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Analysts' annual earnings forecasts and changes to the I/B/E/S database

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Abstract

I/B/E/S is a common source of analyst earnings forecast data, and the reliability of these data is important for practice and academic research. Examining a common sample period, we compare annual earnings forecasts across two versions of the I/B/E/S detail file, one made available in 2009 and the other made available in 2015. We find substantial differences in the contents of these two versions of the detail file as well as significant differences in the attributes of the earnings forecasts available in each version. Specifically, the earnings forecasts in the more recent version are more accurate and less biased, and they identify substantially different firms as meeting or just beating analysts' expectations than those in the older version. To highlight the potential impact of these differences, we show that the economic magnitude of the effects of analyst experience and brokerage size on earnings forecast accuracy change by over 30% when we use the more recent version. Additional analyses suggest that the differences across versions of the detail file are ongoing. In contrast, we find that different versions of the summary file exhibit only minor differences over time. We also find significant differences in the properties of consensus earnings forecasts calculated from the individual earnings forecasts available in the detail file and consensus earnings estimates from the summary file. Finally, we provide guidance to researchers using I/B/E/S for analyst earnings forecast data.

Keywords I/B/E/S · Analysts · Earnings forecasts · Consensus · Market expectations

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1 Introduction

Analyst earnings forecasts provide important information to both retail and institutional investors (Brown et al. 2016; Beaver et al. 2008; Cornell and Landsman 1989) and are widely examined in the accounting and finance academic literatures. For example, research examines the properties of analyst earnings forecasts (Lim 2001; Clement 1999; Mikhail et al. 1997; Francis and Philbrick 1993) and how analyst and brokerage characteristics affect these properties (Clement 1999; Mikhail et al. 1997). Other research uses analyst earnings forecasts as a proxy for the market's earnings expectations (Bradshaw et al. 2012; O'Brien 1988; Brown et al. 1987a; Fried and Givoly 1982; Brown and Rozeff 1978), to estimate the cost of capital (Dhaliwal et al. 2016), and to identify firms suspected of managing earnings (Bartov et al. 2002; Degeorge et al. 1999).

Researchers typically obtain analyst earnings forecasts from I/B/E/S because this database is readily available and considered a superior source of data (Bradshaw 2011; Ramnath et al. 2005; Brown et al. 1987b). In the spirit of Ljungqvist et al. (2009), who reveal the instability of stock recommendation data available from I/B/E/S, we compare all annual earnings forecasts from January 1993 through November 2007 (i.e., a common sample period) across two versions of the I/B/E/S detail file downloaded on different dates. The first version is the detail file made available to researchers in 2009 ("*OLD*"), and the second version is the detail file made available to researchers in 2015 ("*NEW*"). These two versions of the file are seemingly identical, except for the date they were downloaded and made available by I/B/E/S. We document substantial changes in the annual earnings forecasts available across these two versions. Importantly, we find that these changes are more pronounced and arise for different reasons than those changes made to the stock recommendation file.

We find a net decrease in the individual analyst earnings forecasts, firms covered, contributing analysts, and contributing brokerages during the common sample period across the versions of the detail file. Specifically, 11.68% of earnings forecasts reported in *OLD* are not available in *NEW*. Further, 6.01% of the earnings forecasts in *NEW* did not exist in *OLD*, and another 0.88% of the forecasts exist in both versions of the file (i.e., same firm, same analyst, and same forecast date) but with a different forecasted value across the versions. Overall, these differences across the versions represent 18.56% of *OLD*. Moreover, an additional analysis comparing two other versions of the detail file suggests that meaningful differences across versions of the detail file continue to occur in more recent years.

To provide insight to researchers as to when their sample of analyst earnings forecasts is more likely affected by changes made to I/B/E/S, we examine the firm, analyst, and brokerage characteristics associated with changes made to the detail file. We find that the differences in earnings forecasts across versions of the detail file are more likely for younger, less followed firms with lower profits and stronger earnings growth and for analysts with more firm-level experience.

We highlight the potential impact of these differences for researchers by examining several earnings forecast properties using *OLD* and then replicating these analyses using *NEW*. We find that the earnings forecasts in *NEW* are significantly more accurate and less biased than those in *OLD*. We also examine the identification of firms that meet or just beat (miss) the analysts' consensus earnings forecast by one cent or less. That is, we develop the consensus earnings forecast for each firm-year observation using the mean of each analyst's last forecast issued in the 90 days prior to the earnings announcement.

We find that 6.89% of the "meet or just beat" and 10.16% of the "just miss" classifications differ across the versions of the detail file. Further, we also find that two characteristics (analyst experience and brokerage size) that are important determinants of earnings forecast accuracy differ by over 30% across the two versions of the detail file in their ability to predict earnings forecast errors. Specifically, the effect of analyst experience (brokerage size) on earnings forecast accuracy is more (less) pronounced in *NEW* than in *OLD*, such that the superiority of experienced analysts (larger brokerages) is significantly stronger (weaker) in the more recent version of the file.

We also compare consensus earnings estimates for this common sample period across two versions of the summary file. We find that changes made to the summary file are much less common than changes made to the detail file. Only 0.11% of the earnings estimates in the *OLD* summary file are deleted from the *NEW* summary file, and 1.49% of the earnings estimates in the *NEW* summary file are not in the *OLD* summary file. Further, only 0.24% of the earnings estimates exist in both versions of the summary file with a different forecasted value. Consistent with these findings, we find only minor differences in forecast accuracy, forecast bias, and meet-or-beat classifications in the *OLD* and *NEW* summary file. Our findings suggest the summary file is relatively less susceptible to changes, compared with the detail file.

Finally, to provide insight into whether the choice of the summary or detail file for earnings forecasts is important, we compare two consensus earnings forecasts available to researchers at a given point in time, one calculated from the *NEW* detail file and the other obtained from the *NEW* summary file. We find meaningful differences in consensus forecasts, forecast errors, and meet-or-beat classifications across these two consensus earnings forecasts. Our results suggest that the choice of the detail file or summary file for consensus earnings estimates leads to important differences. We also provide evidence of a greater association between earnings announcement stock returns and unexpected earnings using consensus earnings estimates from the summary file, relative to consensus earnings forecasts calculated using individual forecasts from the detail file. This evidence suggests the consensus earnings estimates in the summary file provide a superior proxy for the market's expectations. Given that the summary file is subject to fewer changes than the detail file, that it generally reflects the views of more analysts covering the firm, and that it is a better proxy for the market's earnings expectations, we recommend the use of the summary file, if appropriate given the research question.

Our study contributes to the large body of academic research on analyst earnings forecasts. Given that I/B/E/S is a primary source of analyst earnings forecast data, it is important for researchers to understand the institutional factors that affect these data. Our study relates to but is distinct from recent studies that also illuminate Thomson Reuters' data gathering processes in constructing I/B/E/S (Akbas et al. 2018; Kaplan et al. 2018).[1] We document changes made to I/B/E/S and how these changes affect properties of the observed earnings forecasts. Our findings of significant differences across versions of I/B/E/S files are not only relevant to researchers who test new hypotheses in these areas but also to those who replicate studies using a more recent version of I/B/E/S to build on the literature's findings.

[1] Thomson Reuters completed the sale of its majority stake in its Financial & Risk unit, the unit responsible for I/B/E/S, to Blackstone Group LP on October 1, 2018. Thomson Reuters retains a 45% stake in the company, which has been renamed Refinitiv. Refinitiv will be responsible for the maintenance of I/B/E/S (Scuffham 2018).

Our findings also extend those of Ljungqvist et al. (2009). Whereas stock recommendations are used in practice and sometimes studied in accounting research, earnings forecasts are arguably relied upon more heavily in practice (Brown et al. 2016) and are the focus of various streams of accounting research (Ramnath et al. 2008). Despite Thomson Reuters reducing or eliminating the differences in the recommendation file—which were attributable to errors—after the publication of Ljungqvist et al. (2009), we find that the differences related to earnings forecasts continue to occur, with potential long-term implications for researchers. Importantly, Thomson Reuters informed us that many of the changes to the detail file are not due to the correction of errors but are instead imposed by the brokerages contributing their analysts' earnings forecasts. Therefore, in contrast to the recommendation file, the data in a more recent version of the detail file do not necessarily better reflect historical analyst coverage than the data in the older version of the detail file.

We also advise researchers to consider using the summary consensus estimate over calculating a consensus forecast using the detail file. Researchers should weigh the benefits of using the more stable summary file against the benefit of a consensus forecast from the detail file based on a specific set of analysts. Our findings are also relevant to investors who use I/B/E/S analyst earnings forecast data. According to Refinitiv, I/B/E/S data are "relied upon by the top asset managers" and are used by investors to "back-test strategies across past market conditions."[2] Our study helps researchers and investors better understand the nature of these data as well as the implications of relying on these data.

This paper proceeds as follows. Section 2 summarizes the literature discussing changes to the contents of I/B/E/S over time and details the explanations provided by Thomson Reuters for changes to the detail file. Section 3 reports our analyses concerning the frequency and type of changes to the detail file. Section 4 reports the determinants of these changes to the detail file. Section 5 highlights some implications of changes to the detail file. Section 6 discusses whether similar changes exist when examining the summary file. Section 7 provides recommendations to researchers using annual earnings forecasts in the detail file. Section 8 concludes.

2 Background literature and explanations for potential changes to I/B/E/S files

2.1 Prior literature on I/B/E/S

Ljungqvist et al. (2009) examine changes to the I/B/E/S stock recommendation file. They compare several downloads of the stock recommendation file across a seven-year period and find significant inconsistencies in the contents and properties of the stock recommendations a researcher would observe at any point in time. Depending on the versions of the file compared, Ljungqvist et al. (2009) observe differences between 1.6% and 21.7% of the file.

In response to inquiries made by Ljungqvist et al. (2009), Thomson Reuters indicated that these differences in the stock recommendation file were the result of clerical and procedural errors that sometimes caused stock recommendations to inadvertently disappear from subsequent versions of the file and to then sometimes reappear as the errors were corrected. Therefore a reader would reasonably conclude

[2] https://www.refinitiv.com/en/financial-data/company-data/institutional-brokers-estimate-system-ibes

that Thomson Reuters has identified and corrected these procedural errors in the stock recommendation file, and Ljungqvist et al. (2009) conclude that more recent versions of the stock recommendation file are superior to older versions.

Ljungqvist et al. (2009) focus on analyst stock recommendations, and a reader may assume that the earnings forecast data in I/B/E/S are stable over time. For example, Wu and Zang (2009, p. 66) state: "[a] recent study by [Ljungqvist et al. 2009] raises concerns about the integrity of the I/B/E/S stock recommendations data. Their findings of apparent ex post alterations of historical records apply to the I/B/E/S stock recommendations database and do not extend to the I/B/E/S earnings forecast data, which is the data source in this study." However, our discussions with Thomson Reuters suggest that any changes to the earnings forecast detail file would occur for different reasons than the changes made to the stock recommendation file.

2.2 Explanations for changes to the detail file provided by Thomson Reuters

We had several productive phone conversations and email exchanges with high-level representatives at Thomson Reuters who helped illuminate possible sources of changes made to the I/B/E/S detail file. They explained that some changes made to the earnings forecasts in the detail file reflect retroactive adjustments for stock splits or stock dividends. Thomson Reuters provides an unadjusted detail file, along with an adjustment factor, allowing researchers to back into the originally issued earnings forecasts and actual values. Payne and Thomas (2003) examine the implications of these split adjustments.

Thomson Reuters also makes "default currency" adjustments. The earnings forecasts and actuals reported in I/B/E/S are based on the currency used by the majority of contributing brokerages. When brokerages start contributing data in a different currency, the "default currency" for a given covered firm changes, prompting Thomson Reuters to adjust the detail file, even retroactively. These adjustments allow users to view a complete time series based on the most recent default currency. Lastly, Thomson Reuters will correct errors in the file as soon as these errors are identified. Adjustments related to stock splits, stock dividends, default currency, and the correction of errors would result in updated forecast values for the same forecasts, rather than differences in the forecasts included, across different versions of the detail file.[3]

Some differences across versions of the detail file occur because of changes initiated by the contributing brokerages, rather than Thomson Reuters itself. For example, even after contributing their analysts' earnings forecasts to I/B/E/S, the brokerage maintains control over the distribution of these forecasts. If a brokerage decides to restrict access to its analysts' earnings forecasts, I/B/E/S ceases distribution of these forecasts, even retroactively. As a result, if brokerages restrict access to their earnings forecasts and I/B/E/S retroactively removes these forecasts from the historical record, forecasts would disappear from later versions of the file.

Differences also occur if Thomson Reuters and contributing brokerages revise their agreements, allowing for the distribution (even retroactively) of earnings forecasts that were previously unavailable. Further, brokerages maintain control over the clients to

[3] The detail file includes a "currency" variable that represents the currency of the individual earnings forecast. This variable is missing for all 17,227 observations classified as "value changes." As a result, we cannot determine whether the value changes in our analyses are due to a currency adjustment or some other explanation.

which their earnings forecasts are distributed. Academic subscribers are often permitted access to only a subset of all the earnings forecasts contributed to I/B/E/S, while institutional clients routinely get access to forecasts issued by a larger set of contributing brokerages. If brokerages restrict (relax) distribution of their earnings forecasts, academic researchers would find fewer (more) forecasts in the detail file at different points in time.[4]

3 Changes to the analyst earnings forecasts reported in I/B/E/S

3.1 Data sources and sample construction

We examine individual analyst earnings forecasts in the I/B/E/S detail file ("I/B/E/S Detail History – Detail File with Actuals [EPS for U.S. Region]"), and, in subsequent tests, we also examine consensus earnings estimates in the summary file ("I/B/E/S Summary History – Summary Statistics with Actuals [EPS for U.S. Region]"). We compare observations from January 1993 through November 2007 using *OLD* and *NEW* for these I/B/E/S files.

Both *OLD* and *NEW* were obtained directly from Wharton Research Data Services (WRDS). Whereas past versions of I/B/E/S files are generally not available for download, we obtained *OLD* via a one-time access to the "sasdata_legacy" FTP file from WRDS on August 21, 2015. As indicated by the date stamps, *OLD* was last edited on March 16, 2009, for the detail file and April 7, 2008, for the summary file, respectively. *NEW* was downloaded on August 25, 2015, from the WRDS current "sasdata" FTP file. Thomson Reuters last updated *NEW* on April 30, 2015, (for the detail file) and May 1, 2015 (for the summary file).

We establish broad data requirements so that our findings are less sensitive to our design choices. First, we start with the complete version of the detail file that a researcher would have downloaded on a particular date (i.e., either *OLD* or *NEW*). Second, we identify all annual earnings forecasts (i.e., FPI = 1, measure = EPS) for U.S. firms and remove all other forecasts (e.g., revenue, cash flow, etc.).[5] Third, we remove duplicate forecasts (i.e., forecasts in a given version of the file that share the same firm ticker, forecast period end-date, broker code, analyst code, and forecast date).[6] Finally, we remove forecasts without a firm ticker, forecast period end-date, broker code, analyst code, or estimate date. These requirements result in sample sizes of 1,967,164 and 1,855,530 forecasts for *OLD* and *NEW*, respectively.[7]

[4] Only 12 of the 905 brokerages contributing to *OLD* (6.74% of the forecasts in *OLD* but not in *NEW*) do not contribute earnings forecasts to *NEW*. Further, only eight of the 901 brokerages contributing to *NEW* (56.22% of the forecasts in *NEW* but not in *OLD*) did not contribute earnings forecasts to *OLD*. Other differences between versions of the detail file may be due to changes brokerages impose on individual earnings forecasts, rather than all forecasts contributed by the brokerage. As such, brokerage-initiated changes to the detail file may represent more than 6.74 (56.22) percent of all deletions (additions) to the file over time.

[5] In 2009, the detail file included all individual forecasts (e.g., EPS, CPS, SAL, etc.) for both U.S. and non-U.S. firms.

[6] This step ensures that we do not identify instances where I/B/E/S cleans up the file by removing duplicate and unnecessary observations. There are very few duplicate observations in either file (less than 0.30% of observations).

[7] We impose similar restrictions on the I/B/E/S summary file, which we elaborate on in Section 6.

3.2 Frequency of deletions, additions, and value changes to the detail file

Table 1, Panel A, documents the net effect of all changes across *OLD* and *NEW* for the earnings forecasts in the detail file. We find that I/B/E/S coverage for a common sample period of January 1993 through November 2007 decreased across the two versions of the detail file. Specifically, we observe a 5.67% decrease in the annual earnings forecasts reported, a 10.18% decrease in the firm-year observations, a 13.30% decrease in the unique firms with at least one annual earnings forecast, and a 3.44% decrease in the unique analysts providing annual earnings forecasts. Interestingly, we observe only a 0.44% decrease in the unique brokerages contributing to I/B/E/S, with only 12 brokerages deleted from *OLD* and only eight brokerages added to *NEW*. In spite of the relatively minor change in the contributing brokerages, we observe relatively large changes to the forecasts, firms, and analysts included in the detail file. These findings suggest a general loss of information in the detail file.[8] We also find that mean analyst following is larger for firms in *NEW* than for firms in *OLD*.

We classify all changes across *OLD* and *NEW* into one of three categories: (a) deletions, (b) additions, and (c) value changes. *Deletions* are earnings forecasts that are included in *OLD* but not in *NEW*. We examine annual earnings forecasts on a firm-year-brokerage-analyst-forecast date basis, so if we observe that on a particular date a given analyst employed by a particular brokerage issued an annual earnings forecast for a covered firm-year observation in *OLD* but not in *NEW*, we classify this observation as a deletion from *OLD*. To illustrate, if for a given firm-year observation we observe two forecasts in *OLD* (e.g., one from analyst A and one from analyst B) and only one forecast in *NEW* (e.g., from analyst A), we classify one of these forecasts as a deletion from *OLD*. *Additions* are earnings forecasts that are included in *NEW* but not included in *OLD*. Similar to our treatment of deletions, if for a given firm-year observation we observe one forecast in *OLD* and two forecasts in *NEW*, we classify one of these forecasts as an addition to *NEW*. *Value changes* occur when a given earnings forecast exists in both versions (on a firm-year-brokerage-analyst-forecast date basis) but for which the forecasted value is different across the two versions. Some forecasts are assigned a new value due to a stock split or stock dividend, because I/B/E/S adjusts pre-split forecasts and puts them on a post-split basis, allowing for greater comparability of forecasts across time. As I/B/E/S provides both adjusted and unadjusted data, and Payne and Thomas (2003) examine split-adjusted forecasts, we do not consider split adjustments to be value changes in our study. Specifically, the only forecasts we classify as value changes are those that exist in both versions but with different forecasted values for reasons other

[8] Although I/B/E/S publishes "release notes" that provide information about the brokerages and firms that are removed from or added to its database, this information is of limited use to researchers. Specifically, I/B/E/S does not identify the new brokerages added to the database, preventing a researcher from deleting these and creating an "as-was" version of the file. Further, while I/B/E/S identifies the brokerages that are deleted from the database, the historical forecasts that are deleted are not made available to researchers seeking to replicate studies. Therefore the "release notes" do not allow researchers to reconcile one version of I/B/E/S to another and do not provide the transparency to allow researchers to observe the frequency and implications of these changes to the database.

Table 1 Frequency and classification of changes to the I/B/E/S detail file

Panel A: Net changes to analyst earnings forecasts across OLD and NEW

			Net change	
	OLD	**NEW**	N	%
Total observations	1,967,164	1,855,530	−111,634	−5.67
Total firm-year observations	85,798	77,063	−8735	−10.18
Unique firms	14,870	12,893	−1977	−13.30
Unique analysts	14,430	13,933	−497	−3.44
Unique brokerages	905	901	−4	−0.44
Mean analyst following per firm	7.24	7.59	0.35	4.83

Panel B: Classification of changes to analyst earnings forecasts

Classification of change	**Frequency**	**% OLD**
Deletions (in *OLD*, not *NEW*)	229,776	11.68
Additions (in *NEW*, not *OLD*)	118,142	6.01
Value changes	17,227	0.88
Total	365,145	18.56

Panel C: Deletions and value changes as a percentage of OLD

Classification of change	**Frequency**	**% OLD**
OLD changes (Deletions + value changes)	247,003	12.56
OLD no changes (*OLD* total – *OLD* changes)	1,720,161	87.44
Total	1,967,164	100.00

Panel D: Additions and value changes as a percentage of NEW

Classification of change	**Frequency**	**% NEW**
NEW changes (Additions + value changes)	135,369	7.30
NEW no changes (*NEW* total – *NEW* changes)	1,720,161	92.70
Total	1,855,530	100.00

Table 1 presents an overview of the changes to the I/B/E/S detail file. We compare two versions of the detail file, *OLD* and *NEW*, for a common sample period (January 1993 through November 2007). Both *OLD* and *NEW* were obtained directly from Wharton Research Data Services (WRDS). *OLD* represents the data made available to researchers in 2009, and *NEW* represents the data made available to researchers in 2015. All observations reflect annual EPS forecasts for U.S. firms for the next fiscal year (FPI = 1). All forecasts include every observation in the corresponding file with a unique firm ticker, forecast period end-date, broker code, analyst code, estimate date, and forecasted value. Panel A documents the net effect of changes across *OLD* and *NEW*. Panel B classifies all changes from *OLD* to *NEW* of the detail file into one of three categories: (a) deletions, (b) additions, or (c) value changes. Deletions represent forecasts that are included in *OLD* but not *NEW*. Additions represent forecasts that are included in *NEW* but not *OLD*. Value changes represent forecasts that exist in both versions of the detail file but for which the forecast value differs across the two versions. Panel C (Panel D) reports the percentage of forecasts in *OLD* (*NEW*) that would have been unchanged and observable to a researcher who downloaded the same file in 2015 (2009)

than a stock split or stock dividend.[9] The appendix Table 10, describes how our data are structured and how we identify deletions, additions, and value changes.

As we report in Panel B of Table 1, 229,776 earnings forecasts from *OLD* are deleted from *NEW* (11.68% of *OLD*). An additional 118,142 earnings forecasts (6.01% of *OLD*) are not in *OLD* but are added to *NEW*, and 17,227 forecasts (0.88% of *OLD*) are included in both versions but with a different forecasted value. In sum, these differences represent 18.56% of *OLD*.[10]

To provide context, across separate downloads in 2000 and 2007, Ljungqvist et al. (2009) examine the I/B/E/S stock recommendation detail file and report deletions of 6.4%, additions of 5.9%, and value changes of 0.7%, for total differences of 13.0%. In addition, in six of seven comparisons of the file between 2000 and 2007, Ljungqvist et al. (2009) report deletions, additions, and value changes ranging from 4.6 to 17.1%, which is less than what we observe for earnings forecasts. Therefore it appears that the changes to the earnings forecast detail file that we identify are more commonplace than are changes to the stock recommendation detail file.[11]

Another way to assess the magnitude of the differences across *OLD* and *NEW* is to examine how much of *OLD* would still be visible to a researcher who accessed I/B/E/S in 2015 (i.e., when we downloaded *NEW*). In Panel C of Table 1, we report that 12.56% of *OLD* would either disappear or appear differently in *NEW*, because of a deletion or a value change. Further, in Panel D of Table 1, we report that 7.30% of *NEW* would not have been available to a researcher who downloaded the data in 2009 (additions plus value changes).[12]

Table 2 reports the frequency of changes for each year in the common sample period that we examine. We find that in both *OLD* and *NEW*, the number of earnings forecasts reported in I/B/E/S generally increases over our sample period. Further, more forecasts are deleted from *OLD* than added to *NEW*, consistent with a loss of information in *NEW*. The percentage of changes (deletions plus value changes in *OLD*; additions plus value changes in *NEW*) generally increases over the sample period. Specifically,

[9] To identify value changes that are due to stock splits or stock dividends, we examine whether the forecast is unchanged in both versions of the unadjusted detail file. If the forecast changes across the two versions of the adjusted detail file but is unchanged across the two versions of the unadjusted detail file, we assume the reason for the change in the adjusted detail file is due to a stock split or stock dividend. Our approach may understate the extent of value changes in the adjusted detail file as there may be a value change in the adjusted file for which there is not a corresponding change in the unadjusted file (e.g., due to an error correction that only affects the adjusted file).

[10] We follow Ljungqvist et al. (2009) in summing the deletions, additions, and value changes to arrive at this figure.

[11] We replicate Ljungqvist et al. (2009) and compare the 2008 and 2015 versions of the stock recommendation file, matching observations across the two versions on ticker, brokerage, and recommendation date. Only 0.25% of these recommendations are classified as deletions, 4.38% are classified as additions, and 0.07% are classified as value changes (i.e., "alterations," per Ljungqvist et al. 2009). Further, only 0.09% of the observations that we classify as additions in our tests share a brokerage and ticker with the additions we identify in the recommendation file, while none of the observations that we classify as deletions (value changes) share a brokerage and ticker with any of the deletions (value changes) from the recommendation file. These results suggest our findings are not driven by any associated problems in the stock recommendation file and that the differences we find are associated with a unique set of analysts and firms.

[12] We re-estimate these analyses at the firm-year-analyst-forecast date level rather than the firm-year-brokerage-analyst-forecast date level (i.e., relaxing the requirement that the observation have the same broker code in both versions of the detail file). We continue to find a large number of deletions and additions (11.47 and 5.79% of *OLD*, respectively), suggesting that any re-coding of broker codes due to mergers is not driving our results.

changes to *OLD* (*NEW*) increase from 8.40 (6.05) percent for forecasts made in 1993, to 13.72 (7.86) percent of forecasts made in 2006, the last full year in our sample. The fact that over 8% (6%) of the 1993 data in *OLD* (*NEW*) were altered between 2008 and 2015 (when *OLD* and *NEW* were downloaded, respectively) suggests there are significant changes made to the detail file long after the original forecasts were made.

We also examine changes to (a) quarterly earnings forecasts (FPI = 6), (b) annual cash flow forecasts, and (c) annual sales forecasts, as these are often used in research (e.g., Ayers et al. 2018; Mohanram 2014; Call et al. 2009, 2013; Ertimur et al. 2011; McInnis and Collins 2011; Keung 2010; Givoly et al. 2009). In untabulated analyses, we find that 6.17% of the quarterly earnings forecasts in *OLD* are deleted from *NEW*, 6.94% are added to *NEW*, and 0.47% have a different value across the two versions of the file. We also find large changes when we examine cash flow forecasts (deletions: 42.70%; additions: 3.49%). In contrast, we observe less severe changes to sales forecasts (deletions: 8.84%; additions: 2.84%).[13]

Overall, consistent with our findings for annual earnings forecasts, we find that fewer individual quarterly earnings forecasts, annual cash flow forecasts, and annual sales forecasts are available in *NEW* than in *OLD*. These findings are relevant to researchers working with these data. Moreover, the vast majority of the deletions and additions to quarterly earnings (86.17% of the combined group of deletions and additions), annual cash flow (88.37%), and annual sales (94.30%) forecasts share the same firm-year-brokerage-analyst combination with an annual earnings forecast that exhibits a corresponding change across the two versions of the detail file. This finding is consistent with the explanation that decisions made by brokerages sometimes affect Thomson Reuters' permission to distribute *all* forecasted items an analyst issues for a given firm. Further, our collective findings suggest deletions to the annual earnings forecasts in the I/B/E/S detail file (see Table 1) are more common among analysts who also issue cash flow forecasts. Researchers examining these other research outputs should be aware that substantial differences in the contents of the I/B/E/S detail file across time may affect their research.[14]

4 Determinants of changes to the detail file

Table 3 presents our analysis of the firm-, brokerage-, and analyst-level determinants of changes to the earnings forecasts across both versions of the detail file. This analysis includes any firm-year-brokerage-analyst-forecast date observation available in either version of the detail file for which we can estimate all of our determinants of interest.[15]

[13] As we do not have a copy of the *OLD* unadjusted detail file for non-earnings forecasts, we cannot estimate the frequency of value changes for these forecasts.

[14] We observe significant differences in the accuracy and bias of quarterly earnings, annual cash flow, and annual sales forecasts across versions of the I/B/E/S file. For example, the median absolute forecast error for quarterly earnings and annual sales (annual cash flow) forecasts is significantly lower (higher) in *NEW* than in *OLD*, and the median bias for quarterly earnings, annual cash flow, and annual sales forecasts is significantly lower in *NEW* than in *OLD*.

[15] The sample we use in these analyses (1,895,191 observations) is smaller than the number of forecasts available from *OLD* and *NEW* combined (2,085,306 = 1,720,161 + 229,776 + 118,142 + 17,227 or summing the unchanged forecasts between the two versions of the file, deletions, additions, and value changes). This difference is due to the requirement that the forecast have an actual value available for the firm-year in both the current year (to determine *LOSS_DUM*, *EPS*, and *EPS_GROWTH*) and the prior year (to determine *EPS_GROWTH*).

Table 2 Frequency of changes for each year of the sample period to the I/B/E/S detail file

	OLD			NEW		
		Changes			Changes	
Year	Total observations	N	% of Total	Total observations	N	% of Total
1993	106,766	8972	8.40	104,091	6297	6.05
1994	109,418	9756	8.92	105,260	5598	5.32
1995	117,898	12,573	10.66	111,341	6016	5.40
1996	128,376	15,531	12.10	119,022	6177	5.19
1997	132,551	17,522	13.22	122,991	7962	6.47
1998	145,343	20,302	13.97	134,425	9384	6.98
1999	141,555	21,086	14.90	130,048	9579	7.37
2000	135,122	18,398	13.62	126,549	9825	7.76
2001	137,050	16,151	11.78	131,862	10,963	8.31
2002	133,017	15,984	12.02	128,505	11,472	8.93
2003	137,769	18,236	13.24	131,220	11,687	8.91
2004	155,513	20,536	13.21	147,134	12,157	8.26
2005	168,971	22,701	13.43	158,417	12,147	7.67
2006	174,944	23,995	13.72	163,828	12,879	7.86
2007	42,871	5260	12.27	40,837	3226	7.90
All	1,967,164	247,003	12.56	1,855,530	135,369	7.30

Table 2 presents the year-by-year changes to the I/B/E/S detail file, where the year is based on the fiscal year of the corresponding forecast period end-date. For *OLD* (*NEW*) we identify the percentage of changes (% of total) as the deletions and value changes (additions and value changes), where deletions represent forecasts that are included in *OLD* but not *NEW*, additions represent forecasts that are included in *NEW* but not *OLD*, and value changes represent forecasts that exist in both versions of the file but for which the forecast value differs across the versions

In doing so, we estimate the following logistic regression, including year fixed effects and clustering standard errors by analyst, to examine the firm-, brokerage-, and analyst-level characteristics associated with changes to the detail file.

$$\begin{aligned} CHANGE_{i,j,k,t} = {} & \alpha_0 + \alpha_1 .AGE_{i,t} + \alpha_2 .AF_{i,t} + \alpha_3 .LOSS\_DUM_{i,t} + \alpha_4 .EPS_{i,t} \\ & + \alpha_5 .EPS\_GROWTH_{i,t} + \alpha_6 .BROKER\_SIZE_{k,t} \\ & + \alpha_7 .GENEXP_{j,t} + \alpha_8 .FIRMEXP_{i,j,t} + \varepsilon_{i,j,k,t}, \end{aligned} \quad (1)$$

where $CHANGE_{i,j,k,t}$ is an indicator variable set equal to 1 for forecasts in *OLD* (*NEW*) that are either deleted from (added to) *OLD* (*NEW*) or that reflect a different earnings forecast (for firm *i* in year *t* by analyst *j* who is affiliated with brokerage *k*) than what is reported in the other version and 0 for forecasts that are identical across both versions.[16] *AGE* is the years firm *i* has appeared in I/B/E/S since the first year of coverage in I/B/E/

[16] Results are inferentially identical when we estimate Equation (1) using a linear probability model.

S. *AF* is the number of analysts issuing an earnings forecast for firm *i* in year *t*. *LOSS_DUM* is an indicator variable set equal to 1 when actual earnings per share is negative and 0 otherwise. *EPS* is firm *i*'s street earnings per share. *EPS_GROWTH* is the growth in firm *i*'s street earnings per share. *BROKER_SIZE* is the number of analysts employed by brokerage *k*. *GENEXP* is the years analyst *j* has supplied to I/B/E/S at least one earnings forecast for any firm since the first year of coverage in I/B/E/S. *FIRMEXP* is the years analyst *j* has supplied at least one earnings forecast for firm *i* since the first year of coverage in I/B/E/S.

In Table 3, Panel A, we provide univariate differences comparing these two groups of firms across several dimensions. Our univariate findings suggest that changes to the detail file are more likely for younger firms (*AGE*) with relatively lower analyst following (*AF*), firms that incur losses (*LOSS_DUM*) and have lower profitability (*EPS*) and lower earnings growth (*EPS_GROWTH*), and analysts with more experience (*GENEXP* and *FIRMEXP*). We find mixed evidence for brokerage size (*BROKER_SIZE*).

Table 3, Panel B, presents our findings from estimating the cross-sectional determinants model outlined in Eq. (1). We find that older firms (*AGE*) are less prone to changes to the detail file. We also find that firms with more analyst following (*AF*) are less prone to changes. More profitable firms (*EPS*) are also less susceptible to changes, while higher-growth firms (*EPS_GROWTH*) are more likely to be subject to changes. Finally, more experienced analysts (*FIRMEXP*) are more likely to see changes to the dissemination of their forecasts in the detail file.[17] In summary, we find that these differences are more likely for analysts following younger, less followed firms with lower profits and stronger earnings growth. Furthermore, forecasts of analysts with more firm-level experience are disproportionately affected by changes.

5 Implications of changes to the detail file

As analyst earnings forecasts are widely used in practice and academic research, we examine whether the changes to the contents of the detail file affect the observed properties of earnings forecasts. We examine the impact of changes to the detail file on forecast accuracy and forecast bias, two widely studied properties of analyst earnings forecasts (Lim 2001; Clement 1999; Lin and McNichols 1998; Mikhail et al. 1997; Dugar and Nathan 1995; Francis and Philbrick 1993). In addition, given that analyst forecasts are often used to estimate the market's earnings expectations, we also examine the implications of changes to the detail file when identifying firms that meet or just beat (just miss) analysts' forecasts.

5.1 The properties of analyst earnings forecasts using the detail file

We measure earnings forecast accuracy as the absolute value of the difference between reported earnings and forecasted earnings, scaled by the absolute value of reported earnings. Forecast bias is forecasted earnings minus reported earnings, scaled by the

[17] As there are more earnings forecasts in *OLD* relative to *NEW*, we examine whether this difference is due to delisted firms. In untabulated tests, we augment Equation (1) with an indicator variable to identify firms included in *OLD* that delist before *NEW* was published. The coefficient on this variable is significantly negative, suggesting that observations related to firms that delist are *less* likely to be subject to changes to the detail file.

Table 3 Determinants of changes to the I/B/E/S detail file

Panel A: Univariate analysis of changes to the detail file

	Changes			No Changes			Mean	Median
Variable	**N**	**Mean**	**Median**	**N**	**Mean**	**Median**	**Difference**	**Difference**
AGE	321,657	10.180	10.000	1,573,534	10.631	10.000	−0.452 ***	0.000 ***
AF	321,657	14.828	13.000	1,573,534	16.787	15.000	−1.959 ***	−2.000 ***
LOSS_DUM	321,657	0.172	0.000	1,573,534	0.136	0.000	0.036 ***	0.000 ***
EPS	321,657	0.909	0.715	1,573,534	1.144	0.960	−0.235 ***	−0.245 ***
EPS_GROWTH	321,657	0.037	0.079	1,573,534	0.045	0.103	−0.008 **	−0.025 ***
BROKER_SIZE	321,657	69.592	40.000	1,573,534	69.338	47.000	0.253 *	−7.000 ***
GENEXP	321,657	6.595	6.000	1,573,534	6.504	5.000	0.092 ***	1.000 ***
FIRMEXP	321,657	3.100	2.000	1,573,534	2.981	2.000	0.119 ***	0.000 ***

Panel B: Cross-sectional analysis of changes to the detail file

$$CHANGE_{i,j,k,t} = \alpha_0 + \alpha_1.AGE_{i,t} + \alpha_2.AF_{i,t} + \alpha_3.LOSS\_DUM_{i,t} + \alpha_4.EPS_{i,t} + . \ \alpha_5.EPS\_GROWTH_{i,t} + \alpha_6.BROKER\_SIZE_{k,t} + \alpha_7.GENEXP_{j,t} + \alpha_8.FIRMEXP_{i,j,t} + \varepsilon_{i,j,k,t}$$

Variable	**coeff.**	**z-stat.**
Intercept	−1.070 ***	−10.59
AGE	−0.012 ***	−4.01
AF	−0.017 ***	−7.71
LOSS_DUM	0.009	0.22
EPS	−0.062 ***	−5.51
EPS_GROWTH	0.008 ***	2.58
BROKER_SIZE	−0.000	−0.30
GENEXP	−0.007	−0.97
FIRMEXP	0.039 ***	4.19
Year fixed effects		Yes

Table 3 (continued)

Pseudo R^2	1.3%
Area under ROC Curve	57.50
Changes (N)	321,657
No changes (N)	1,573,534
Total N	1,895,191

Table 3, Panel A, presents the univariate analysis of the determinants of changes to the I/B/E/S detail file. The "changes" subsample includes all observations in the file that were deleted from (added to) *OLD* (*NEW*) or that report a different earnings forecast across the two versions of the detail file. The "no changes" subsample includes all observations that are idential across both versions. *AGE* is the years firm *i* has appeared in I/B/E/S since the first year of coverage in I/B/E/S. *AF* is the number of analysts issuing an earnings forecast for firm *i* in year *t*. *LOSS_DUM* is an indicator variable equal to 1 when actual earnings per share is negative and equal to 0 otherwise. *EPS* is firm *i*'s street earnings per share. *EPS_GROWTH* is the growth in firm *i*'s street earnings per share. *BROKER_SIZE* is the number of analysts employed by brokerage *k*. *GENEXP* is the years analyst *j* has supplied to I/B/E/S at least one earnings forecast for any firm since the first year of coverage in I/B/E/S. *FIRMEXP* is the years analyst *j* has supplied at least one earnings forecast for firm *i* since the first year of coverage in I/B/E/S. Table 3, Panel B, presents the cross-sectional analysis of the determinants of changes to the I/B/E/S detail file. $CHANGE_{i,j,k,t}$ is an indicator variable equal to 1 for observations in *OLD* (*NEW*) that were deleted from (added to) *OLD* (*NEW*) or that reflect a different earnings forecast for firm *i* in year *t* by analyst *j* who is affiliated with brokerage *k*. Standard errors are clustered by analyst. ***, **, and * indicate signficance at the 0.01, 0.05, and 0.10 level (two-tailed), respectively

absolute value of reported earnings. We limit this analysis to forecasts issued before the earnings announcement.[18]

Table 4, Panel A, presents absolute forecast errors. We find that deletions from *OLD* are less accurate (mean: 0.916; median: 0.169) than the additions to *NEW* (mean: 0.554; median: 0.093). Among the value changes, we observe no significant difference in the mean absolute forecast error while the median absolute forecast error is greater for *OLD* relative to *NEW*.[19] In total, the earnings forecasts in *NEW* are 7.19% more accurate (0.043/0.598) than the earnings forecasts in *OLD*. Further, when we examine only each analyst's last earnings forecast issued prior to the earnings announcement—commonly the subject of academic research—we find similar results.

Table 4, Panel B, presents earnings forecast bias. We find that the deletions from *OLD* are more biased (mean: 0.592; median: 0.019) than the additions to *NEW* (mean: 0.282; median: 0.000). Value changes are significantly less biased in *NEW* than *OLD* when we compare the medians but exhibit no significant difference in mean bias. Overall, the earnings forecasts in *NEW* are 9.59% less biased (0.035/0.365) than the forecasts in *OLD*, and these findings extend to the last earnings forecast issued by each analyst prior to the earnings announcement.[20] In general, our findings suggest *NEW* creates a more favorable impression of analysts when examining the observed properties of their forecasts, in that the earnings forecasts disseminated in *NEW* are more accurate and less biased relative to forecasts in *OLD*.[21]

5.2 Identifying firms that meet or beat analysts' expectations using the detail file

Research also relies on the analyst earnings forecasts in I/B/E/S to establish a proxy for the market's earnings expectations (e.g., Kirk et al. 2014; Koh et al. 2008; O'Brien 1988). Other studies use meeting or just beating the consensus earnings forecast as an indication of earnings management (Bhojraj et al. 2009; Yu 2008; Bartov et al. 2002; Degeorge et al. 1999) or to assess the market implications of small positive and negative earnings surprises (Bartov et al. 2002). In this section, we examine how changes to the detail file impact the identification of firms that just meet or beat or just miss the consensus analyst earnings forecast.

We limit this analysis to the 48,272 firm-year observations that exist in both versions of the detail file.[22] We classify a firm as "just meet or beat" if the earnings surprise (i.e., actual earnings minus the mean consensus earnings forecast at the time of the earnings announcement) is greater than or equal to $0.00 and less than $0.015. Further, we classify a firm as "just miss" if the earnings surprise is greater than -$0.015 and less

[18] Only 6.83, 5.35, and 4.49% of the deletions, additions, and value changes, respectively, represent earnings forecasts for which the actual value is missing or the estimate date is on or after the earnings announcement.

[19] The value changes in *OLD* and *NEW* are not identical due to data requirements used to calculate forecast accuracy and bias. To calculate these properties, (a) the earnings announcement date must be available, (b) the date of the forecast must precede the earnings announcement, and (c) the actual EPS must be nonmissing and nonzero.

[20] In untabulated tests, we find that the impact of I/B/E/S changes on earnings forecast accuracy and bias is consistent across the years in the common sample period.

[21] Differences in forecast error and bias across the files are not driven by outliers. Our results are qualitatively unchanged when we winsorize or truncate our data at the first and 99th percentiles for analyst forecast error and bias.

[22] We also exclude firm-year observations impacted by stock splits or stock dividends as such adjustments could cause differences in meet or beat classifications across *OLD* and *NEW* (Payne and Thomas 2003).

Table 4 Changes and the properties of analyst annual earnings forecasts in the I/B/E/S detail file

Panel A: Absolute forecast error – OLD vs. NEW

	OLD			NEW			Difference (NEW – OLD)	
	N	Mean	Median	N	Mean	Median	Mean	Median
Deletions (*OLD*) vs. additions (*NEW*)	214,085	0.916	0.169	111,816	0.554	0.093	−0.362 ***	−0.076 ***
Value changes	16,453	1.173	0.248	16,450	0.953	0.235	−0.220	−0.014 ***
All changes	230,538	0.934	0.173	128,266	0.605	0.102	−0.329 ***	−0.071 ***
All I/B/E/S forecasts	1,887,919	0.598	0.093	1,787,288	0.555	0.087	−0.043 ***	−0.006 ***
Last forecast only	568,186	0.378	0.045	536,554	0.342	0.042	−0.036 ***	−0.004 ***

Panel B: Bias – OLD vs. NEW

	OLD			NEW			Difference (NEW – OLD)	
	N	Mean	Median	N	Mean	Median	Mean	Median
Deletions (*OLD*) vs. additions (*NEW*)	214,085	0.592	0.019	111,816	0.282	0.000	−0.310 ***	−0.019 ***
Value changes	16,453	0.412	0.042	16,450	0.081	−0.006	−0.331	−0.048 ***
All changes	230,538	0.579	0.020	128,266	0.257	0.000	−0.323 ***	−0.020 ***
All I/B/E/S forecasts	1,887,919	0.365	0.000	1,787,288	0.330	0.000	−0.035 ***	0.000 ***
Last forecast only	568,186	0.156	−0.006	536,554	0.125	−0.006	−0.031 ***	0.000 ***

Panel C: Just meet or beat – OLD vs. NEW

	N	% OLD Just meet or beat
Just meet or beat *OLD*	9852	
Just meet or beat *NEW*	9859	
Just meet or beat *OLD* not *NEW*	336	3.41%
Just meet or beat *NEW* not *OLD*	343	3.48%
Just meet or beat not equal	679	6.89%

Panel D: Just miss – OLD vs. NEW

	N	% OLD Just miss
Just miss *OLD*	4527	
Just miss *NEW*	4571	
Just miss *OLD* not *NEW*	208	4.59%
Just miss *NEW* not *OLD*	252	5.57%
Just miss not equal	460	10.16%

Table 4 compares the absolute forecast error (Panel A), bias (Panel B), "just meet or beat" classifications (Panel C), and "just miss" classifications (Panel D) across the earnings forecasts in *OLD* and *NEW*. We measure the absolute forecast error as the absolute value of the difference between reported earnings and the forecasted value of earnings, scaled by the absolute value of reported earnings. Earnings forecast bias is the forecasted value of earnings minus reported earnings, scaled by the absolute value of reported earnings. In Panels A and B, the "last forecast only" row includes only the last forecast issued by an analyst for a given firm-year observation prior to the earnings announcement. For a common sample of 48,272 firm-year observations available in both *OLD* and *NEW*, in Panel C, we classify a firm as "just meet or beat" if the earnings surprise (actual earnings minus the mean consensus earnings forecast at the time of the earnings announcement) is greater than or equal to $0.00 and less than $0.015. In Panel D, we classify a firm as "just miss" if the earnings surprise is greater than -$0.015 and less than $0.00. ***, **, and * indicate signficance at the 0.01, 0.05, and 0.10 level (two-tailed), respectively.

than $0.00. We define the consensus earnings forecast as the mean of all analysts' most recent earnings forecasts issued within 90 days of the earnings announcement (Billings and Cedergren 2015; Brown et al. 2012).[23]

Panels C and D of Table 4 present the results of our "just meet or beat" and "just miss" analyses, respectively. Of the 9852 (9859) observations in *OLD* (*NEW*) that are classified as "just meet or beat," there are 679 observations for which the "just meet or beat" classification is different across the two versions of the detail file. Of these 679 observations, 336 (343) observations are classified as "just meet or beat" in *OLD* (*NEW*) but are classified differently in *NEW* (*OLD*). These differences represent 6.89% of the observations classified as "just meet or beat" in *OLD*. Further, as shown in Panel D of Table 4, 4527 (4571) observations are classified as "just miss" in *OLD* (*NEW*). However, 460 of these firm-year observations (10.16% of all "just miss" observations in *OLD*) are classified differently across the two versions of the detail file. In other words, a researcher using the detail file to identify firms that meet or just beat (just miss) the consensus earnings forecast would classify 6.89 (10.16) percent of the firm-year observations differently, simply based on which version of the file is used. These differences are relevant to practice and research that relies on the earnings forecasts reported by I/B/E/S to determine the market's earnings expectations.

5.3 Impact of changes on the relation between forecast accuracy and key characteristics

We perform two sets of additional tests to highlight the importance of our findings. First, research documents that analysts with experience covering the firm issue more accurate earnings forecasts than inexperienced analysts (e.g., Clement 1999; Mikhail et al. 1997), and institutional investors are more likely to rely on the insights of analysts who have considerable history covering the firm in question (Brown et al. 2016). We compare the relation between analyst experience and earnings forecast accuracy using *OLD* and then replicate this analysis using *NEW*. Importantly, for this analysis we use the same procedures (i.e., the same SAS program) to pull observations and conduct all tests. To perform this comparison, we estimate the following regression.

$$AFE_{i,j,k,t} = \alpha_0 + \alpha_1 .FIRMEXP_{i,j,t} + \alpha_2 .NEW_{i,t} + \alpha_3 .FIRMEXP_{i,j,t} \times NEW_{i,t} + \varepsilon_{i,j,k,t}, \quad (2)$$

where $AFE_{i,j,k,t}$ is the absolute earnings forecast error for firm i in year t by analyst j who is affiliated with brokerage k, $FIRMEXP_{i,j,t}$ is the number of years analyst j has been covering firm i as of year t, and $NEW_{i,t}$ is an indicator variable set equal to 0 (1) for forecasts in *OLD* (*NEW*).[24]

As we report in Panel A of Table 5, the coefficient on *FIRMEXP* is significantly negative, consistent with research that finds that experienced analysts issue more accurate earnings forecasts. The coefficient on *NEW* is also significantly negative, consistent with our findings that the earnings forecasts in *NEW* are, on average, more accurate than the earnings forecasts in *OLD* (see Table 4). Importantly, the coefficient on *FIRMEXP*×*NEW* is significantly negative, suggesting that the superiority of experienced analysts is larger in *NEW* than in *OLD*. The economic magnitude of this effect

[23] Our findings are inferentially the same if we use the median (rather than mean) consensus earnings forecast.
[24] For purposes of Equation (2), we standardize *FIRMEXP* to have a mean of 0 and a standard deviation of 1.

is nontrivial, in that the coefficient on the interaction term (−0.004) is more than 30% of the size of the coefficient on the main effect for *FIRMEXP*. In other words, a researcher who used the same procedures to examine this issue would get a meaningfully different view of the magnitude of experienced analysts' superiority over inexperienced analysts, depending on when the detail file was obtained. We perform the same analysis using *BIAS* as the dependent variable and find similar results. Specifically, relative to inexperienced analysts, experienced analysts appear less biased using *NEW*. These findings would give researchers the impression that the superiority of experienced analysts is significantly stronger in *NEW* than in *OLD*.

Second, we also examine the superiority of analysts who work for large brokerages by estimating the following regression.

$$AFE_{i,j,k,t} = \alpha_0 + \alpha_1.BROKER\_SIZE_{i,k,t} + \alpha_2.NEW_{i,t} + \alpha_3.BROKER\_SIZE_{i,k,t} \times NEW_{i,t} + \varepsilon_{i,j,k,t}, \quad (3)$$

where $BROKER\_SIZE_{i,k,t}$ is the number of analysts employed by brokerage k.[25] As we report in Panel B of Table 5, we find that analysts employed by large brokerages issue more accurate earnings forecasts (Clement 1999) but that the superiority of analysts employed by large brokerages is actually significantly *weaker* by approximately 43% in *NEW* than in *OLD* (i.e., 0.010/0.023). Similarly, while these analysts generally issue less biased earnings forecasts, this effect is much smaller in *NEW* than in *OLD*. In contrast to our findings with respect to analyst experience, these findings would give researchers the impression that the superiority of larger brokerages is significantly *weaker* in *NEW* than in *OLD*. Overall, the findings in Table 5 suggest that the relations between forecasting performance and two important analyst and brokerage characteristics differ significantly, depending on which version of the detail file a researcher uses.

5.4 Ongoing differences in the detail file

To address whether the differences we document are limited to only the two versions of the detail file we examine (i.e., 2009 and 2015), we also compare two different versions of the detail file, one made available in October 2012 and the other available in April 2018. We choose these versions because (a) the 2012 version comes after the integration with First Call that potentially resolved these issues, (b) the 2018 version precedes the reshuffling of the broker codes in October 2018, and (c) both versions come after the publication of Ljungqvist et al. (2009), when issues with the recommendation file were revealed.[26] Comparing forecasts issued between 1993 to 2007 (i.e., the same common sample period we use in our primary analyses) across the 2012 and 2018 versions of the detail file, we find that 1.85% of the forecasts in the 2012 version are deleted from the 2018 version and that 13.58% of the forecasts available in the 2018 version are not included in the 2012 version (untabulated).[27]

[25] For purposes of Equation (3), we standardize *BROKER_SIZE* to have a mean of 0 and a standard deviation of 1.

[26] https://wrds-www.wharton.upenn.edu/documents/1030/Product_Change_Notification-IBES_Detail_History-_PreApproval_Contributor._.pdf?_ga=2.263469196.1099027739.1565208724-659584067.1532130746

[27] Our results are similar when we evaluate forecasts between 1993 and 2011 (1.39 and 12.06%, respectively).

Whereas deletions are more prevalent in the comparison of the 2009 and 2015 versions of the file (deletions: 11.68%; additions: 6.01%), additions are more prevalent in the comparison of the 2012 and 2018 versions of the file (deletions: 1.85%; additions: 13.58%). The instability of the relative frequency of deletions and additions is consistent with the explanation provided by Thomson Reuters that no one version of the file can be viewed as being superior. Therefore the most recent version of the detail file is not necessarily superior because changes to the file do not simply reflect the deletion of erroneous forecasts. In general, these findings suggest that the issues we document are not isolated to the versions of the detail file we examine in our primary analyses but instead highlight ongoing issues when using the detail file.

6 Summary file

6.1 Changes to the summary file

Although we find that the detail file is susceptible to significant changes, our discussions with Thomson Reuters personnel (described in Section 2.2) suggest the consensus earnings estimates published in the I/B/E/S summary file are relatively stable. These estimates in the summary file are proprietary to Thomson Reuters and all forecasts from all brokerages contributing to I/B/E/S are eligible for inclusion in the consensus earnings estimate in the summary file, regardless of the restrictions imposed (academic versus institutional investor) by the individual brokerages. In addition, if a given brokerage decides to cease contributing to I/B/E/S and asks Thomson Reuters to suspend access to some or all of its analysts' forecasts, Thomson Reuters will retroactively remove the corresponding earnings forecasts from the detail file but will continue publishing the same consensus earnings estimate in the summary file. As a result, the issues affecting the detail file do not necessarily impact the summary file.

To empirically explore this issue, we compare two versions of the summary file. *OLD* (*NEW*) represents the data available to researchers in 2008 (2015), similar to our analysis of the detail file. Table 6, Panel A, documents the net effect of all changes across *OLD* and *NEW*. In contrast to the detail file, we observe a slight increase in I/B/E/S coverage from *OLD* to *NEW*. Specifically, we find a 1.38% increase in the number of consensus annual earnings estimates reported for the firms, a 1.17% increase in the firm-years for which there is a consensus earnings estimate, a 0.84% increase in the unique firms for which there is a consensus earnings estimate, and a 1.09% increase in the mean analysts following these firms. Therefore, unlike the detail file that exhibits significant changes to its contents, the summary file exhibits substantially fewer changes across the two different versions.

Further, as we report in Panel B of Table 6, we find very few consensus earnings estimates that are deleted from (905 total consensus earnings estimates, or 0.11% of *OLD*) or added to the summary file (12,350 consensus earnings estimates, or 1.49% of *OLD*). Further, only 1968 estimates (0.24% of *OLD*) report a different consensus earnings estimate across the two versions of the summary file, due to reasons other than stock splits or stock dividends. We provide additional detail in Panels C and D of Table 6, where we document that only 0.35% of *OLD* would disappear or appear differently in *NEW* (deletions plus value changes) and that only 1.70% of *NEW* would

Table 5 Changes in the properties of analyst annual earnings forecasts in common research settings

Panel A: Firm-specific analyst experience

$AFE_{i,j,k,t}$ ($BIAS_{i,j,k,t}$) = $\alpha_0 + \alpha_1.FIRMEXP_{i,j,t} + \alpha_2.NEW_{i,t} + \alpha_3.FIRMEXP_{i,j,t} \times NEW_{i,t} + \varepsilon_{i,j,k,t}$

	AFE	BIAS
Intercept	0.421***	0.240***
	(80.13)	(51.37)
FIRMEXP	−0.013***	−0.001
	(−4.07)	(−0.40)
NEW	−0.029***	−0.021***
	(−15.19)	(−12.70)
FIRMEXP ×*NEW*	−0.004***	−0.002*
	(−2.74)	(−1.72)
N	3,615,215	3,615,215
Adjusted R^2	0.04%	0.01%

Panel B: Brokerage size

$AFE_{i,j,k,t}$ ($BIAS_{i,j,k,t}$) = $\alpha_0 + \alpha_1.BROKER\_SIZE_{i,k,t} + \alpha_2.NEW_{i,t} + \alpha_3.BROKER\_SIZE_{i,k,t} \times NEW_{i,t} + \varepsilon_{i,j,k,t}$

	AFE	BIAS
Intercept	0.420***	0.239***
	(80.64)	(51.57)
BROKER_SIZE	−0.023***	−0.025***
	(−10.26)	(−12.20)
NEW	−0.029***	−0.021***
	(−15.27)	(−12.63)
BROKER_SIZE ×*NEW*	0.010***	0.008***
	(11.27)	(9.14)
N	3,670,226	3,670,226
Adjusted R^2	0.05%	0.06%

Table 5, Panel A, presents the results for the estimation of Eq. (2) estimated over the combined sample of observations in *OLD* and *NEW*. The dependent variables are absolute forecast error (*AFE*) and bias (*BIAS*). We measure the absolute forecast error as the absolute value of the difference between reported earnings and the forecasted value of earnings, scaled by the absolute value of reported earnings. Earnings forecast bias is the forecasted value of earnings minus reported earnings, scaled by the absolute value of reported earnings. *FIRMEXP* is the years analyst *j* has supplied at least one earnings forecast for firm *i*. We standarize *FIRMEXP* such that it has a mean of 0 and a standard deviaiton of 1. *NEW* is an indicator variable equal to 0 for observations in *OLD* and equal to 1 for observations in *NEW*. Table 5, Panel B, presents the results for the estimation of Eq. (3) estimated over the combined sample of observations in *OLD* and *NEW* for which we can calculate forecast error and bias and the brokerage has at least one analyst included in the detail file for that year with an analyst code not equal to 000000, which indicates the analyst name is available. *BROKER_SIZE* is the number of analysts employed by brokerage *k*. We standarize *BROKER_SIZE* such that it has a mean of 0 and a standard deviaiton of 1. *AFE*, *BIAS*, and *NEW* are the same as those defined for Panel A. t-statistics are presented in parentheses and are based on standard errors clustered by firm-year. ***, **, and * indicate signficance at the 0.01, 0.05, and 0.10 level (two-tailed), respectively.

not have been available to a researcher who downloaded the same data in 2008 (additions plus value changes).

In Fig. 1 we compare the annual frequency of changes to the summary file, relative to the frequency of changes to the detail file. Specifically, this figure presents year-by-year changes

(i.e., the number of observations classified as deletions, additions, or value changes) as a percentage of the total observations in *OLD* that year, separately for the summary file and detail file. Consistent with the findings in Tables 1 and 6, this figure highlights that the summary file is relatively stable across time while the detail file exhibits substantial differences.[28]

We also examine the effect of changes to the summary file on the observed properties of analyst earnings forecasts. Table 7, Panel A, (Panel B) examines the absolute forecast error (bias) across the two versions of the summary file. We find that both the mean (1.156) and median (0.276) forecast error for the deletions from *OLD* are significantly greater than the mean (0.828) and median (0.201) forecast error for the additions to *NEW*. However, as deletions and additions represent such a small percentage of the summary file, these differences in absolute earnings forecast error and bias are not discernable when considering all observations or when considering only the last estimate issued prior to the earnings announcement.[29]

Panel C (Panel D) of Table 7 examines the "just meet or beat" ("just miss") classifications for the summary file. We also observe very minor differences in the "just meet or beat" and "just miss" classifications across *OLD* and *NEW* of the summary file. Specifically, only 0.65% of the observations in *OLD* are classified as "just meet or beat" in one version of the summary file but not the other (Table 7, Panel C), and only 1.47% of the observations in *OLD* are classified as "just miss" in one version of the summary file but not the other (Table 7, Panel D). These differences are much less common than the differences of 6.89% for the "just meet or beat" classification (Table 4, Panel C) and 10.16% for "just miss" classification (Table 4, Panel D) examining the detail file. In conclusion, changes to the summary file are infrequent and have only a minor impact on the observed properties of the consensus earnings estimates reported in this file.

6.2 Differences between the consensus earnings forecasts in the detail and summary files

To provide insight into whether the choice of the summary or detail file for a consensus earnings forecast is important, we examine differences between consensus earnings forecasts calculated using the detail file and the consensus earnings estimates provided in the summary file at a given point in time (using both files made available to researchers in 2015). We measure the consensus earnings forecast from the detail file as the average of the most recent of each analyst's forecast issued within 90 days of the firm's earnings announcement (i.e., the most common horizon used by researchers to calculate the consensus earnings forecast from the detail file based on our review of the recent literature). The consensus earnings estimate from the summary file is the most recent mean consensus earnings estimate published before the firm's earnings announcement. We restrict our analysis to the 52,793 firm-year

[28] The annual percentages for the detail file in Figure 1 do not reflect the sum of the changes to *OLD* and *NEW* for each year in Table 2. In Table 2, value changes are considered to be changes to both *OLD* and *NEW* (to provide a sense for how much of the detail file changes from one year to the next), whereas for the purpose of Figure 1, value changes are included only once each year.

[29] We note a statistically significant difference in the median absolute forecast error when considering all earnings forecasts in *OLD* and *NEW*. However, this difference (0.001) is not economically significant, as it represents less than 1 % of the median absolute forecast error.

Table 6 Frequency and classification of changes to the I/B/E/S summary file

Panel A: Net changes to consensus earnings estimates across OLD and NEW

			Net change	
	OLD	**NEW**	**Observations**	**%**
Total observations	830,994	842,439	11,445	1.38
Total firm-year observations	78,965	79,885	920	1.17
Unique firms	12,806	12,914	108	0.84
Mean analyst following per firm	6.41	6.48	0.07	1.09

Panel B: Classification of changes to consensus earnings estimates

Classification of change	**Frequency**	**% OLD**
Deletions (in *OLD*, not *NEW*)	905	0.11
Additions (in *NEW*, not *OLD*)	12,350	1.49
Value changes	1968	0.24
Total	15,223	1.83

Panel C: Deletions and value changes as a percentage of OLD

Classification of change	**Frequency**	**% OLD**
OLD changes (Deletions + value changes)	2873	0.35
OLD no changes (*OLD* total – *OLD* changes)	828,121	99.65
Total	830,994	100.00

Panel D: Additions and value changes as a percentage of NEW

Classification of change	**Frequency**	**% NEW**
NEW changes (Additions + value changes)	14,318	1.70
NEW no changes (*NEW* total – *NEW* changes)	828,121	98.30
Total	842,439	100.00

Table 6 presents an overview of the changes to the I/B/E/S summary file. We compare two versions of the summary file, *OLD* and *NEW*, for a common sample period (January 1993 through November 2007). Both *OLD* and *NEW* were obtained directly from Wharton Research Data Services (WRDS). *OLD* represents the data made available to researchers in 2008, and *NEW* represents the data made available to researchers in 2015. All observations reflect annual earnings estimates for U.S. firms for the next fiscal year (FPI = 1). Panel A documents the net effect of changes across *OLD* and *NEW*. Panel B classifies all changes from *OLD* to *NEW* of the summary file into one of three categories: (a) deletions, (b) additions, or (c) value changes. Deletions represent estimates that are included in *OLD* but not *NEW*. Additions represent estimates that are included in *NEW* but not *OLD*. Value changes represent estimates that exist in both *OLD* and *NEW* but for which the estimate value is different across the two versions. Panel C (Panel D) reports the percentage of estimates in *OLD* (*NEW*) that would have been unchanged and observable to a researcher who downloaded the same file in 2015 (2008).

observations where we obtain a consensus earnings forecast from both files and compare these consensus earnings forecasts along a variety of dimensions.

We first assess the frequency of differences between the two measures of consensus earnings forecasts. We calculate the difference between the two consensus earnings forecasts as a percentage of the actual. Table 8, Panel A, reports that the consensus earnings forecasts differ by more than 5% of the actual for 22.22% of the firm-year observations, with a higher summary (detail) consensus forecast for 13.55 (8.67) percent of the observations. Further, the consensus forecasts differ by at least 10% of the actual for 13.96% of the sample, with a higher summary (detail) consensus forecast for 8.83 (5.13) percent of these observations.

In Panel B of Table 8, we report the difference in absolute forecast errors across the measures of consensus earnings forecasts. We find that the forecast errors differ by at least 5% of the actual for 20.42% of the observations, with the summary (detail) forecast error being larger for 10.97 (9.44) percent of these observations. Further, when we examine differences in forecast errors that exceed 10% of the actual, 12.53% of observations produce different forecast errors, with the summary (detail) file producing the larger forecast error for 6.79 (5.74) percent of these observations.

Lastly, in Panel C (Panel D) of Table 8 we assess differences in the classification of firms that meet or just beat (just miss) the consensus forecast, based on whether the detail or summary file is used to determine analysts' consensus earnings forecast. As we report in Panel C of Table 8, both files identify a similar number of firms that meet or just beat analysts' consensus earnings forecasts (11,210 firm-year observations when using the detail file and 11,553 firm-year observations when using the summary file). However, in many instances, the two consensus earnings forecasts are not identifying the same firm-year observations. Specifically, 34.27 (37.33) percent of the firm-year observations identified as meeting or just beating analysts' consensus earnings forecast based on the detail (summary) file are not identified as meeting or just beating analysts' consensus earnings forecast based on the summary (detail) file. We find even larger differences in Panel D when we examine firms that just miss analysts' consensus earnings forecasts, where 60.31 (41.67) percent of the "just miss" observations based on the detail (summary) file are not similarly classified when using the summary (detail) file.

Overall, the findings in Tables 6 and 7 suggest that the summary file is more stable than the detail file, both in terms of its composition and the forecast properties a researcher would observe. In addition, Table 8 highlights that the choice of the summary versus detail file leads to meaningful differences along a variety of dimensions of interest to academic researchers (e.g., consensus earnings forecast, consensus earnings forecast error, and meet-or-beat classification).

6.3 Does the detail or summary earnings consensus better capture market expectations?

Given the nontrivial differences between the detail and summary files, we now examine whether the detail or summary consensus forecast better reflects the market's earnings expectations. We argue that the consensus measure that is more strongly associated with stock returns around the earnings announcement is a better reflection of the market's underlying earnings expectations (Jame et al. 2016). As a result, we compare the market reaction to earnings surprises based on the consensus earnings forecast calculated from the detail file and the consensus earnings estimate provided in the summary file. To assess the ability of these consensus measures to capture the market's earnings expectations, we estimate the following regression.

$$RET_{i,t} = \alpha_0 + \alpha_1 . UE_{i,t} + \alpha_2 . NONLINEAR_{i,t} + \varepsilon_{i,t}, \quad (4)$$

where $RET_{i,t}$ is the three-day market-adjusted abnormal return surrounding the day of firm i's earnings announcement, and $UE_{i,t}$ is unexpected earnings measured as the actual earnings minus analysts' consensus forecast measured using either the detail or summary file, scaled by price per share as of the fiscal year-end. $NONLINEAR_{i,t}$,

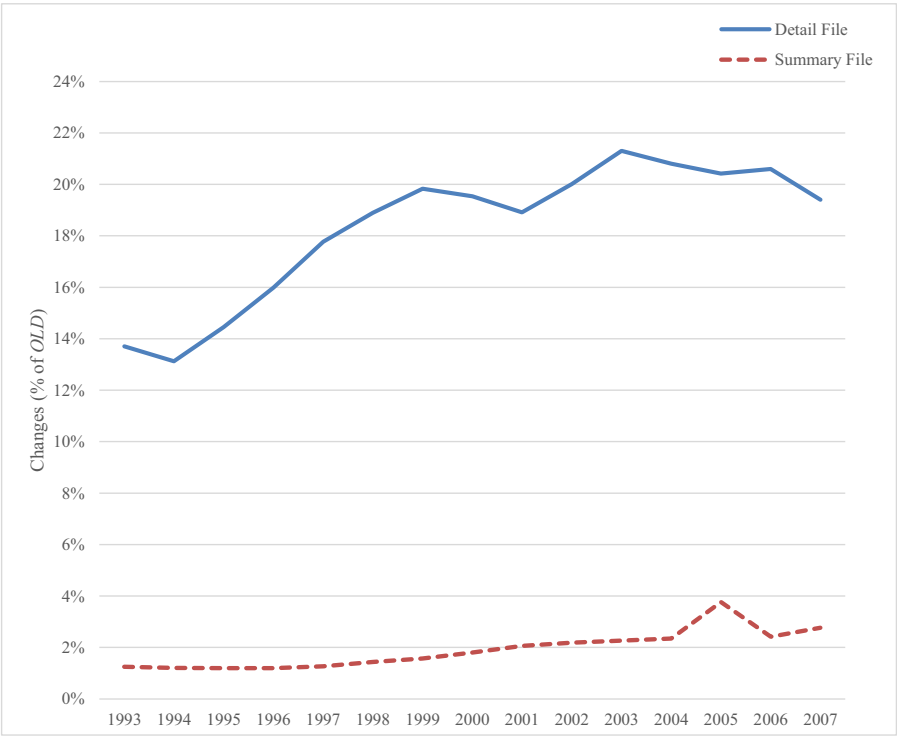

Fig. 1 Frequency of changes to the I/B/E/S detail versus summary files. Figure 1 presents the year-by-year changes (i.e., deletions + additions + value changes) to the I/B/E/S detail and summary files as a percentage of the total observations in *OLD* that year, where the year is based on the fiscal year of the corresponding forecast period end date. The annual percentages for the detail file above do not reflect the sum of the changes to *OLD* and *NEW* for each year in Table 2. In Table 2, value changes are considered to be changes to both *OLD* and *NEW*, whereas for the purpose of this figure, value changes are included only once each year

defined as $UE \times |UE|$, controls for the nonlinear relation between unexpected earnings and announcement returns (Freeman and Tse 1992). We also include year fixed effects and winsorize all continuous variables at the first and 99th percentiles.[30]

We first estimate Eq. (4) when unexpected earnings are measured based on the consensus earnings forecast calculated using the individual forecasts in the detail file (i.e., the mean of each individual analyst's most recent forecast within the 90 days prior to the firm's earnings announcement). We then estimate Eq. (4) when unexpected earnings are measured using the most recent consensus estimate in the summary file issued prior to the firm's earnings announcement. We compare the earnings response coefficients across the two versions of the model to assess which earnings expectation is more strongly associated with announcement returns and thus which consensus forecast better reflects the market's earnings expectations.

The first column of Table 9 reports the results from estimating Eq. (4) with the 90-day detail consensus earnings forecast and, alternatively, the consensus estimate from the summary file. We find that the earnings response coefficient is significantly larger when unexpected earnings are calculated using the summary file, suggesting that the summary consensus estimate better reflects the market's earnings expectations at the time earnings are

[30] We also impose the requirement that the absolute value of both earnings surprise estimates (consensus forecast minus I/B/E/S actual) not exceed 10% of the firm's stock price.

Table 7 Changes and the properties of consensus analyst annual earnings estimates in the I/B/E/S summary file

Panel A: Absolute forecast error – OLD vs. NEW

	OLD			NEW			Difference (NEW – OLD)	
	N	Mean	Median	N	Mean	Median	Mean	Median
Deletions (*OLD*) vs. additions (*NEW*)	660	1.156	0.276	10,394	0.828	0.201	−0.329 ***	−0.074 ***
Value changes	1610	0.696	0.101	1623	0.669	0.099	−0.027	−0.002
All changes	2270	0.830	0.131	12,017	0.806	0.188	−0.023	0.057 ***
All I/B/E/S estimates	757,973	0.726	0.109	768,694	0.727	0.110	0.001	0.001 ***
Last estimate only	71,214	0.448	0.053	72,192	0.448	0.054	0.000	0.001

Panel B: Bias – OLD vs. NEW

	OLD			NEW			Difference (NEW – OLD)	
	N	Mean	Median	N	Mean	Median	Mean	Median
Deletions (*OLD*) vs. additions (*NEW*)	660	0.267	0.115	10,394	0.446	0.032	0.179	−0.083 ***
Value changes	1610	0.472	0.009	1623	0.462	0.010	−0.009	0.001
All changes	2270	0.412	0.022	12,017	0.448	0.027	0.036	0.005
All I/B/E/S estimates	757,973	0.493	0.006	768,694	0.492	0.007	0.000	0.001
Last estimate only	71,214	0.216	−0.003	72,192	0.215	−0.003	−0.002	0.000

Panel C: Just meet or beat – OLD vs. NEW

	N	% OLD Just meet or beat
Just meet or beat *OLD*	12,928	
Just meet or beat *NEW*	12,936	
Just meet or beat *OLD* not *NEW*	38	0.29%
Just meet or beat *NEW* not *OLD*	46	0.36%
Just meet or beat not equal	84	0.65%

Panel D: Just miss – OLD vs. NEW

	N	% OLD Just miss
Just miss *OLD*	4497	
Just miss *NEW*	4513	
Just miss *OLD* not *NEW*	25	0.56%
Just miss *NEW* not *OLD*	41	0.91%
Just miss not equal	66	1.47%

Table 7 compares the absolute forecast error (Panel A), bias (Panel B), "just meet or beat" classifications (Panel C), and "just miss" classifications (Panel D) between the consensus earnings estimates in *OLD* and *NEW*. We measure the absolute earnings forecast error as the absolute value of the difference between reported earnings and the forecasted value of earnings, scaled by the absolute value of reported earnings. Earnings forecast bias is the forecasted value of earnings minus reported earnings, scaled by the absolute value of reported earnings. In Panels A and B, the "last estimate only" row includes only the last consensus estimate for a given firm-year observation prior to the earnings announcement. For a common sample of 65,055 firm-year observations available in both *OLD* and *NEW*, in Panel C, we classify a firm as "just meet or beat" if the earnings surprise (actual earnings minus the mean consensus earnings estimate at the time of the earnings announcement) is greater than or equal to $0.00 and less than $0.015. In Panel D, we classify a firm as "just miss" if the earnings surprise is greater than -$0.015 and less than $0.00. ***, **, and * indicate signficance at the 0.01, 0.05, and 0.10 level (two-tailed), respectively.

Table 8 Changes and the properties of analyst annual earnings consensus forecasts in the I/B/E/S detail file vs. summary file

Panel A: Magnitude of differences in consensus forecasts – NEW detail file vs. NEW summary file

	± 5% of Actual		± 10% of Actual	
	N	%	N	%
Detail consensus forecast is higher	4575	8.67%	2706	5.13%
Summary consensus estimate is higher	7154	13.55%	4661	8.83%
Total with difference	11,729	22.22%	7367	13.96%

Panel B: Magnitude of differences in consensus forecast errors – NEW detail file vs. NEW summary file

	± 5% of Actual		± 10% of Actual	
	N	%	N	%
Detail consensus forecast is higher	4986	9.44%	3031	5.74%
Summary consensus estimate is higher	5793	10.97%	3586	6.79%
Total with difference	10,779	20.42%	6617	12.53%

Panel C: Just meet or beat – NEW detail file vs. NEW summary file

	N	% NEW detail Just meet or beat
Just meet or beat *NEW detail*	11,210	
Just meet or beat *NEW summary*	11,553	
Just meet or beat *NEW detail* not *NEW summary*	3842	34.27%
Just meet or beat *NEW summary* not *NEW detail*	4185	37.33%
Just meet or beat not equal	8027	71.60%

Panel D: Just miss – NEW detail vs. NEW summary

	N	% NEW detail Just miss
Just miss *NEW detail*	5037	
Just miss *NEW summary*	4098	
Just miss *NEW detail* not *NEW summary*	3038	60.31%
Just miss *NEW summary* not *NEW detail*	2099	41.67%
Just miss not equal	5137	101.99%

Table 8 compares the error (Panel A), bias (Panel B), "meet or beat" classifications (Panel C), and "just miss" classifications (Panel D) between the earnings forecasts in the *NEW* version of the detail file with those in the *NEW* version of the summary file. For a common sample of 52,793 firm-year observations with firm-year observations available in both the *NEW* version of the detail file and the *NEW* version of the summary file, we measure the earnings forecast error as the absolute value of the difference between reported earnings and the consensus EPS forecast, scaled by the absolute value of reported earnings. Earnings forecast bias is the forecasted value of earnings minus reported earnings, scaled by the absolute value of reported earnings. We classify a firm as "meet or beat" if the earnings surprise is greater than or equal to $0.00 and less than $0.015. We classify a firm as "just miss" if the earnings surprise is greater than -$0.015 and less than $0.00. When using the detail file, the consensus forecast is calculated as the mean of all analysts' most recent forecast issued within 90 days of the firm's earnings announcement. When using the summary file the consensus estimate is the most recent mean consensus estimate available prior to the earnings announcement.

announced. We also note that the Vuong (1989) test reveals a statistically significant difference in adjusted R^2 across the two models. Finally, we show that these results are

robust to using horizons of 30, 60, or 180 days to calculate the consensus earnings forecast using the detail file.[31]

These findings suggest the summary consensus forecast is a superior measure of the market's earnings expectations. This conclusion is consistent with our earlier findings that the summary file is more stable over time and less susceptible to changes based on the preferences of the contributing brokerages. However, we also recognize the existence of an additional explanation that may contribute to these findings. Specifically, given that the summary file directly provides a consensus earnings estimate for investors, while the detail file requires an investor to calculate the consensus earnings forecast using individual analyst forecasts, investors may rely more heavily on the summary consensus estimate simply because it requires relatively lower processing costs. Relatedly, these findings may reflect more broad dissemination of the summary consensus estimate by forecast data providers. These explanations are consistent with the findings of Bochkay et al. (2018), who suggest that forecast data providers play a key role in alleviating information processing frictions faced by market participants.

7 Recommendations for researchers

Given our finding that the detail file but not the summary file is subject to significant changes through time, we offer several suggestions for researchers who rely on I/B/E/S for analyst earnings forecast data. Researchers rely on I/B/E/S for consensus earnings forecasts in a variety of research contexts, including studies of earnings surprises (e.g., Landsman et al. 2012), meeting-or-beating the market's earnings expectations (e.g., Reichelt and Wang 2010), estimating the cost of capital (e.g., Dhaliwal et al. 2016), and measuring the news in management's earnings guidance (e.g., Yang 2012). Despite the wide use of I/B/E/S data as a proxy for the market's earnings expectations, researchers have relatively little guidance about whether to calculate the consensus earnings forecast from the detail file or to use the consensus earnings estimate in the summary file.[32] As a result, the literature exhibits great variation in the earnings forecast data used to calculate the consensus earnings forecast.

To illustrate, we examine every study published in five premier accounting journals from 2010 to 2016 and identify each study that uses I/B/E/S data to obtain an estimate of analysts' consensus earnings forecast.[33] Of the 268 papers using a consensus earnings forecast from I/B/E/S, 29% use the detail file to calculate the consensus, 43% use the summary file, 27%

[31] When we reestimate Equation (4) using maximum likelihood estimation and employ the Bayesian information criterion to compare the two earnings surprise metrics (Chiang et al. 2019), we continue to find that the consensus estimate provided in the summary file is superior. Specifically, in the four comparisons reported in Table 9, the Bayesian information criterion difference is 107, 154, 106, and 106, where a difference greater than 10 is generally considered strong evidence in favor of one model's superiority over the other.

[32] Brown (1991) finds that the mean of all individual earnings forecasts is less accurate than a mean based on a subset of more recent earnings forecasts, providing guidance to researchers relying on the detail file about which forecasts to include when calculating the consensus earnings forecast. Payne and Thomas (2003) document issues that arise when using I/B/E/S adjusted earnings forecast data and encourage researchers to request the original (pre-split) data from I/B/E/S and create their own split-adjusted data that are not subject to rounding concerns.

[33] These journals are *Contemporary Accounting Research*, *Journal of Accounting and Economics*, *Journal of Accounting Research*, *Review of Accounting Studies*, and *The Accounting Review*.

do not provide sufficient information to determine which file they use, and 1% use a consensus earnings forecast from both files in their tests.[34] In sum, researchers working in a variety of literatures frequently rely on consensus earnings forecast data from I/B/E/S and make different decisions about which file to use, and our findings yield several suggestions.

First, because the contents of the summary file are more stable and better reflect the market's expectations, we encourage researchers to favor the consensus earnings estimate in the summary file over a consensus earnings forecast calculated from the detail file. Not only is the summary consensus estimate less subject to changes, it also reflects the views of more analysts at a given point in time. For example, the average number of analysts contributing to the summary consensus estimate in *NEW* is 9.01, whereas for a common set of firm-year observations the average number of analysts included in a 90-day consensus earnings forecast calculated from the detail file is only 5.58.[35] Moreover, the number of analysts included in the summary consensus estimate exceeds the number included in the 90-day consensus forecast from the detail file for 70% of firm-year observations, while the analysts included in the 90-day detail consensus forecast exceeds the number included in the summary consensus estimate for only for 10% of firm-year observations.

We also note that, when an analyst has not updated an earnings forecast in several months (or in response to a significant event in which the majority of other analysts following the same firm revise their forecasts) or if the analyst issues a forecast that is on a different accounting basis than the majority of the analysts following the firm, Thomson Reuters contacts the analyst to determine whether the forecast should remain in or be removed from the consensus estimate reported in the summary file. These efforts mitigate concerns about stale forecasts in the summary consensus estimate that often encourage researchers to favor a consensus forecast calculated from the detail file. Nevertheless, certain research settings demand a consensus forecast based on either a very specific horizon (e.g., Ertimur et al. 2014) or a very specific set of analysts (e.g., Clement et al. 2011), and the detail file is appropriate and useful in these settings. We encourage researchers using the detail file to report the date on which they obtained the data from I/B/E/S, as the timing of the download has a material impact on the contents of the file.

Second, when using individual earnings forecasts from the detail file, we encourage researchers to assess the susceptibility of their sample to the changes that we document. For example, our findings suggest that changes to the detail file are more likely for younger, less followed firms. Research questions or settings that focus on these types of firms may be more vulnerable to these changes. Relatedly, we find that changes to the detail file are more likely to occur shortly after (rather than many years after) the forecasted period in question (see Table 2). Therefore studies based on sample periods that are several years in the past (e.g., a 2015 study about the reaction to Regulation Fair Disclosure that

[34] Some papers state which file they use. Many papers do not, but we infer which file they use based on the language in the paper. For example, Cadman et al. (2014, p. 63) indicate that they measure the earnings surprise as the difference between the actual EPS value and "the average of the most recent individual analyst earnings per share forecasts," which suggests they use the detail file to construct their consensus earnings forecast. On the other hand, Rajgopal and Venkatachalam (2011, p. 14) measure earnings forecast errors as the difference between the actual and "the most recent median consensus earnings forecast immediately prior to the earnings announcement date," which we infer as evidence that they use the summary file. Many studies do not provide enough information to reliably infer which file is used.

[35] We find similar results when we compare the summary consensus estimate (average analyst following is 9.01) to consensus earnings forecasts calculated from the detail file over 30 days (2.50), 60 days (3.99), and 120 days (8.21).

Table 9 Differences in earnings response coefficients (ERC) for the I/B/E/S detail and summary consensus annual earnings forecasts

	Column 1		**Column 2**		**Column 3**		**Column 4**	
Variable	90-Day Detail	Summary	30-Day Detail	Summary	60-Day Detail	Summary	180-Day Detail	Summary
UE	1.186***	1.302***	0.646***	1.340***	1.160***	1.331***	1.223***	1.327***
	(16.60)	(18.40)	(8.28)	(14.25)	(14.56)	(16.98)	(20.37)	(21.89)
NONLINEAR	−13.883***	−15.187***	−4.810***	−16.735***	−13.354***	−15.987***	−13.742***	−15.121***
	(−11.70)	(−12.75)	(−3.57)	(−10.50)	(−9.95)	(−12.10)	(−14.07)	(−15.28)
N	45,208	45,208	26,172	26,172	37,019	37,019	54,664	54,664
Adjusted R^2	1.2%	1.5%	0.8%	1.4%	1.1%	1.4%	1.5%	1.7%
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Difference in ERC	0.116*** *p* value = 0.008		0.694*** *p* value <0.001		0.171*** *p* value = 0.002		0.104*** *p* value = 0.002	
Vuong Test of R^2	0.001*** *p* value = 0.001		0.006*** *p* value <0.001		0.003*** *p* value = 0.001		0.002*** *p* value = 0.002	

Table 9 examines the earnings response coefficients when the market's earnings expectation is based on the I/B/E/S consensus earnings forecast. The dependent variable is the three-day market-adjusted stock return centered on the date of the firm's earnings announcement. *UE* is the I/B/E/S actual minus the corresponding consensus earnings forecast, scaled by price as of the fiscal period end date. When examining the I/B/E/S detail file, the consensus earnings forecast is the mean of all individual analysts' most recent earnings forecast issued within the 90 days prior to the firm's earnings announcement (or alternatively, within 30, 60, or 180 days prior to the firm's earnings announcement). When examining the I/B/E/S summary file, the consensus earnings forecast is the most recent mean consensus estimate available prior to the earnings announcement. *NONLINEAR* is $UE \times |UE|$. All continuous variables are winsorized at the first and 99th percentiles. ***, **, and * indicate signficance at the 0.01, 0.05, and 0.10 level (two-tailed), respectively.

became effective in October 2000) are less susceptible to subsequent changes to the sample than are studies relying on more recent data. Given that changes to the detail file are more prevalent for more recently issued forecasts, robustness tests focused on older subsets of the sample would give additional confidence that the study's findings would continue to hold with subsequent versions of the detail file.

Third, our examination of the effect of changes to the detail file on several analyst forecast properties suggests that earnings forecasts in *NEW* are significantly more accurate and less biased than the earnings forecasts in *OLD*. Further, there are significant differences in the identification of firms that meet or just beat (miss) the analysts' consensus by one cent or less across *OLD* and *NEW*. Given that the accuracy, bias, and the propensity to meet or beat analyst forecasts are commonly examined outcome variables, studies involving these variables are susceptible to the changing composition of the detail file. Therefore, when feasible, we recommend that researchers examining questions involving these variables highlight the robustness of their findings to different versions of the detail file for a common sample of firms.

Fourth, as a practical matter, we encourage researchers—particularly those using the detail file—to maintain historical records of the raw I/B/E/S data they download. While this is a good practice in all empirical research, it is particularly important when working with databases that are subject to substantial change across various iterations. Importantly, while Ljungqvist et al. (2009) encourage researchers to avoid recycling older versions of the I/B/E/S stock recommendation data (because more recent versions of the stock recommendation detail file are more accurate), it is unclear whether newer versions of the detail file are better than previous versions. As a result, all we can say with certainty is that researchers should maintain their original data in their raw form for subsequent analysis and replication.

Finally, we acknowledge that the surprise file is another alternative to the detail file. The surprise file provides a consensus forecast at the time of the earnings announcement, which often includes updates, relative to the most recent summary consensus estimate that is updated only monthly (on the third Thursday of the month). The surprise file offers some potential advantages over the summary file in that it reflects analysts' most recent views, offering an updated consensus forecast for about 33% of firm-year observations (relative to the last summary consensus issued before the earnings announcement). In addition, our findings (untabulated) suggest that, like the summary file, the surprise file is stable through time.[36] However, the surprise file has some disadvantages, relative to the summary file. For example, the surprise file is only available beginning in 2010 and appears to be rarely used in research. In addition, the surprise file only provides the mean forecast, whereas the summary file also provides the median, high, and low forecasts. Further, the surprise file does not disclose the number of analysts contributing to the consensus forecast, making it unclear whether it reflects the views of as many analysts as are included in the summary consensus. Importantly, when we examine the ability of the consensus earnings estimate from the surprise file to capture the market's earnings expectations using analyses involving

[36] Specifically, for a common sample period (January 1993 through November 2007) for a version of the surprise file downloaded in 2012 and a separate version downloaded in 2018, we document deletions, additions, and value changes of only 0.53, 1.30, and 0.12%, respectively, as a percentage of the observations in the 2012 version.

earnings response coefficients, we find that the summary consensus estimate outperforms the earnings estimate available in the surprise file (untabulated). As a result, we encourage researchers to favor the summary consensus estimate when proxying for the market's expectations at the time of the earnings announcement.

8 Conclusion

We examine the consistency of analyst earnings forecast data available in I/B/E/S. Analysts are important information intermediaries in the capital markets. Their forecasts are associated with stock price changes and inform the investment decisions made by retail and institutional investors (Brown et al. 2016). Further, analyst earnings forecasts are used extensively in accounting and finance research to provide insight into their underlying properties, to proxy for the market's earnings expectations, and to identify firms engaged in earnings management (Bradshaw et al. 2012; Bartov et al. 2002). I/B/E/S is a common source of analyst earnings forecast data, and the consistency of the data and replicability of several key properties based on analyst forecasts are important for both practice and academic research.

We compare all annual earnings forecasts obtained from two different versions of the I/B/E/S detail file—one from 2009 ("*OLD*") and another from 2015 ("*NEW*")—for a common sample period from January 1993 through November 2007. We find that about 19% of the observations in *OLD* are not available in *NEW*, or vice versa, suggesting that a researcher would potentially obtain a substantially different sample based on the date on which the raw data are downloaded from I/B/E/S. These differences appear to be ongoing rather than idiosyncratic to the specific versions of the detail file we examine.

We also examine the implications of changes to the historical contents of the detail file for several features of analyst earnings forecast data commonly used in practice and examined in academic research. Even though *OLD* and *NEW* are purportedly capturing an identical sample of firms and analysts, we find that earnings forecasts in *NEW* are significantly more accurate and less biased than the forecasts in *OLD*. In addition, when considering firms that meet or just beat (just miss) analysts' consensus forecasts, about 7 (10) percent of the firm-year observations would be classified differently across the two versions of the detail file. Importantly, when we examine two different versions of the summary file, we find relatively minor differences in the contents of and forecast attributes associated with these estimates. We also find that the summary file provides a superior proxy for the market's expectations. Given the relative consistency of the summary file and that it provides a superior proxy for the market's expectations, we encourage researchers to favor the summary consensus earnings estimates over consensus earnings forecasts calculated from individual forecasts in the detail file.

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Appendix

Table 10 Illustration of deletions, additions, and value changes to the detail file

Observation	Forecast period indicator	Measure	Firm	Year	Brokerage	Analyst	Forecast date	Value	Classification
OLD									
1	1	EPS	AAA	12/31/1999	111	222	10/1/1999	1.26	–
2	1	EPS	AAA	12/31/1999	333	333	10/31/1999	1.28	DELETION
3	1	EPS	CCC	11/30/2002	222	333	9/15/2002	2.25	–
4	1	EPS	DDD	3/30/2005	222	333	2/1/2005	3.64	–
5	1	EPS	DDD	3/30/2006	222	333	1/31/2006	3.73	–
6	1	EPS	EEE	12/31/2006	111	444	7/12/2006	2.81	VALUE CHANGE
7	1	EPS	FFF	12/31/1997	444	555	12/1/1997	0.34	–
8	1	EPS	FFF	12/31/1998	555	777	9/30/1998	0.28	DELETION
9	1	EPS	FFF	12/31/1999	111	444	9/4/1999	0.38	VALUE CHANGE
10	1	EPS	GGG	7/31/2001	888	111	4/22/2001	5.21	–
11	1	EPS	HHH	6/30/2004	666	999	6/1/2004	0.75	DELETION
NEW									
1	1	EPS	AAA	12/31/1999	111	222	10/1/1999	1.26	–
2	1	EPS	BBB	12/31/2001	111	222	6/30/2001	4.12	ADDITION
3	1	EPS	CCC	11/30/2002	222	333	9/15/2002	2.25	–
4	1	EPS	DDD	3/30/2005	222	333	2/1/2005	3.64	–
5	1	EPS	DDD	3/30/2006	222	333	1/31/2006	3.73	–
6	1	EPS	EEE	12/31/2006	111	444	7/12/2006	2.79	VALUE CHANGE

Table 10 (continued)

Observation	Forecast period indicator	Measure	Firm	Year	Brokerage	Analyst	Forecast date	Value	Classification
7	1	EPS	FFF	12/31/1997	444	555	12/1/1997	0.34	–
8	1	EPS	FFF	12/31/1998	999	888	5/31/1998	0.27	ADDITION
9	1	EPS	FFF	12/31/1999	111	444	9/4/1999	0.34	VALUE CHANGE
10	1	EPS	GGG	7/31/2001	888	111	4/22/2001	5.21	–

This appendix illustrates how we classify forecasts as deletions, additions, and value changes. Specifically, our sample begins with all annual EPS forecasts where FPI = 1. We first remove any observation in either *OLD* or *NEW* that is a duplicate on a firm-year-brokerage-analyst-forecast date basis, such that each version of the file has only one observation for each firm-year-brokerage-analyst-forecast date combination. Deletions (additions) are those observations that exist in *OLD* (*NEW*) but not in *NEW* (*OLD*). Observations 2, 8, and 11 in *OLD* are classified as deletions, and observations 2 and 8 in *NEW* are classified as additions. Value changes are those observations that exist in both *OLD* and *NEW* but where the forecasted value is different across the two versions of the file. Observations 6 and 9 are classified as value changes.

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