast revisions and stock returns in the US. Bandyopadhyay, Brown, and Richardson (1995) document similar results in Canada, and Arand, Kerl, and Walter (2015) do so in other countries (including France, Germany, Italy, Spain, the U K, Switzerland, and Japan).

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[2] Ke and Yu (2009) provide a comprehensive analysis of the factors associated with the disconnection between individual analysts' stock recommendations and earnings forecasts, showing that the translations of analysts' forecasts into profitable stock recommendations are adversely affected by a strong reliance on trading commissions and in periods of extreme investor sentiments. Barniv, Hope, Myring, and Thomas (2009) and Chen and Chen (2009) find that the series of regulations enacted between 2000 and 2003 induce less optimistic stock recommendations, which in turn mitigate or reverse the negative associations between recommendations and earnings-forecast-based valuations.

[3] Bradshaw et al. (2006) document biased analysts' recommendations. Dugar and Nathan (1992) show that analysts of brokerage firms that provide investment banking business to companies are more optimistic than noninvestment banking analysts in their recommendations. Lin and McNichols (1998) find that lead and co-underwriter analysts' growth forecasts and recommendations are significantly more favorable than those made by unaffiliated analysts. Irvine (2004) finds that analysts generate higher trading commissions through issuing positive stock recommendations. Jackson (2005) demonstrates that analysts face a conflict between issuing accurate forecasts to build reputation versus misleading investors via optimistic forecasts and recommendations to generate short-term increases in trading commissions.

[4] Barber, Lehavy, McNichols, and Trueman (2001), Billings, Buslepp, and Huston (2014), and Groysberg, Healy, Serafeim, and Shanthikumar (2013) generally document positive effects of *level* stock recommendations on future returns, but Bradshaw (2004), Barniv et al. (2009), and Barniv et al. (2010) show insignificant or negative effects.

[5] In addition, Barber et al. (2001) document a 2.1% 3-day size-adjusted return for a change from strong sell to strong buy recommendation and -6.79% for a change from strong buy to strong sell recommendation. Jegadeesh, Kim, Krische, and Lee (2004) document a significant difference of about 3% between increase and decrease in stock recommendations. Mikhail, Walther, and Willis (2004) demonstrate a moderate 5-day buy-and-hold positive (negative) excess return for a change from sell to buy (buy to strong sell) recommendation. Mikhail, Walther, and Willis (2007) document that large (small) investors earn an average of 5.4% (0.4%) return following upgrades and 4.9% (−3.7%) following downgrades.

[6] Dechow, Hutton, and Sloan (1999), Frankel and Lee (1998), Loh and Mian (2006), and Ohlson (1995) also suggest and document that analysts' valuation estimates generated using earnings forecasts positively affect future stock returns.

2.2. Recommendation–forecast consistency and market reaction

The first purpose of this study is to examine whether consistent recommendation–forecast pairs result in stronger market reactions to recommendation and forecast revisions than inconsistent pairs in a large international sample. Kane, Lee, and Marcus (1984), Louis and Robinson (2005), and Rees and Sivaramakrishnan (2007) suggest that investors who receive two noisy signals assign more credence to the reinforcing signals than to the contradictory ones. Relying on Baker and Wurgler (2006), Hong and Kubik (2003), Jackson (2005), Kecskes, Michaely, and Womack (2010), and Simon and Curtis (2011), Brown and Huang (2013) expect that US investors react more strongly to consistent recommendation-forecast pairs because these pairs tend to be more reliable. Specifically, they develop two measures for the incremental effects of consistency on the market reaction to stock recommendations and earnings forecasts, which are the interactions of recommendation–forecast consistency with recommendation revisions and with forecast revisions, respectively. Brown and Huang (2013) demonstrate positive and significant coefficients on the two interactions, suggesting that consistent recommendation- forecast pairs receive stronger market reactions to recommendation and forecast revisions than inconsistent ones in the US.

We expect similar findings for our international sample for at least three reasons. First, due to the globalization of security markets, financial analysts have become more globally oriented with increasing cross-country operations and real-time access to financial statements, market data, and media information, suggesting similarities in the information environments between US and non-US countries. Second, prior studies (Balboa et al., 2009; Barniv et al., 2010; Dubois, Fresard, & Dumontier, 2013; Moshirian et al., 2009) document that analysts in the non-US countries issue optimistic and biased recommendations as frequently as their U. S. counterparts. Thus, we expect that consistent pairs reflect lower biases in recommendation revisions than inconsistent pairs in non-US countries, as in the US. Third, the global trends enhance analysts' incentives to provide more superior earnings forecasts across countries. Thus, we expect that recommendation–forecast consistency would lessen potential conflicting effects of earnings forecast revisions on future stock returns. Overall, the preceding discussions lead us to predict that consistent recommendation-forecast pairs have stronger market reactions than inconsistent pairs in our international sample, as stated in the first hypothesis:

H1. Ceteris paribus, recommendation-forecast consistency adds incremental positive effects on the market reactions to analysts' stock recommendation revisions and earnings forecast revisions for the international sample.

2.3. Investor protection (IP) effects on the market reaction to consistent recommendation revisions and forecast revisions

Global research on the effects of analyst outputs has partitioned countries into various regimes. For example, Bae, Tan, and Welker (2008) and Hope (2003) separate countries by their financial reporting systems, while Ahmed, Chalmers, and Khlif (2013) and Barniv, Myring, and Thomas (2005) segregate countries by their legal origins. These studies find that countries may differ in their capital market characteristics, investor protection, regulations, accounting disclosure practices, legal origins, and other attributes, which can lead to variations in analyst behaviors across countries.

Our second research focus is on the effect of IP on the relations of consistent recommendation-forecast pairs with stock returns. This examination is important for several reasons. First, IP may affect financial reporting quality and the overall information environment, and thus drive the extent of analyst coverage and the quality of analyst research outputs. Compared to weak-IP countries, strong-IP countries are characterized by larger capital markets (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1997), in which ownership is more widely dispersed across individual investors (Giannetti & Koskinen, 2010); and analysts in strong-IP countries are more incentivized to bias stock recommendations and to issue optimistic recommendations because individual investors observe stock recommendations more often in these countries due to the ease of use and low cost.[7] Consistent with this notion, Barniv et al. (2010) show that analysts' biased stock recommendations are more common in strong-IP countries than in weak ones, which occur partially because of the higher demand for analysts' research by investors in strong-IP countries than in weak-IP countries.[8] The authors also document negative (positive) relations between recommendations and stock returns in strong-IP (weak-IP) countries. This finding implies that investors rely less (more) on stock recommendations in strong (weak) IP countries. Therefore, we expect recommendation–forecast consistency to add more reliability to the informativeness of stock recommendations in strong- IP countries as compared to weak-IP countries because this consistency lessens the prevalent biases and optimism in analysts' recommendations and also enhances investors' reliance on analyst recommendations.

From the earnings forecast perspective, we expect consistent forecast–recommendation pairs to have a stronger impact on returns in strong-IP countries, due to higher investors' demand for and more usefulness of analyst earnings forecasts in these countries than in weak-IP countries. Specifically, Basu et al. (1998), DeFond and Hung (2007), Giannetti and Koskinen (2010), Hope (2003), and Leuz, Nanda, and Wysocki (2003) show that reported earnings are more useful and have better predictability (due to greater use of accrual-basis accounting and reduced earnings management) in common law countries and in countries with stronger IP. These studies suggest that investors' demand for reported earnings and analyst earnings

[7] The most optimistic distributions of stock recommendations occur in strong-IP countries (e.g., the US and the United Kingdom (UK)), and the least optimistic distributions appear in weak-IP countries, such as France and Germany (Balboa et al., 2009).

[8] Barniv et al. (2010, Table 1) show an almost identical partition of countries by investor-participation rates and IP scores.

forecasts is higher in strong-IP countries and lower in weak-IP countries. This demand induces greater usefulness and informativeness of analysts' earnings forecasts and their revisions in strong-IP countries than in weak-IP countries. This further incentivizes analysts to provide superior earnings forecasts, which increases the competition among analysts in high investor participation countries where IP is generally stronger (Barniv et al., 2010). In contrast, Barniv et al. (2005) and DeFond and Hung (2007) suggest that in weak-IP countries, the demand for earnings forecasts and their revisions is weaker as non-earnings information plays a greater role in equity pricing, leading to less incentives for analysts to expend effort and expertise in providing superior earnings forecasts. Correspondingly, Kerl and Pauls (2014) provide evidence to confirm a considerably lower level of bias in analysts' earnings forecasts in strong-IP than weak IP countries. Moreover, Barniv et al. (2010), Black and Carnes (2006), and Capstaff and Rees (1998) document stronger positive effects of accurate and reliable earnings forecasts on stock returns in strong-IP countries where financial statements are more transparent and earnings forecasts are more accurate than in weak-IP countries.[9] Hence, assuming that analysts' earnings forecasts are generally superior when they are consistent with the same analysts' recommendations, we expect analysts' consistent pairs to have greater impact on future returns in strong-IP countries than in weak-IP countries. In sum, the preceding discussions lead to our second hypothesis:

H2. Ceteris paribus, the incremental effects of recommendation-forecast consistency on the market reactions to analysts' stock recommendation revisions and earnings forecast revisions are greater in strong-IP countries than in weak-IP countries.

2.4. The effects of International Financial Reporting Standards (IFRS) adoption on the market reaction to consistent recommendation revisions and forecast revisions

While research on the overall benefits of IFRS adoption has not produced consistent results, studies discussed below provide evidence on the positive effects of IFRS adoption on financial analyst behaviors.[10] For instance, regarding analyst stock recommendation revisions, Charitou et al. (2018) show that both analysts' stock recommendation upgrades and downgrades are more informative to investors following IFRS adoption in Europe. They also note that analysts' downgrades are more informative after IFRS adoption for firms in both high and low enforcement environments (i.e., countries with high legal enforcement and countries with low legal enforcement). Analysts' upgrades, however, are more informative only if they are issued for firms domiciled in high enforcement countries. Regarding analyst earnings forecasts, Horton, Serafeim, and Serafeim (2013), and Tan, Wang, and Welker (2011) find that IFRS adoption improves analyst forecast accuracy, reduces forecast dispersion, and tends to attract foreign analysts. Hodgdon et al. (2008) show that individual analysts' forecast errors were negatively related to IFRS compliance. The authors present evidence that IFRS-compliant firms benefitted since financial analysts were better able to predict earnings that are relevant to valuing firms' securities. Houqe et al. (2014) find a significant improvement in forecast accuracy and forecast dispersion following IFRS adoption in three civil law Western European countries (all three are classified as weak-IP countries by World Economic Forum (WEF), 2012).[11]

Following these studies, we expect IFRS adoption to positively influence analyst behaviors such that it will enhance the incremental effects of recommendation–forecast consistency on the market reactions to analyst recommendation revisions and earnings forecast revisions. This leads to our third research hypothesis:

H3. Ceteris paribus, the incremental effects of recommendation-forecast consistency on the market reactions to analysts' stock recommendation revisions and earnings forecast revisions are greater in IFRS adopting countries than in non-IFRS countries.

3. Research design

To examine the market reaction to recommendation-forecast consistency in our international sample, we start with the following model (1), as adapted from Brown and Huang (2013), for testing H1 on the full sample and across the buy, hold, and sell recommendations:

[9] Capstaff and Rees (1998) find that analysts' forecasts are a little less accurate and that the forecasting process appears to be less efficient in Germany (a weak-IP country) than in the UK (a strong-IP country), but that the bias is greater in the UK. Black and Carnes (2006) find that among Asia-Pacific nations (which tend to have strong IP), those that are more open to foreign trade and investment and those that are ranked more highly on the World Economic Forum Global Competitiveness Index have more transparent financial statements and more accurate analyst forecasts.

[10] For example, there are mixed findings on whether IFRS changed companies' accounting reporting and disclosures. On the one hand, Hodgdon and Hughes (2016) suggest that IFRS creates changes in the decisions to make a disclosure and affects the length and content of those disclosures in the European Union. On the other hand, Haller and Wehrfritz (2013) find a tendency by most firms in Germany and the UK to retain the accounting policies required by national rules when adopting IFRS; apparently after adopting IFRS, these companies have little significant changes in accounting choices over time from 2005 to 2009.

[11] Hsu and Pourjalali (2015) show that analysts forecasts are more accurate after changing the Taiwanese consolidation standards to the International Accounting Standard (IAS) No. 27. He and Lu (2017) find that analysts are more likely to issue sales forecasts after firms mandatorily adopt IFRS; analysts' sales forecasts become more accurate and less dispersed after firms mandatorily adopt IFRS; and the effect of IFRS adoption is stronger in countries with strong law enforcement.

$$RET_{i,j,t} = \alpha_0 + \alpha_1 CON_{i,j,t} + \alpha_2 REC\_REV_{i,j,t} + \alpha_3 EARN\_REV_{i,j,t} + \alpha_4 \mathbf{CON_{i,j,t} * REC\_REV_{i,j,t}} + \boldsymbol{\alpha_5 CON_{i,j,t} * EARN\_REV_{i,j,t}} + \sum Controls_{i,j,t} + \sum Control_{i,j,t} * REC\_REV_{i,j,t} + \sum Controls_{i,j,t} * EARN\_REV_{i,j,t} + \varepsilon_{i,j,t}, \quad (1)$$

The dependent variable (RET) is the monthly excess stock return.[12] Detailed definitions of the dependent and independent variables, including the eight analyst and forecast characteristics used as control variables in model (1), are provided in Appendix A. The interactions of the eight control variables with a recommendation revision (REC_REV) and an earnings forecast revision (EARN_REV), respectively, are also included in the model.

Similar to Brown and Huang (2013), our two variables of interest for testing H1 are the interactions of the consistency dummy (CON) with a recommendation revision (CON * REC_REV) and an earnings forecast revision (CON * EARN_REV). The coefficients on these two variables indicate the incremental effects of consistency on the market reactions to stock recommendation revisions and earnings forecast revisions. Specifically, a positive coefficient on CON * REC_REV indicates that market reaction to an analyst's recommendation revision will be stronger if the analyst's stock recommendation and his/her earnings forecast are consistent than if they are not. A positive coefficient on CON * EARN_REV indicates that market reaction to an analyst's forecast revision will be stronger if the analyst's stock recommendation and his/her earnings forecast are consistent than if they are not.

Next, we focus on the subsamples with IP scores, and use regressions based on model (1) to test H2 separately for the strong-IP and weak-IP subsamples. We then compare the differences in the coefficients on CON * REC_REV and CON * EARN_REV between the two subsamples, and report the results for all of the observations and across the buy, hold, and sell recommendation levels in each subsample. Similar to testing H1, we include the eight analyst and forecast characteristics as well as their interactions with REC_REV and EARN_REV (see Appendix A) as control variables when testing H2. We use the five measures from the WEF (World Economic Forum (WEF, 2012) to generate the IP score for each country. This IP score contemporarily controls for recent global trends. The first four measures, which range from 1 (extremely weak) to 7 (extremely strong), are: (1) the efficacy of corporate boards, (2) the strength of auditing and accounting standards, (3) the protection of minority shareholders' interests, and (4) judicial independence. The fifth measure is the strength of investor protection, which ranges from 1 (extremely weak) to 10 (extremely strong). Similar to the partition by investor participation provided in Barniv et al. (2010), we use the mean score across the five measures to classify a country as a strong-IP (weak-IP) country if its IP score is above (below) the mean. This mean score places slightly more weight on the 10-point scale measure of the strength of investor protection than on the 7-point scales for each of the other four measures.

To test H3, we partition the full international sample into four subsamples: (1) a subsample of analyst-firm-year observations for companies from IFRS adopting countries after IFRS adoption (AIFRS) and (2) a subsample of all analyst-firm-year observations from companies which have not adopted IFRS (ANIFRS). The ANIFRS subsample further consists of two subsamples: (3) observations from the IFRS adopting countries before adoption when companies used domestic (local) generally accepted accounting principles (BIFRS), and (4) observations from countries where IFRS reporting was not allowed during our whole sample period, such as Japan and India (NIFRSC). We run regression model (1) for each of these four subsamples, and then compare the differences in the coefficients on CON * REC_REV and CON * EARN_REV among the four subsamples. The same eight control variables used in testing H1 and H2 are also used in testing H3. We further replicate the testing of H3 in the subsamples with IP scores.

4. Data, sample, and major descriptive statistics

4.1. Data and sample

We obtain detailed analyst stock recommendations and earnings forecasts from Thomson Reuters I/B/E/S. We reverse the I/B/E/S coding of stock recommendations using a 5-point scale, with 1 = strong sell, 2 = sell, 3 = hold, 4 = buy, and 5 = strong buy, to make the interpretation of our results more intuitive, with higher numbers indicating more favorable recommendations. Each observation in the model is either a consistent recommendation-forecast pair that equals one or an inconsistent pair that equals zero.

Similar to Brown and Huang (2013), we require our sample observations to meet five specific requirements. First, all earnings forecasts must be accompanied by stock recommendations that are issued by the same analysts on the same day, so that consistency can be defined unambiguously. Second, firms are followed by at least three analysts during a year, to allow for reliable estimates of the earnings forecast and the stock recommendation consensus. Third, an analyst issues more than one forecast for a given firm, to ensure the active status of the analyst. Fourth, an analyst forecast or recommendation is not equal to its consensus, to ensure unambiguous definition of consistency. Finally, the information about price and dividends

[12] Unlike Brown and Huang (2013), who use 3-day accumulated excess returns in the US, we use the monthly excess returns because of the limited access to daily stock prices for many companies in our large global sample. This generated further interest to examine whether the monthly returns in our global sample are affected by consistent forecast-recommendation pairs, similar to the short return interval used by Brown and Huang (2013). We examine monthly returns for a random US sample and find that the monthly results (untabulated) are similar to the effects of the two variables of interest on the shorter-3-day returns interval reported by Brown and Huang (2013).

Table 1
Sample selection.

Earnings forecasts accompanied by recommendations on the same day	559,305
Less: Firms followed by fewer than three analysts in a year	78,871
Less: Analysts who issued only one forecast for the firm in a year	85,058
Less: Consensus forecasts or recommendations not available in the previous 90 days	37,054
Less: Recommendations that equal the recommendation consensus or earnings forecasts that equal the forecast consensus	40,705
Less: Firms with missing stock return data or some relevant country data and countries with fewer than 10 observations	80,116
Final sample with available buy-and-hold monthly market-adjusted returns (RET)	237,601

are obtainable. Table 1 presents the sample selection process. Appendix B reports the number of firms, the number of analyst-firm-year observations, and the mean percentage of consistent pairs by country. The countries are partitioned by IP regimes.

Our full international sample consists of 237,601 observations from 8358 firms in 81 countries with fiscal-year-ends from January 2001 to December 2014, along with analyst data ending in September 2015 to accommodate for late releases of earnings and financial statements by some of the firms in our sample. To test our first hypothesis, we start with our full sample which includes analyst-firm-year observations in all countries with available data. Then, we use a subsample of observations with IP scores versus a subsample of countries without IP classification. This analysis enables us to better comprehend and extend the testing of our first hypothesis. Next, we test our second hypothesis using two subsamples of observations from strong-IP and from weak-IP countries. Finally, we test our third hypothesis using the full sample as well as the subsamples with IP scores.

4.2. Major descriptive statistics, consistency, frequency, and sample partitions

Table 2 shows the consistency frequency between stock recommendations and earnings forecasts for the full sample and by IP classification, year, and consistency. Panel A shows that 55.3 % of the observations in the full sample are consistent pairs of analysts' recommendations and forecasts. That is, the global consistency frequency is slightly lower than the 58.3 % (of 92,764 analyst-firm-year observations) documented by Brown and Huang (2013) in the US. Panel B summarizes the number of firms and total analyst-firm-year observations by the regimes of IP countries. The sample consists of 4434 firms with 133,262 firm-year observations in strong-IP countries, 3477 firms with 96,910 analyst-firm-year observations in weak-IP countries, and 447 firms with 7429 analyst-firm-year observations in countries without IP classification. Panel B also tabulates the percentages of consistent pairs for countries with strong, weak, and no IP scores—which are 55.7 %, 54.8 %, and 53.1 %, respectively. Panel C presents these distributions of observations by year across the strong-, weak-, and no-IP countries. The number of annual observations increases monotonically from 2001 to 2009 and then decreases monotonically from 2010 to 2014. Panel D presents the consistency frequency by recommendation level in the strong-, weak-, and no-IP countries. Following previous studies (Brown & Huang, 2013; Francis & Soffer, 1997), we classify strong buy and buy recommendations into the buy category, and strong sell and sell into the sell category. We find that the number of buy recommendations (107,461) is far greater than the number of sell recommendations (45,680). In addition, consistency is more evident for sell recommendations (64.6 %) than for hold (52.9 %) or buy recommendations (53.6 %). Furthermore, the percentages of consistent pairs tend to be similar for strong-IP and weak-IP countries in each of the buy, hold, and sell recommendation categories.

Table 3 presents the means of the monthly market-adjusted returns (RET), recommendation revisions (REC_REV), and earnings forecast revisions (EARN_REV), partitioned by recommendation level. We report the means for all observations, followed by the means for strong-IP and weak-IP countries. The means of RET, REC_REV, and EARN_REV for consistent buy (hold and sell) pairs are significantly higher (lower) than those for inconsistent pairs for the full sample and the strong-IP and weak-IP subsamples.

5. Results

5.1. Tests for H1

Table 4 reports the results of regressing RET on stock recommendation revisions and earnings forecast revisions conditional on consistency and clustered by company and by year. Panel A shows the regression results for our full sample. Panels B and C report the regression results for countries with and without IP scores, respectively. We document very similar findings for Panels A and B. Specifically, Columns (1) of Panels A and B report the results for our baseline model without control variables and show that the coefficients on our variables of interest, CON * REC_REV and CON * EARN_REV, are positive (as expected) and statistically significant. Columns (2) of Panels A and B report the results for our full model, which

Table 2
Sample, recommendation-forecast consistency, and investor protection.

Panel A: Consistency for the full sample of 81 countries

Full sample	No. of firm-year observations	No. of consistent observations	Consistency (CON) %
	237,601	131,348	55.3 %

Panel B: Observations by strong, weak and no investor protection (IP) Scores

Region	Number of firms	Number of analyst-firm-year observations	Consistency (CON) %	Investor protection (IP) score
Total 17 Strong IP countries	4434	133,262	55.70%	5.92
Total 33 weak IP countries	3477	96,910	54.81 %	4.48
Total 31 countries without IP scores	447	7429	53.05%	
Total 81 countries	8358	237,601	55.30%	

Panel C: Number of observations across years by investor protection (IP) group

Year	Strong IP countries	Weak IP countries	Countries with no IP score
2001	3554	2936	34
2002	5099	3274	43
2003	8929	6492	135
2004	10,724	6221	148
2005	8558	5616	198
2006	8716	5661	263
2007	10,590	7209	514
2008	13,504	9773	868
2009	14,231	10,968	870
2010	12,203	9473	924
2011	11,919	9408	1052
2012	9824	7837	925
2013	8527	6191	741
2014	6884	5851	714
Total	133,262	96,910	7429

Panel D: Consistency by recommendation level

Recommendation level	Investor protection level of countries	No. of total observations	No. of consistent observations	Consistency (CON) %
Buy	Strong	59,555	32,447	54.48%
	Weak	44,387	24,028	54.13%
	No IP score	3519	1831	52.03%
	Total	107,461	58,306	53.55%
Hold	Strong	48,105	25,192	52.37 %
	Weak	33,714	17,381	51.55%
	No IP score	2641	1447	54.79%
	Total	84,460	44,020	52.90%
Sell	Strong	25,602	16,215	63.33%
	Weak	18,809	11,957	63.57%
	No IP score	1269	850	66.98%
	Total	45,680	29,024	64.63%
Full sample		**237,601**	**131,353**	

Notes: Buy includes buy and strong buy recommendations. Sell includes sell and strong sell recommendations.

also includes the analyst and forecast controls and their interactions with REC_REV and EARN_REV.[13] They show that the coefficients on CON * REC_REV and CON * EARN_REV remain positive and significant. Overall, results from Columns (1) and (2) of Panel A support our first hypothesis on the incremental positive effect of consistency signals on the market reactions to stock recommendation revisions and earnings forecast revisions for our international sample, before and after controlling

[13] The 24 coefficients on the eight control variables and their interactions with REC_REV and EARN_REV are not tabulated to save space. The complete presentation of Tables 4, 5 and 7 with all controls are available upon request. Our presentation approach is similar to Brown and Huang (2013) and enables the comparison with BH's US findings. The directions of signs and the levels of significance for the coefficients on CON, REC_REV, and EARN_REV reported in most columns of Table 4 are consistent with Brown and Huang (2013).

Table 3
Buy-and-hold monthly market-adjusted returns, earnings forecast revisions, and recommendation revisions by recommendation level.

		ALL				Strong IP				Weak IP			
Recommendation	Variable	ALL	Consistent	Inconsistent	DIFF	ALL	Consistent	Inconsistent	DIFF	ALL	Consistent	Inconsistent	DIFF
BUY	*N*	107,461	58,306	49,155	9151	59,555	32,447	27,108	5339	44,387	24,028	20,359	3669
	Mean RET	0.015	0.021	0.007	0.013***	0.015	0.023	0.006	0.016***	0.014	0.018	0.009	0.009***
	Mean REC_REV	0.937	0.961	0.907	0.055***	0.955	0.983	0.923	0.060***	0.919	0.941	0.893	0.047***
	Mean EARN_REV	0.001	0.012	−0.012	0.024***	0.0008	0.012	−0.013	0.025***	0.001	0.012	−0.012	0.024***
HOLD	*N*	84,460	44,020	40,440	3580	48,105	25,192	22,913	2279	33,714	17,381	16,333	1048
	Mean RET	−0.011	−0.017	−0.004	−0.013***	−0.011	−0.019	−0.002	−0.016***	−0.011	−0.015	−0.007	−0.008***
	Mean REC_REV	−0.430	−0.480	−0.376	−0.104***	−0.430	−0.479	−0.375	−0.103***	−0.423	−0.473	−0.370	−0.103***
	Mean EARN_REV	−0.004	−0.010	0.002	−0.012*	−0.004	−0.010	0.003	−0.013***	−0.004	−0.009	0.002	−0.011***
SELL	*N*	45,680	29,022	16,658	12,364	25,602	16,215	9387	6828	18,809	11,957	6852	5105
	Mean RET	−0.028	−0.037	−0.013	−0.024***	−0.030	−0.040	−0.014	−0.026***	−0.025	−0.032	−0.011	−0.022***
	Mean REC_REV	−1.518	−1.528	−1.500	−0.029***	−1.510	−1.522	−1.490	−0.032***	−1.520	−1.528	−1.506	−0.022*
	Mean EARN_REV	−0.010	−0.024	0.014	−0.038***	−0.009	−0.022	0.014	−0.036***	−0.011	−0.025	0.015	−0.040***

Notes: Appendix A provides definitions for the variables. *** Significant at 1% level. ** significant at 5% level. * significant at 10 % level. Significance levels are based on two-tailed tests.

Table 4
Regressions of monthly market-adjusted returns on recommendation revisions and forecast revisions, conditional on consistency.

Panel A: All observations

VARIABLES	(1) ALL (t-stat)	(2) ALL + Controls (t-stat)	(3) BUY (t-stat)	(4) HOLD (t-stat)	(5) SELL (t-stat)
Constant	0.0001	−0.0010	0.0098	−0.0074	−0.0295
	(−0.06)	(−0.63)	(2.82)***	(−2.38)**	(−3.39)***
CON	−0.0024	−0.0025	0.0039	−0.0021	−0.0135
	(−4.65)***	(−3.62)***	(2.30)**	(−1.40)	(−3.08)***
REC_REV	0.0010	−0.0064	−0.0118	−0.0256	−0.0199
	(2.54)**	(−4.88)*	(−4.05)***	(−6.31)***	(−3.80)***
EARN_REV	0.0502	−0.3496	−0.5000	−0.1459	−0.4682
	(2.38)**	(−5.25)***	(−4.83)***	(−1.35)	(−3.40)***
CON * REC_REV	**0.0106**	**0.0124**	**0.0067**	**0.0243**	**0.0048**
	(20.1)* **	**(17.4)*** **	**(4.60)*** **	**(11.4)*** **	**(1.95)***
CON * EARN_REV	**0.3692**	**0.3257**	**0.4779**	**0.1018**	**0.3739**
	(11.9)* **	**(7.74)*** **	**(5.99)*** **	**(1.35)**	**(3.07)*** **
Model control variables	NO	YES	YES	YES	YES
R^2	2.08%	2.89 %	1.36 %	1.97 %	2.24 %
Observations	237,601	125,710	53,586	46,652	25,472

Panel B: Observations in 50 countries with Investor Protection Scores (strong and weak IP countries)

VARIABLES	(1) ALL (t-stat)	(2) ALL + Controls (t-stat)	(3) BUY (t-stat)	(4) HOLD (t-stat)	(5) SELL (t-stat)
Constant	−0.0001	−0.0008	0.0098	−0.0072	−0.0276
	(−0.10)	(−0.50)	(2.82)***	(−2.30)**	(−3.16)***
CON	−0.0024	−0.0025	0.0039	−0.0018	−0.0133
	(−4.62)***	(−3.51)***	(2.27)**	(−1.20)	(−2.98)***
REC_REV	0.0010	−0.0065	−0.0119	−0.0261	−0.0188
	(2.62)***	(−4.89)***	(−4.06)***	(−6.37)***	(−3.58)***
EARN_REV	0.0595	−0.3382	−0.4538	−0.1620	−0.4589
	(2.76)***	(−5.03)***	(−4.39)***	(−1.48)	(−3.27)***
CON * REC_REV	**0.0105**	**0.0123**	**0.0064**	**0.0245**	**0.0050**
	(19.9)* **	**(17.3)*** **	**(4.37)*** **	**(11.6)*** **	**(1.99)** **
CON * EARN_REV	**0.3697**	**0.3263**	**0.4843**	**0.1066**	**0.3775**
	(11.9)* **	**(7.67)*** **	**(5.97)*** **	**(1.42)**	**(3.03)*** **
Model control variables	NO	YES	YES	YES	YES
R^2	2.11 %	2.92 %	1.39 %	2.00 %	2.27 %
Observations	230,172	122,542	52,226	45,446	24,870

Panel C: Observations in 31 countries without IP scores

Variables	(1) ALL (t-stat)	(2) ALL + Controls (t-stat)	(3) BUY (t-stat)	(4) HOLD (t-stat)	(5) SELL (t-stat)
Constant	0.0005	−0.0084	0.0135	−0.0134	−0.1203
	(0.22)	(−0.83)	(0.61)	(−0.70)	(−1.75)*
CON	−0.0026	−0.0049	0.0038	−0.0160	−0.0158
	(−0.86)	(−1.17)	(0.39)	(−1.73)*	(−0.66)
REC_REV	0.0002	−0.0021	−0.0130	−0.0086	−0.0631
	(0.10)	(−0.30)	(−0.69)	(−0.38)	(−1.76)*
EARN_REV	−0.1306	−0.8060	−2.0283	0.4171	−0.6505
	(−1.67)*	(−2.48)**	(−4.02)***	(0.70)	(−1.53)
CON * REC_REV	**0.0121**	**0.0118**	**0.0158**	**0.0105**	**0.0013**
	(4.12)* **	**(2.77)*** **	**(1.77)***	**(0.83)**	**(0.10)**
CON * EARN_REV	**0.3612**	**0.2789**	**0.0680**	**−0.1610**	**0.1088**
	(2.52) **	**(1.36)**	**(0.19)**	**(−0.43)**	**(0.22)**
Model control variables	NO	YES	YES	YES	YES
R^2	1.74 %	3.59 %	5.74 %	4.31 %	4.99 %
Observations	7429	3168	1360	1206	602

for analyst and forecast factors that affect market reactions. The results from Columns (1) and (2) of Panel B show similar effect of consistency in countries with IP scores. Moreover, Columns (3) – (5) of Panels A and B show that the coefficients on CON * REC_REV and CON * EARN_REV are positive and significant across recommendation levels (except the coefficient on CON * EARN_REV for hold recommendations), indicating the incremental positive effects of consistency signals on the market reactions to analysts' stock recommendation revisions and earnings forecast revisions across recommendation levels for both our full sample and the countries with IP scores.

Panel C of Table 4 shows the regression results for 31 countries that have no IP scores. Column 1 shows that the coefficients on our two variables of interest, CON * REC_REV and CON * EARN_REV, are positive and statistically significant for our baseline model without the control variables. Columns 2 and 3 show that the coefficients on CON * REC_REV are positive and statistically significant with the control variables for all observations and for the buy recommendations.

In summary, our results suggest that consistent signals generate stronger market-adjusted returns than inconsistent signals.[14] The positive incremental effects of recommendation–forecast consistency seem to be valid for both REC_REV and EARN_REV, across recommendation levels and across country regimes. Taken together, the findings support H1, suggesting that, similar to the US results, the market reacts positively to consistent recommendation–forecast pairs in our international sample and subsamples.

5.2. Tests for H2

Panels A and B of Table 5 show the regression results for the strong-IP and weak-IP subsamples, respectively. We focus on comparing the impacts of our variables of interest on market-adjusted returns across the two types of IP countries. Panel A shows that in the strong-IP sample, the coefficients on our two variables of interest are positive and statistically significant for all observations in both the model without controls (Column 1) and the model with controls (Column 2). Furthermore, the coefficients on these two variables are positive and significant for the buy, hold, and sell recommendations, as presented in Columns 3, 4, and 5, respectively.

Panel B of Table 5 presents the results for weak-IP countries. The coefficients on our two variables of interest are positive and significant for all observations (Columns 1 and 2). However, these coefficients are less significant than those reported for these two variables in Panel A. For the buy recommendations (Column 3), the two coefficients are positive and significant. For the hold recommendations (Column 4), the coefficient on CON * REC_REV is positive and significant, but the coefficient on CON*EARN_REV is negative and insignificant. Finally, both coefficients are not significant for the sell recommendations. Overall, the results reported in Panels A and B generally imply that our two variables of interest have stronger effects on stock returns in strong-IP countries than in weak-IP countries.

Panel C of Table 5 specifies an explicit test to compare the estimated coefficients in the regression results for the strong-IP versus weak-IP samples. The results provide further support to H2, suggesting more significant positive market reactions to consistent stock recommendation revisions and consistent earnings forecast revisions in strong-IP countries than in weak-IP countries for all observations (Columns 1 and 2), and for the hold and sell recommendations (Columns 4 and 5).

5.3. Comparison with the US results

Table 6 summarizes and compares our international results reported in Tables 4 and 5 with results reported by Brown and Huang (2013) in the US. The coefficients and signs on our two variables of interest, as reported in Columns 4 and 5, are positive and significant for our international sample and subsamples, and similar to those reported in the US. Our coefficients and signs on the other three explanatory variables tend to be similar to those reported by Brown and Huang (2013) as well. These findings are in line with our first research objective showing that the effects documented in the US can be generalized to a non-US global setting.

5.4. The effect of international financial reporting standards (IFRS) adoption

Table 7 reports the regression results for the IFRS adopting subsample (AIFRS) and the three non-IFRS subsamples (ANIFRS, BIFRS and NIFRSC). Panel A of Table 7 show that the coefficients on our two variables of interest are positive and statistically significant for all observations in the regressions without controls (Columns 1–4) and in the regressions with controls (Columns 6–8). The significant estimated coefficients on our two variables of interest are highest for the IFRS adopter subsample (AIFRS). Panel B of Table 7 compares the estimated coefficients on our two variables of interest between the AIFRS subsample and the three subsamples of the non-IFRS observations. The differences in the coefficients on CON * REC_REV are positive and statistically significant when comparing the AIFRS subsample with each of the three non-IFRS subsamples. The differences in the coefficients on CON*EARN_REV tend to be positive and statistically significant across the three comparisons. Overall, the above findings suggest that our variables of interest positively affect stock returns for firms that report either

[14] As reported in Panel A, consistent recommendation revisions result in market-adjusted returns that are more than eleven times the magnitude of those to inconsistent ones, i.e., (0.0106 + 0.0010) / 0.0010 = 11.6. This is greater than consistent earnings forecast revisions that result in market-adjusted returns that are about eight times the magnitude of those to inconsistent ones, i.e., (0.3692 + 0.0502) / 0.0502 = 8.3.

Table 5
Regressions of Monthly Market-Adjusted Returns on Recommendation Revisions and Forecast Revisions, Conditional on Consistency by Investor Protection.

Panel A: Informativeness of consistency across Strong Investor Protection countries

Variables	(1) ALL (t-stat)	(2) ALL + Controls (t-stat)	(3) BUY (t-stat)	(4) HOLD (t-stat)	(5) SELL (t-stat)
Constant	−0.0001	−0.0002	0.0144	−0.0022	−0.0254
	(−0.19)	(−0.08)	(3.00)***	(−0.52)	(−2.06)**
CON	−0.0026	−0.0017	0.0053	−0.0022	−0.0102
	(−3.67)***	(−1.76)*	(2.22)**	(−1.11)	(−1.75)*
REC_REV	0.0006	−0.0086	−0.0174	−0.0228	−0.0203
	(1.08)	(−4.81)***	(−4.37)***	(−4.01)***	(−2.74)***
EARN_REV	0.0872	−0.3946	−0.4045	−0.2791	−0.7308
	(3.08)***	(−4.13)***	(−2.86)***	(−1.79)	(−3.66)***
CON * REC_REV	**0.0120**	**0.0140**	**0.0074**	**0.0288**	**0.0065**
	(17.03)***	**(14.9)*****	**(3.73)*****	**(10.3)*****	**(1.91)***
CON * EARN_REV	**0.4194**	**0.4157**	**0.4111**	**0.2095**	**0.8056**
	(9.74)***	**(7.02)*****	**(3.96)*****	**(1.95)***	**(5.08)*****
Model control variables	NO	YES	YES	YES	YES
R^2	2.53%	3.43 %	1.85 %	2.41 %	3.21 %
Observations	133,262	70,702	30,155	26,452	14,095

Panel B: Informativeness of consistency across Weak Investor Protection countries

Variables	(1) ALL (t-stat)	(2) ALL + Controls (t-stat)	(3) BUY (t-stat)	(4) HOLD (t-stat)	(5) SELL (t-stat)
Constant	0.0000	−0.0020	0.0043	−0.0134	−0.0331
	(0.08)	(−0.83)	(0.87)	(−2.97)***	(−2.74)***
CON	−0.0021	−0.0035	0.0018	−0.0012	−0.0165
	(−2.81)***	(−3.51)***	(0.74)	(−0.53)	(−2.51)**
REC_REV	0.0016	−0.0033	−0.0056	−0.0286	−0.0186
	(2.82)***	(−1.67)*	(−1.30)	(−4.91)***	(−2.55)**
EARN_REV	0.0225	−0.2421	−0.4654	−0.0252	−0.1780
	(0.68)	(−2.57)**	(−3.08)***	(−0.16)	(−0.95)
CON * REC_REV	**0.0084**	**0.0099**	**0.0053**	**0.0182**	**0.0039**
	(10.73)***	**(9.14)*****	**(2.49)****	**(5.88)*****	**(1.08)**
CON * EARN_REV	**0.3076**	**0.2160**	**0.6057**	**−0.0223**	**−0.0160**
	(6.99)***	**(3.56)*****	**(4.78)*****	**(−0.22)**	**(−0.09)**
Model control variables	NO	YES	YES	YES	YES
R^2	1.60%	2.37 %	1.13 %	1.73 %	2.11 %
Observations	96,910	51,840	22,071	18,994	10,775

Panel C: Tests for comparing the differences between strong and weak Investor Protection countries for estimated coefficients on the two variables of interest

Variables	(1) ALL Difference	(2) ALL + Controls Difference	(3) BUY Difference	(4) HOLD Difference	(5) SELL Difference
CON * REC_REV	0.0036***	0.0041***	0.0022	0.0107**	0.0026*
CON * EARN_REV	0.1118*	0.1998**	−0.1945	0.2318*	0.8216***
Model control variables	NO	YES	YES	YES	YES

Notes: Appendix A provides definitions for the variables, including the eight control variables (not reported in Table 5): ACCUR, LFR, FEXP, NFIRMS, FREQ, BSIZE, HORIZ, PACCUR. Interactions of the control variables with REC_REV and EARN_REV are included in the regressions, but not reported in the table. The interactions include ACCUR*REC_REV, ACCUR*EARN_REV, LFR*REC_REV, LFR*EARN_REV, FEXP*REC_REV, FEXP*EARN_REV, NFIRMS*REC_REV, NFIRMS*EARN_REV, FREQ*REC_REV, FREQ*EARN_REV, BSIZE*REC_REV, BSIZE*EARN_REV, HORIZ*REC_REV, HORIZ*EARN_REV, PACCUR*REC_REV and PACCUR*EARN_REV. The 24 coefficients on the control variables and their interactions are available upon request. *** indicates significance at 1%. ** indicates significance at 5%. * indicates significance at 10 %. Significance levels use two-tailed tests.

based on IFRS or based on domestic standards, but the positive effect is more significant for the IFRS adopters in the post-adoption period.

Panel C of Table 7 shows the regression results for the AIFRS subsample and the ANIFRS subsample within strong-IP countries and then within weak-IP countries. The coefficients on our two variables of interest are positive and statistically significant in all regressions (except the coefficient on CON*EARN_REV for the ANIFRS subsample in weak-IP countries in Column 8). The significant t-statistics is highest for the AIFRS subsample in strong-IP countries. Panel D of Table 7 compares

Table 6
Comparative Regressions of Monthly Market-Adjusted Returns on Recommendation Revisions and Forecast Revisions, Conditional on Consistency: Comparisons of Brown and Huang (2013) and Current Study.

Panel A: All observations with no control variables

Variables:	(1) CON	(2) REC_REV	(3) EARN_REV	**(4) CON * REC_REV**	**(5) CON * EARN_REV**	(6) Observations
US: Brown and Huang (2013)	−0.008	0.005	0.223	**0.019**	**0.796**	92,764
	(−14.3)***	(12.3)***	(5.5)***	**(32.1)*** **	**(15.1)*** **	
All Countries	−0.002	0.001	0.050	**0.011**	**0.369**	237,601
Panel A of Table 4	(−4.65)***	(2.54)**	(2.38)**	**(20.1)*** **	**(11.9)*** **	
Countries with IP scores	−0.002	0.001	0.060	**0.011**	**0.370**	230,172
Panel B of Table 4	(−4.62)***	(2.62)***	(2.76)***	**(19.9)*** **	**(11.9)*** **	
Countries without IP scores	−0.003	0.001	−0.131	**0.012**	**0.361**	7429
Panel c of Table 4	(−0.86)	(0.10)	(−1.67)*	**(4.12)*** **	**(2.52)** **	
Strong IP Countries.	−0.003	0.001	0.087	**0.012**	**0.420**	133,262
Panel A of Table 5	(−3.67)***	(1.08)	(3.08)***	**(17.0)*** **	**(9.74)*** **	
Weak IP Countries	−0.002	0.002	0.023	**0.008**	**0.308**	96,910
Panel B of Table 5	(−2.81)***	(2.82)***	(0.68)	**(10.7)*** **	**(6.99)*** **	

Panel B: All observations with control variables

Variables:	(1) CON	(2) REC_REV	(3) EARN_REV	(4) CON * REC_REV	(5) CON * EARN_REV	(6) Observations
US: Brown and Huang (2013)	−0.009	−0.007	−0.579	0.020	0.770	44,537
	(−11.6)***	(−5.1)***	(−3.5)***	(26.7)***	(8.5)***	
All Countries	−0.003	−0.006	−0.350	0.012	0.326	125,710
Panel A of Table 4	(−3.62)***	(−4.88)*	(−5.25)***	(17.4)***	(7.74)***	
Countries with IP scores	−0.003	−0.007	−0.338	0.012	0.326	122,542
Panel B of Table 4	(−3.51)***	(−4.89)***	(−5.03)***	(17.3)***	(7.67)***	
Countries without IP scores	−0.005	−0.002	−0.806	0.012	0.278	3168
Panel c of Table 4	(−1.17)	(−0.30)	(−2.48)**	(2.77)***	(1.36)	
Strong IP Countries	−0.002	−0.009	−0.395	0.014	0.416	70,702
Panel A of Table 5	(−1.76)*	(−4.81)***	(−4.13)***	(14.9)***	(7.02)***	
Weak IP Countries	−0.004	−0.003	−0.242	0.010	0.216	51,840
Panel B of Table 5	(−3.51)***	(−1.67)*	(−2.57)**	(9.14)***	(3.56)***	

the estimated coefficients on our two variables of interest between the AIFRS subsample and the ANIFRS subsample in strong-IP countries and then in weak-IP countries. Such differences tend to be statistically significant in strong-IP countries, but not statistically significant in weak-IP countries.

Taken together, the above findings generally suggest that our two variables of interest positively affect stock returns, for companies reporting either based on IFRS or domestic standards. Moreover, IFRS enhances the information content of the two signals, and higher enrichment is obtained in strong-IP countries than in weak-IP countries.

5.5. Supplemental analyses

Some countries have few observations. A large difference in the sample size of our study may suggest that any results could be affected by unbalanced samples. On the other hand, deleting countries with fewer observations is less representative of the global population of analyst-firm-year observations and generally limits the conclusions only to countries remaining in the reduced sample. In this analysis, we control for differences in the number of observations in our international sample by excluding the 12 countries (all of which are in the weak-IP subsample) with fewer than 300 analyst-firm-year observations of the computable data.[15]

After deleting the observations from the 12 weak-IP countries, the untabulated coefficients on our two variables of interest in the additional analyses are almost identical to those reported in all panels of Tables 4–6. Our conclusions from all analyses reported in the tables remain unchanged. In the subsequent analyses, we exclude countries with fewer than 200 observations and then those with fewer than 50 observations, and our conclusions remain unchanged.

[15] Each strong-IP country in our sample has more than 300 observations. We follow Leuz et al. (2003), who include countries with at least 300 observations in their international sample. Brown and Higgins (2005) exclude countries with fewer than 100 observations. Brochet, Naranjo, and Yu (2016) drop countries with fewer than 10 observations during their sample period. Cascino and Gassen (2015) require each country to have at least 50 firms with sufficient data. Hung, Li, and Wang (2015) and Zhong, Chourou, and Ni (2017) exclude countries with fewer than 20 firms from their analyses.

Table 7
The Effects of IFRS Adoption on Regressions of Monthly Market-Adjusted Returns on Recommendation Revisions and Forecast Revisions Conditional on Consistency.

Panel A: All observations

Variables	(1) AIFRS (t-stat)	(2) ANIFRS (t-stat)	(3) BIFRS (t-stat)	(4) NIFRSC (t-stat)	(5) AIFRS (t-stat)	(6) ANIFRS (t-stat)	(7) BIFRS (t-stat)	(8) NIFRSC (t-stat)
Constant	0.0007	−0.0012	−0.0018	0.0003	−0.0002	−0.0031	−0.0050	0.0019
	(1.21)	(−1.58)	(−1.95)*	(0.20)	(−0.11)	(−1.10)	(−1.49)	(0.37)
CON	−0.0017	−0.0039	−0.0034	−0.0048	−0.0020	−0.0038	−0.0023	−0.0075
	(−2.65)***	(−4.33)***	(−3.26)***	(−2.97)***	(−2.32)**	(−3.03)***	(−1.50)	(−3.36)***
REC_REV	0.0007	0.0025	0.0026	0.0009	−0.0065	−0.0054	−0.0051	−0.0071
	(1.49)	(3.71)***	(3.26)***	(0.67)	(−4.09)***	(−2.18)**	(−1.70)*	(−1.66)
EARN_REV	0.0692	0.1261	0.1007	0.0693	−0.3293	−0.2678	−0.2599	−0.5676
	(2.65)***	(3.35)***	(2.40)**	(0.90)	(−4.11)***	(−2.18)**	(−1.83)*	(−2.36)**
CON * REC_REV	**0.0116**	**0.0088**	**0.0092**	**0.0075**	**0.0129**	**0.0112**	**0.0110**	**0.0121**
	(18.2)* **	**(9.36)*** **	**(8.37)*** **	**(4.23)*** **	**(15.43)*** **	**(8.35)*** **	**(7.08)*** **	**(4.87)*** **
***CON* EARN_REV ***	**0.3616**	**0.2129**	**0.2610**	**0.3602**	**0.3171**	**0.1593**	**0.2406**	**0.2602**
	(9.62)* **	**(3.84)*** **	**(4.06)*** **	**(3.74)*** **	**(6.24)*** **	**(2.00)** **	**(2.73)** **	**(2.45)** **
Model control variables	NO	NO	NO	NO	YES	YES	YES	YES
R^2	2.28%	1.75 %	1.81 %	1.79 %	2.88 %	2.10 %	3.01 %	4.06 %
Observations	145,447	84,725	64,346	20,379	81,393	41,149	30,768	10,381

Panel B: Tests of the differences between IFRS adopters and non-IFRS observations in estimated coefficients on the two variables of interest

Variables		(1) AIFRS vs ANIFRS Difference	(2) AIFRS vs BIFRS Difference	(3) AIFRS vs NIFRSC Difference
CON * REC_REV	Comparison between	0.0028***	0.0024***	0.0041***
CON * EARN_REV	models without controls	0.1487***	0.1006*	0.0014
CON * REC_REV	Comparison between	0.0017***	0.0019***	0.0008**
CON * EARN_REV	models with controls	0.15784**	0.0765*	0.0569*

Panel C: Observations in 50 countries with Investor Protection Scores (strong-IP and weak-IP Countries)

	STRONG-IP COUNTRIES				**WEAK-IP COUNTRIES**			
Variables	(1) AIFRS (t-stat)	(2) ANIFRS (t-stat)	(3) AIFRS (t-stat)	(4) ANIFRS (t-stat)	(5) AIFRS (t-stat)	(6) ANIFRS (t-stat)	(7) AIFRS (t-stat)	(8) ANIFRS (t-stat)
Constant	0.0005	−0.0013	0.0017	−0.0061	0.0011	−0.0014	−0.0034	−0.0006
	(0.59)	(−1.15)	(0.64)	(−1.49)	(1.25)	(−1.38)	(−1.14)	(−0.15)
CON	−0.0018	−0.0042	−0.0012	−0.0029	−0.0016	−0.0028	−0.0032	−0.0041
	(−2.07)**	(−3.31)***	(−1.03)	(−1.59)	(−1.71)*	(−2.29)**	(−2.63)*	(−2.34)**
REC_REV	−0.0001	0.0019	−0.0091	−0.0067	0.0019	0.0012	−0.0020	−0.0053
	(−0.20)	(2.03)**	(−4.34)***	(−1.93)*	(2.73)***	(1.26)	(−0.85)	(−1.57)
EARN_REV	0.1050	0.0525	−0.3988	−0.4005	0.0135	0.0356	−0.1961	−0.2899
	(3.04)***	(1.06)	(−3.37)***	(−2.53)**	(0.34)	(0.64)	(−1.89)*	(−1.52)
CON * REC_REV	**0.0134**	**0.0091**	**0.0155**	**0.0105**	**0.0119**	**0.0083**	**0.0089**	**0.0071**
	(16.1)* **	**(6.93)*** **	**(14.1)*** **	**(5.74)*** **	**(12.3)*** **	**(6.32)*** **	**(6.89)*** **	**(3.76)*** **
CON * EARN_REV	**0.6783**	**0.4790**	**0.3499**	**0.3181**	**0.3261**	**0.2851**	**0.2778**	**0.1143**
	(13.3)* **	**(6.13)*** **	**(5.00)*** **	**(2.92)*** **	**(5.95)*** **	**(3.93)*** **	**(3.81)*** **	**(1.08)**
Model control variables	NO	NO	YES	YES	NO	NO	YES	YES
R^2	2.67%	2.30 %	3.40 %	3.75 %	1.74 %	1.42 %	2.35 %	2.75 %
Observations	87,878	45,384	49,056	21,646	57,569	39,341	32,337	19,503

Panel D: Comparison of estimated coefficients on the two variables of interest in IFRS adopters versus non-IFRS observations in 50 countries with Investor protection (IP) scores

	Strong IP countries		Weak IP countries	
	AIFRS versus all ANIFRS		AIFRS versus ANIFRS	
Variables	(1) AIFRS versus BIFRS Difference	(2) AIFRS versus NIFRSC Difference	(3) AIFRS versus BIFRS Difference	(4) AIFRS versus NIFRSC Difference
CON * REC_REV	0.0043***	0.0049**	0.0036**	0.0018
CON * EARN_REV	0.1994**	0.0318	0.0409	0.1634
Model control variables	NO	YES	NO	YES

Notes: Appendix A provides definitions for the variables, including the eight control variables (not reported in Table 7). *** indicates significance at 1%. ** indicates significance at 5%. * indicates significance at 10 %. Significance levels use two-tailed tests.

6. Conclusions

Using a large international sample from 81 counties, this study examines the incremental effects of recommendation–forecast consistency on the market reactions to revisions in stock recommendations and earnings forecasts. We hypothesize and find significant incremental effects of the consistency signal on the market reactions to stock recommendation revisions and to earnings forecast revisions, respectively, for our full international sample and for the subsamples of strong-IP and weak-IP countries. We show similar, but less significant effects, among countries without IP classification. The positive effects are significantly greater in strong IP countries than in weak IP countries. Finally, we show that IFRS adoption significantly enhances these positive effects with the effects statistically more significant for the IFRS adopters during the post-adoption period than the pre-adoption period and in non-adopting countries.

We acknowledge limitations in this study that may lead to future research. First, we follow Brown and Huang (2013) to develop one specific measure of consistency and not to include the basic firm characteristics in the models for our international sample. Future studies may consider other measures and types of consistency (e.g., horizon span) in the US and other countries, and include basic firm characteristics (e.g., firm size, Return on Assets, or leverage) in the models. Second, our study is built on the assumption that a recommendation-forecast pair reflects fewer economic/behavioral biases and, thus, provides more superior information than an inconsistent pair. However, other possible alternative explanations (e.g., analysts with lower conflicts of interest concern) may drive the stronger association between stock market reactions and recommendation-forecasts consistency. Thus, future research may further explore other possible alternative explanations or the specific incentives or behaviors that could have been changed for analysts when they issue consistent pairs in the US and other countries.

In summary, our study extends the literature on the informativeness of analyst research by demonstrating that a consistent recommendation–forecast pair provides a useful signal to investors in the international setting. Our study also adds to cross-country studies by showing the importance of IP differences and the mandatory IFRS adoption in influencing the incremental value of recommendation-forecast consistency on the market reactions to revisions in stock recommendations and earnings forecasts.

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Appendix A. Variable definitions

Dependent variables	
$RET_{i,j,t}$	Return: The difference between firm j's monthly stock return and the mean monthly stock return of all firms in a country for the same month in year t, scaled by firm j's stock price in the prior month.
Independent variables[a]	
$CON_{i,j,t}$	Consistency: A binary variable that equals 1 if both the stock recommendation and the earnings forecast are both above or below the stock recommendation consensus and earnings forecast consensus, and 0 otherwise.
$REC\_REV_{i,j,t}$	Recommendation Revision: The difference between analyst i's recommendation and the mean recommendation consensus for firm j during the 90-day period prior to the joint recommendation-forecast issuance date.
$EARN\_REV_{i,j,t}$	Earnings Revision: The difference between analyst i's earnings forecast and the mean earnings forecast consensus, scaled by the stock price at the end of the month before the joint announcement date of the recommendation and forecast.
IP Score	Investor Protection score: The mean score across (1) the efficacy of corporate boards, (2) the strength of auditing and accounting standards, (3) the protection of minority shareholders' interests, (4) judicial independence, and (5) the strength of investor protection. The 5 measures are from WEF (2012). Countries divided into strong (weak) investor protection (IP) countries based on whether their IP scores are above (below) the mean IP score.
International Financial Reporting Standards (IFRS) Variables	
AIFRS	Adopted IFRS: Analyst-firm-year observations in countries after they adopted IFRS.
ANIFRS	IFRS Not Adopted: Analyst-firm-year observations of non-IFRS adopters with firm reporting based on domestic (i.e. local) GAAP. ANIFRS is also split into two subsamples, BIFRS and NIFRSC.
BIFRS	Before IFRS Adoption: Analyst-firm-year observations before a country's IFRS adoption when firm reporting is based on domestic GAAP.
NIFRSC	Non-adopting IFRS Countries: Analyst-firm-year observations in countries where IFRS has not been allowed during the whole sample period.
The Two variables of Interest	
$\boldsymbol{CON_{i,j,t} * REC\_REV_{i,j,t}}$	The interaction of $CON_{i,j,t}$ * $REC\_REV_{i,j,t}$: This variable equals zero for inconsistent-pair observations and REC_REV for consistent-pairs observations.
$\boldsymbol{CON_{i,j,t} * EARN\_REV_{i,j,t}}$	The interaction of $CON_{i,j,t}$ * $EARN\_REV_{i,j,t}$: This variable equals zero for inconsistent-pair observations and EARN_REV for consistent-pairs observations.

Analyst Characteristics Control Variables	*All control variables are measured as specified in note b below*[b]
$ACCUR_{i,j,t}$	Forecast accuracy: The absolute forecast error of analyst i relative to all other analysts following firm j in year t.
$LFR_{i,j,}$	Timeliness: Analyst i's forecast timeliness for firm j in year t, based on the raw leader-follower ratio.[c]
$FEXP_{i,j,t}$	Firm experience: The number of prior forecasting years for analyst i following firm j in year t.
$NFIRMS_{i,j,t}$	Number of firms followed: The number of firms followed by analyst i in year t.
$FREQ_{i,j,t}$	Forecast frequency: The number of forecasts made by analyst i for firm j in year t.
$BSIZE_{i,j,t}$	Brokerage size: The number of analysts employed by the brokerage house employing analyst i who follows firm j in year t.
$HORIZ_{i,j,t}$	Forecast horizon: The days from the forecast date to the earnings announcement date for analyst i following firm j in year t.
$PACCUR_{i,j,t}$	Past accuracy: The absolute forecast error for analyst i who follows firm j in year t -1 relative to all other analysts following company j in that year.

Notes:

[a.] We reverse the I/B/E/S coding of stock recommendations using a 5-point scale, with 1 = strong sell, 2 = sell, 3 = hold, 4 = buy, and 5 = strong buy, to make the interpretation of our results more intuitive, with higher numbers indicating more favorable recommendations.

[b.] As in Brown and Hugon (2009), the relative measures for our eight control variables are used in the following form to make the variables more comparable across analysts:

$$\text{Characteristic}_{i,j,t} = \frac{Raw\_characteristic\,i,j,t - Min\_characteristic\,i,j,t}{Range\ of\ characteristic\,i,j,t}$$

$\text{Characteristic}_{i,j,t}$ is the range-adjusted characteristic for analyst i following firm j in year t. Raw_characteristic is the raw characteristic value for analyst i, and Min_characteristic (range of Characteristic) is the minimum value (range) of all analysts in our sample who follow firm j in year t. Scaling by the range of characteristic ensures that each variable is between zero to one to allow comparison of regression coefficients.

[c.] The raw leader-follower ratio is the cumulative number of days between the two immediately preceding forecasts and the forecast of interest divided by the cumulative number of days between the two immediately succeeding forecasts and the forecast of interest.

Appendix B. Observations by country

Country	IBES country code	Number of firms	Number of analysts-firm-year observations	Consistency (CON) %
Strong Investor Protection Countries				
Australia	AA	563	14,098	55.30%
Belgium	EB	88	3099	56.15%
Canada	NC	1082	21,317	55.36%
Denmark	SD	86	3681	54.22%
Finland	SF	113	7667	57.28%
Hong Kong	FH	317	11,542	56.06%
Ireland	EZ	43	933	55.41%
Israel	FZ	24	303	53.14%
Japan	FJ	118	1421	57.92%
Malaysia	FM	240	5211	58.47%
Netherlands	EN	154	8453	55.40%
Norway	SN	191	7053	54.74%
Saudi Arabia	FW	48	428	53.97%
Singapore	FS	184	2850	58.53%
South Africa	KS	143	4379	55.65%
Sweden	SS	186	10,020	55.10 %
United Kingdom	EX	854	30,807	54.24%
Total 17 strong-IP countries	4434	133,262	55.70%	
List of 37 Weak Investor Protection Countries				
Argentina	LA	25	108	62.96%
Austria	EA	54	1703	56.49%
Brazil	LB	211	3978	53.97%
Chile	LC	27	240	51.25%
China	FC	1024	15,937	57.41%
Colombia	LL	10	117	48.72%
Czech Republic	EC	8	313	60.06%
Egypt	KE	34	388	55.15%
France	EF	338	14,984	54.42%
Germany	ED	373	18,410	54.30%
Greece	EH	60	1341	53.84%
Hungary	EM	13	541	53.97%
India	FI	27	200	57.00%
Indonesia	FL	98	2830	55.58%

Italy	EI	163	6035	53.49%
Kenya	KK	6	27	48.15%
Korea, South	FK	13	91	57.14%
Kuwait	FO	9	31	45.16%
Mexico	LM	82	1450	54.76%
Morocco	KM	5	15	46.67%
Nigeria	KN	14	96	53.13%
Peru	LP	6	11	63.64%
Philippines	FP	36	547	54.84%
Poland	EG	79	2315	54.73%
Portugal	EP	30	1108	54.33%
Romania	EK	7	110	60.00%
Russia	ER	174	2556	53.83%
Spain	EE	116	6653	53.68%
Switzerland	ES	159	6947	54.89%
Thailand	FT	148	5303	57.33%
Turkey	ET	89	2075	55.37%
Ukraine	DU	10	25	56.00%
United Arab Emirates (UAE)	FU	29	425	56.71%
Total 33 weak-IP countries		3482	96,910	54.38%
Total 31 countries without IP scores		447	7429	53.05%
Total 81 countries		8358	237,601	54.15%

Appendix C. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.intaccaudtax.2020.100317.

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