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The quality of street cash flow from operations

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Abstract We provide empirical evidence on the quality of street cash flow from operations (CFO) as an alternative financial performance summary measure. We focus our investigation on the quality of the items analysts exclude in their determination of street CFO. Based on a sample of 8,518 firm-year observations over the 1993–2008 period, we find that the street CFO number is generally higher than the GAAP CFO number, indicating that analysts typically make CFO-increasing exclusions. Our inspection of hand-collected analyst reports reveals that, while some analysts make sophisticated exclusions of transitory cash items, many others ignore working capital and other accruals when adjusting forecasted earnings to arrive at their street CFO forecasts. We find that street CFO exclusions are negatively associated with future operating earnings, suggesting that these exclusions are not fully transitory or unimportant in forecasting future performance. Our results also indicate that street CFO exclusions are less transitory than the implicit accrual component of analysts' street earnings exclusions. These results suggest that the average quality of analysts' street CFO exclusions is quite low and that it is even lower than the quality of their implied accrual exclusions. Moreover, we find that investors perceive analysts' CFO exclusions to be of such low quality to render street CFO measures less informative than GAAP CFO figures. Finally, we find that analyst conflicts of interest and (to some extent) the greater inherent volatility of firms' CFO series contribute to the low-quality nature of analysts' street CFO exclusions.

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1 Introduction

During the last two decades, the disclosure of non-GAAP adjusted financial measures has become increasingly more common. Analysts forecast various measures of earnings and cash flow from operations (CFO) that exclude certain items that analysts deem to be unimportant in forecasting core (i.e., recurring) earnings and CFO performance. As a result, forecast data providers (hereafter FDPs) such as I/B/E/S typically adjust the realized earnings and CFO measures to exclude items not forecasted by the majority of analysts (the "majority rule") to allow for more meaningful comparisons to ex ante forecasts. These FDP-adjusted realized earnings and CFO measures are often referred to as "street earnings" and "street CFO," respectively, and are frequently compared to the non-GAAP metrics that are sometimes voluntarily disclosed by managers in earnings press releases.

While several studies examine various properties of street earnings measures (e.g., Bradshaw and Sloan 2002; Brown and Sivakumar 2003; Doyle et al. 2003; Gu and Chen 2004), there is limited empirical evidence on the properties of street CFO as an alternative financial metric. This type of evidence is warranted given investors' increased demand for analyst CFO information (DeFond and Hung 2003) and the ongoing debate on the quality of analysts' street CFO forecasts (Givoly et al. 2009; Call et al. 2009, 2013). We investigate the average quality of analysts' street CFO metrics with specific focus on the persistence and informativeness of the exclusions made by analysts (and, in turn, FDPs) in deriving the street CFO figure.[1] When analysts exclude items from both their street earnings and CFO forecasts, they also provide an implicit estimate of excluded accrual items. Accordingly, we examine the relative quality of analysts' street CFO and implied accrual exclusions. Based on detailed inspections of full-text analyst reports, we also assess the common types of items individual analysts exclude in calculating street CFO and whether these common exclusions are reflected in the actual street CFO figure reported by I/B/E/S. This evidence is important since it improves our understanding of the interplay between the street CFO exclusion decisions made by analysts and FDPs. Finally, while prior research debates the quality of analysts' street CFO and implied accrual estimates, we know little about the factors that influence the quality of these measures. We therefore investigate whether the average and relative quality of analysts' street CFO and implied accrual exclusions are influenced by two

[1] We base our large-sample analyses on the I/B/E/S actual CFO metric (an ex post FDP-adjusted measure based on analysts' ex ante forecasts). Our small-sample analyses are based directly on hand-collected data from analysts' ex ante reports. We acknowledge that we often discuss "analysts' exclusions" even though the actual CFO measure is determined ex post by I/B/E/S using the majority rule (based on ex ante exclusions from analysts' CFO forecasts).

important factors discussed in the extant literature: (1) analysts' conflicts of interest and (2) the relative volatility of firms' CFO series.

Our evidence is particularly timely and relevant given investors' presumed demand for analyst CFO information and the continuing debate on the quality of analysts' CFO forecasts. Since CFO is more objective and less vulnerable to management manipulation, prior studies posit that investors often demand CFO information from analysts as a valuable supplement to earnings information, especially in cases where earnings quality is suspect. For instance, DeFond and Hung (2003) find evidence suggesting that the dramatic increase in the frequency of analyst CFO forecasts is a result of investors' demand for supplemental CFO information.[2] This "demand hypothesis" implies that analysts' CFO information is of sufficiently high quality to warrant investors' demand. In line with this argument, DeFond and Hung (2003) report anecdotal evidence that analysts' CFO forecasts are sophisticated measures derived from detailed predictions of working capital accrual adjustments and other noncash add-backs to net income.

Recent research debates DeFond and Hung's (2003) conclusion regarding the sophistication of analysts' CFO forecasts.[3] On one side of the debate, Givoly et al. (2009) find evidence suggesting that analysts' CFO forecasts are naïve extensions of their earnings forecasts and that analysts largely ignore changes in working capital and other accruals when adjusting forecasted earnings to arrive at their CFO forecasts. Their results also indicate that analysts' implied accrual forecasts (i.e., the difference between their earnings and CFO forecasts) are poor estimates of unexpected accruals. Therefore, they conclude that analysts' CFO forecasts are low in quality. Givoly et al. also report that street CFO metrics often do not conform to standard GAAP CFO numbers and that the discrepancy between these measures is economically large, suggesting that analysts exclude a significant amount of cash items. However, they find that this discrepancy does not bias their conclusion that analysts' CFO forecasts are of low quality.

On the opposite side of the debate, Call et al. (2009) provide anecdotal evidence that analysts make sophisticated predictions of working capital and tax accruals when deriving their street CFO forecasts, consistent with DeFond and Hung's (2003) evidence. Call et al. (2009) find that analysts' earnings forecasts are more accurate when they also issue CFO forecasts, suggesting that analysts who forecast CFO better understand firms' earnings process. In direct response to Givoly et al. (2009), Call et al. (2013) argue that Givoly et al.'s results do not provide diagnostic evidence of the sophistication of analysts' CFO forecasts, given the discrepancy between street and GAAP CFO metrics. Call et al. (2013) report that analysts' CFO forecasts outperform naïve CFO forecasts when they account for the mismatch

[2] Prior research also suggests an increase in voluntary disclosures of management CFO forecasts (especially adjusted CFO forecasts) and that this trend is fueled by investor demand (Wasley and Wu 2006; Dambra et al. 2013).

[3] Consistent with this line of research, we use the term "sophistication" to refer to the quality of analysts' derivation of their street CFO forecasts. Sophisticated forecasts are those derived from detailed predictions of working capital accruals and other non-cash add-backs to forecasted earnings, whereas less-sophisticated (or naïve) forecasts are those derived by simply adding back predictions of depreciation expense to the forecasted earnings figure.

between street and GAAP CFO metrics. They also find that analysts make sophisticated implied accrual forecasts that are consistent with their own street CFO forecasts and that investors react to analysts' CFO forecast revisions. Call et al. (2013) therefore conclude that analysts' CFO forecasts are not low-quality CFO measures as suggested by Givoly et al. but instead that they are informative measures that incorporate sophisticated accrual predictions.

This ongoing debate suggests that the discrepancy between FDP-adjusted and GAAP CFO metrics can be an important factor in assessing the quality of analysts' street CFO measures. Our research takes a different approach and informs this debate by examining the components and quality of analysts' exclusions in determining the street CFO figure (i.e., those items analysts do not incorporate when adjusting forecasted earnings to arrive at their CFO forecasts). We also examine the relative quality of analysts' implied accrual exclusions (i.e., the difference between their earnings and CFO exclusions), given conflicting evidence on the sophistication of implied accrual forecasts (Givoly et al. 2009; Call et al. 2013). Specifically, we examine three research questions. (1) Do analysts make (economically significant) exclusions when deriving the street CFO figure and are these exclusions reflected in the actual street CFO figures reported in I/B/E/S? (2) What is the average quality of analysts' street CFO exclusions, and how does it compare to the quality of analysts' implied accrual exclusions? (3) Which factors influence the average and relative quality of analysts' street CFO and implied accrual exclusions?

The street earnings literature defines high-quality street exclusions as those that are transitory or that have the least implications for predicting future firm performance (Doyle et al. 2003; Gu and Chen 2004; Kolev et al. 2008). Conversely, low-quality exclusions are those that persist in future periods and therefore are not fully transitory as some analysts claim. Prior street earnings research also assesses the quality of analysts' exclusions by examining the informativeness of street earnings relative to GAAP earnings (Bradshaw and Sloan 2002; Brown and Sivakumar 2003) as well as investors' perceptions of excluded earnings items (Doyle et al. 2003; Gu and Chen 2004; Landsman et al. 2007). These studies suggest that high-quality exclusions lead to street earnings metrics that are more informative than GAAP earnings and that investors discount exclusions that appear to be of low quality. Following this body of research, we assess the average and relative quality of analysts' street CFO and implied accrual exclusions based on the two key properties used in prior research to define quality: persistence and informativeness.

We base our investigation on a sample of 8,518 firm-year observations over the 1993–2008 period. To study the quality of analysts' implicit accrual exclusions (i.e., the difference between analysts' street earnings and CFO exclusions), our sample is comprised solely of observations with comparative I/B/E/S actual street earnings and CFO figures. We find that the street CFO number is generally higher than the Compustat GAAP CFO number, indicating that analysts typically make CFO-increasing exclusions. For a randomly selected sample, we hand-collect and inspect 110 full-text reports issued by analysts providing CFO forecasts as identified in the I/B/E/S database. We find that roughly 67 % (32 %) of the full-text reports do not incorporate changes in working capital accruals (deferred taxes) when adjusting forecasted net income to arrive at the street CFO forecast. Further, about 18 % of

the reports compute a naïve CFO forecast by simply adding back depreciation expense to net income, whereas 17 % ignore nonrecurring cash items such as restructuring charges, litigation payments, and one-time pension cash contributions. These results suggest that, while some analysts do not forecast transitory cash items (which the street literature would consider high-quality exclusions), many others fail to forecast working capital and other accruals (which the street literature would consider to be low-quality exclusions).

Additional empirical tests indicate that street CFO exclusions computed using I/B/E/S actual CFO figures reflect the major types of exclusions we identify from individual analyst reports (i.e., changes in working capital accruals and deferred taxes). The results also suggest that these excluded items account for an economically significant proportion of the CFO exclusions made by I/B/E/S. This evidence suggests a strong interplay between the CFO items excluded by individual analysts and the adjustments made by I/B/E/S when reporting the actual street CFO values. Given the difficulty in determining all types of CFO exclusions from hand-collected analyst reports, we conduct large-sample analyses of the association between street CFO exclusions (computed using I/B/E/S data) and adjustments to net income used to calculate GAAP CFO based on the indirect method as reported in Compustat. Our results again indicate that analysts, on average, fail to forecast working capital accruals and that these excluded items are economically significant, consistent with analysts' employing naïve derivations of their CFO forecasts. This evidence is also consistent with prior evidence that analysts often forecast CFO figures that do not conform to the standard GAAP CFO definition (Givoly et al. 2009; Call et al. 2013).

Our persistence tests indicate that analysts' CFO exclusions are negatively associated with future operating earnings, suggesting that these exclusions are not fully transitory and thus are of low quality. We also find that street CFO exclusions are *less* transitory and therefore are of even lower quality than analysts' implied accrual exclusions. Our information content tests suggest that investors do not perceive the street CFO metric to be more informative than the corresponding GAAP CFO figure. This result contrasts with prior evidence suggesting that investors pay more attention to street earnings than to GAAP earnings (e.g., Bradshaw and Sloan 2002; Brown and Sivakumar 2003). We also find that investors discount street CFO exclusions and that this discount is greater than that of analysts' implied accrual exclusions. These results indicate that investors perceive street CFO metrics (and the items excluded to arrive at the street CFO metric) to be low-quality measures of firm's CFO performance.

Givoly et al. (2009) argue that the quality of analysts' street CFO forecasts (and, in turn, the quality of their implied accrual forecasts) may be influenced by (1) analysts' economic incentives and (2) the greater inherent volatility of firms' CFO series, which makes CFO forecasting more difficult than the forecasting of accrual-based earnings. Moreover, prior research suggests that incentives to generate investment banking business influence the quality of analysts' earnings exclusions (Baik et al. 2009; Barth et al. 2012) and that analysts may exclude hard-to-predict earnings items for either information-related or opportunistic reasons (Lambert 2004). We therefore examine the average and relative quality of analysts' CFO and

implied accrual exclusions, *conditional* on (1) conflicts of interest faced by analysts issuing CFO forecasts for a particular firm and (2) the relative volatility of the firm's CFO series.

Our results indicate that analyst conflicts of interest and relative CFO volatility both play a significant role in determining the types and economic significance of the items excluded from analysts' street CFO forecasts. Specifically, we find that working capital and tax accruals account for a greater proportion of excluded CFO items for firms followed by strongly conflicted analysts and firms with more volatile CFO series. Our persistence tests suggest that the quality of street CFO exclusions is significantly lower for firms followed by strongly conflicted analysts but only marginally lower for firms with more volatile CFO series. Taken together, these results suggest that analyst conflicts of interest and (to some extent) the difficulty of forecasting CFO both contribute to the low-quality nature of analysts' street CFO exclusions. In extended analyses, we find an increase in the quality of street CFO exclusions following SEC scrutiny into the use of non-GAAP metrics. However, analyst conflicts of interest still have a strong negative effect on the quality of street CFO exclusions, despite post-intervention improvements.

Our study makes three important contributions to the extant literature. First, we extend prior research on street financial metrics by providing evidence that analysts' street CFO exclusions are of such low quality that they render street CFO measures uninformative to investors relative to GAAP CFO. Second, our evidence informs the continuing debate on the quality of analysts' street CFO forecasts. Our results regarding the low-quality nature of analysts' CFO exclusions imply that analysts' derivation of forecasted CFO is, on average, unsophisticated, consistent with Givoly et al. (2009). Third, our evidence that analyst conflicts of interest and relative CFO volatility influence the components and quality of street CFO exclusions improves our understanding of the factors contributing to the naïve nature of the street CFO metrics provided by some analysts. Our results have practical implications for academic researchers who rely on FDP-adjusted CFO data to address various research questions and for investors who wish to assess the quality of adjusted street CFO information provided by analysts and FDPs. Finally, our study informs standard setters who have expressed concern about the provision of non-standard financial measures that exclude normal operating cash flow items (Chasan 2012).

2 Background and research questions

2.1 Street earnings measures

Several studies examine the quality of street earnings measures based on two key properties: persistence and informativeness. The street earnings literature argues that truly transitory or one-time items should be excluded from earnings, while the exclusion of recurring (persistent) items is less justifiable. Prior studies thus argue that high- (low-) quality exclusions are those that are less (more) associated with future operating performance. Consistent with this notion, Doyle et al. (2003) and Landsman et al. (2007) find that recurring items excluded from street earnings are significantly

negatively associated with future operating earnings, suggesting that these exclusions are relevant in predicting future performance and thus are of low quality.

Prior evidence on the persistence of nonrecurring exclusions is mixed. Doyle et al. (2003) find that special items excluded from street earnings are unrelated to future cash flows, but significantly related to future free cash flows, suggesting that these exclusions predict future capital expenditures. Landsman et al. (2007) report that exclusions of positive special items are fully transitory, whereas exclusions of negative special items are persistent and thus of low quality. Gu and Chen (2004) find that nonrecurring earnings exclusions are not fully transitory; however, nonrecurring exclusions are more transitory than the nonrecurring items included in street earnings. Gu and Chen therefore conclude that some analysts have expertise in making high-quality exclusion decisions. In contrast, Hsu and Kross (2011) find no difference in the persistence of special items included in versus excluded from street earnings. Finally, Kolev et al. (2008) find that, while the transitory nature of recurring earnings exclusions has improved after SEC scrutiny into the use of non-GAAP metrics, special items exclusions are more persistent, indicating a post-intervention decline in the quality of nonrecurring earnings exclusions.

Prior studies also assess the quality of street earnings measures by examining the informativeness of street earnings relative to GAAP earnings as well as investors' perceptions of the excluded earnings items. Bradshaw and Sloan (2002) and Brown and Sivakumar (2003) find that street earnings metrics are more highly associated with announcement period returns than GAAP earnings, suggesting that investors perceive street earnings to better represent core earnings performance. Although investors pay more attention to street earnings, Doyle et al. (2003) and Landsman et al. (2007) find that investors discount low-quality exclusions of recurring items. However, this discount is incomplete, suggesting that investors do not fully understand the low-quality nature of these items.

Recent research investigates factors that influence the quality of street earnings measures. For instance, prior evidence indicates that analysts' incentives can influence their street exclusion decisions, but this evidence is mixed. Baik et al. (2009) find that analysts are more likely to make income-increasing exclusions of nonrecurring earnings items for stocks exhibiting glamour characteristics, presumably to generate investment banking business by curry favoring with management. They also find that analyst conflicts of interest lead to street earnings that are less useful in predicting future earnings for glamour stocks. In contrast, Barth et al. (2012) find that the incentives of managers and analysts differ and lead to different exclusion decisions. While managers exclude stock-based compensation for opportunistic reasons (i.e., to meet expectations), analysts appear to exclude stock-based compensation to improve the informativeness of street earnings. Finally, Lambert (2004) argues that analysts may purposely exclude "hard-to-predict" earnings items, not for the benefit of providing a more informative measure to investors, but for their own self-interest. Thus, while street exclusions could reflect information-related motives, they could also reflect analysts' opportunistic motives to appear more accurate than they actually are.

We extend this body of research by investigating the quality of analysts' street CFO (and implied accrual) measures with specific focus on the persistence and

informativeness of the items excluded in calculating these measures. This evidence is important given investors' presumed demand for analyst-provided CFO information and implications from prior research that this information is of high quality.

2.2 Street CFO measures

Analysts provide CFO forecasts less frequently than earnings forecasts. However, the provision of CFO forecasts by analysts and the tracking of these forecasts by FDPs has increased dramatically during the last two decades. In studying this recent phenomenon, DeFond and Hung (2003) find evidence consistent with the conjecture that the increased availability of analyst CFO forecasts results from investors' demand for supplemental CFO information, especially in cases where earnings information is of lower quality and more prone to managerial manipulation. This demand hypothesis implies that analysts' CFO information is of sufficiently high quality to warrant investors' demand. In line with this notion, DeFond and Hung (2003) provide anecdotal evidence that analysts' CFO forecasts are not trivial extensions of their earnings forecasts but instead are derived from detailed predictions of working capital accrual adjustments and other non-cash add-backs to forecasted net income.

Along with the increased availability of analyst CFO forecasts, recent research has examined various properties of analyst CFO information. Specifically, these studies investigate (1) the quality of analysts' CFO forecasts (Givoly et al. 2009; Call et al. 2013), (2) the indirect benefit of CFO forecasts on the quality of analysts' earnings forecasts (Pae et al. 2007; Call et al. 2009), (3) analysts' strategic issuance of CFO forecasts concurrent with earnings forecasts (Yoo et al. 2011), (4) the role of CFO forecasts in encouraging or curbing earnings management (Zhang 2008; McInnis and Collins 2011), (5) the effect of CFO forecast issuance on management CFO disclosures (Call 2008) and the accrual anomaly (Mohanram 2014), (6) the market rewards for meeting/beating analyst CFO forecasts (Brown et al. 2013), and (7) the differential persistence and informativeness of unexpected CFO and unexpected accruals inferred from analysts' earnings and CFO forecasts (Melendrez et al. 2008).

The existing research on the quality of analysts' CFO forecasts is most relevant for our study. Givoly et al. (2009) call into question DeFond and Hung's (2003) conclusion regarding the sophistication of analysts' CFO forecasts. Givoly et al. compare the quality of analysts' earnings and CFO forecasts and find that the accuracy of analysts' CFO forecasts is not significantly different than that of naïve CFO forecasts (calculated by adding back depreciation expense to analysts' earnings forecasts). This evidence suggests that many analysts derive their CFO forecasts by simply adding back predictions of depreciation expense to forecasted earnings. In further tests, Givoly et al. regress analysts' CFO forecasts on analysts' earnings forecasts and on the Compustat GAAP actual values of depreciation expense, the net change in working capital accruals, and other accrual adjustments to net income needed to arrive at the CFO forecast based on the indirect method. They find that, while the coefficients on analysts' earnings forecasts and

depreciation are close to one (which we would expect), the coefficients on the net change in working capital and other accrual adjustments are far below one, suggesting that many analysts do not incorporate estimates of working capital and other accruals when deriving their street CFO forecasts. Finally, they find that analysts' CFO forecasts are weakly associated with stock returns and that their implied accrual forecasts (i.e., the difference between their earnings and CFO forecasts) are poor estimates of unexpected accruals. Based on these results, Givoly et al. conclude that analysts' CFO forecasts are of low quality and appear to be mechanical extensions of more detailed earnings forecasts.

Givoly et al. also provide early descriptive evidence on the difference between actual street and GAAP CFO figures. They find a discrepancy between the two metrics for most (96 %) of their sample, which is quite striking, since only roughly 48 % of the I/B/E/S sample has an actual street earnings measure that differs from actual GAAP operating earnings (see Doyle et al. 2003; Abarbanell and Lehavy 2007). They report that the mismatch between the two measures is economically large, and even larger than the mismatch between actual street and GAAP earnings measures. This evidence reinforces their inference that analysts fail to predict a sizable amount of accrual and non-cash adjustments when forecasting street CFO. Nonetheless, Givoly et al. find that the pervasive mismatch between actual street and GAAP CFO does not affect their conclusion that CFO forecasts are low in quality.

Givoly et al.'s evidence of low-quality CFO forecasts has spurred further debate in the literature. Consistent with DeFond and Hung (2003), Call et al. (2009) provide anecdotal evidence that analysts make sophisticated predictions of working capital and tax accruals when deriving their street CFO forecasts. Call et al. (2009) find that analysts' earnings forecasts are more accurate when they also issue CFO forecasts, presumably because analysts do a better job of articulating the financial statements and understanding the forecasting implications of firms' earnings components.[4] They also find fewer turnovers for analysts who provide more accurate CFO forecasts, suggesting that CFO forecast accuracy is relevant to analysts' career incentives. However, based on Givoly et al.'s (2009) evidence, Lehavy (2009) expresses skepticism that the provision of CFO forecasts improves analysts' earnings forecast accuracy. Lehavy further argues that Call et al.'s (2009) results could be attributable to stale forecasts, extreme bad-news earnings surprises, or the exclusion of forecast data from more recent periods.

In a follow-up study, Call et al. (2013) re-examine the quality of analysts' CFO forecasts with specific focus on the sophistication of analysts' accrual adjustments to net income when deriving the CFO forecast. They replicate Givoly et al.'s (2009) results by estimating the same regression of analysts' CFO forecasts on their earnings forecasts and on the Compustat GAAP actual values of depreciation expense, the net change in working capital, and other accrual adjustments but with one exception: they replace CFO forecasts with the actual street CFO figures from I/B/E/S. This modification addresses two issues. First, it assesses the derivation of

[4] Similarly, Pae et al. (2007) find that analysts experience an improvement in earnings forecast accuracy when they issue CFO forecasts. However, they find that the indirect benefit of CFO forecasts on earnings forecast accuracy is limited in that CFO forecast issuers do not outperform the earnings forecast accuracy of non-issuers.

CFO forecasts assuming analysts have perfect foresight of firms' actual street CFO. Second, it addresses the mismatch between the street CFO figure and the actual GAAP values of accrual adjustments to net income. Based on their modified regression, Call et al. (2013) again find estimated coefficients far below one for the net change in working capital and other accrual adjustments. They argue that this result is attributable to the mismatch between the street and GAAP CFO metrics. That is, their result suggests that, even with perfect foresight, analysts do not forecast GAAP-defined accruals as reported in Compustat but instead they forecast accruals consistent with their own CFO forecasts. Call et al. (2013) thus conclude that Givoly et al.'s results do not provide diagnostic evidence of CFO forecast sophistication, given the mismatch between street and GAAP CFO metrics.

Call et al. (2013) further argue that the low coefficients on the GAAP accrual adjustments could be due to analysts' naïve CFO forecasting efforts which are, in turn, reflected in the actual CFO figure reported by I/B/E/S. However, they provide evidence that counters this alternative explanation. Their inspection of full-text analyst reports indicates that CFO forecasts are not trivial extensions of earnings forecasts. Instead of naïve adjustments, they conclude that many analysts appear to make sophisticated working capital and other accrual adjustments to forecasted earnings in developing their CFO forecasts. They also find that analysts' CFO forecasts outperform naïve CFO forecasts (computed as forecasted earnings plus actual depreciation expense) when forecast errors are based solely on actual street CFO metrics from I/B/E/S. This result contrasts with Givoly et al.'s approach, which relies on the actual GAAP CFO figure from Compustat to compute CFO forecast errors whenever the actual I/B/E/S CFO figure is missing (which occurs about 50 % of the time). Finally, Call et al. (2013) find evidence that analysts' implied accrual forecasts are more accurate than time-series accrual estimates and that investors respond to analysts' CFO forecast revisions. Given these results, Call et al. (2013) conclude that analysts' CFO forecasts are not naïve extensions of earnings forecasts, as Givoly et al. suggest, but instead are informative measures that incorporate sophisticated accrual predictions.

Our evidence contributes to this ongoing debate on the quality of analysts' CFO metrics. As Call et al. (2013) suggest, the discrepancy between the street and GAAP CFO metrics can be an important factor is assessing the quality of analysts' street CFO measures. Therefore, we take a different approach and investigate the average and relative quality of analysts' exclusions in determining the street CFO figure (i.e., those items analysts do not incorporate when adjusting forecasted earnings to arrive at their CFO forecasts). We also assess the components and economic significance of analysts' street CFO exclusions and whether these exclusions are reflected in actual street CFO values reported by I/B/E/S. Finally, we inform the debate by providing previously undocumented evidence of specific factors that influence the average and relative quality of analysts' street CFO exclusions.

2.3 Research questions

Since our study is the first to investigate the quality of analysts' exclusions in their determination of street CFO, we begin by examining the types of CFO exclusions

made by individual analysts and the economic significance of these excluded items. The actual street CFO figure reported in I/B/E/S reflects the majority rule whereby I/B/E/S adjusts the reported CFO metric by excluding those items not incorporated in the majority of analysts' CFO forecasts. One concern with assessing the properties of FDP-adjusted metrics is that the majority rule could result in actual street figures that are not comparable to the figures forecasted by individual analysts (Yoo et al. 2011). Thus, we further assess whether the actual CFO figure reported in I/B/E/S reflects, on average, those items individual analysts do not incorporate in their CFO forecasts. We state our first research question in two separate but related parts as follows:

RQ1a Which CFO items do individual analysts exclude when adjusting net income to arrive at the street CFO forecast and are these exclusions economically significant?

RQ1b Are the street CFO exclusions of individual analysts reflected in the actual street CFO figures reported by FDPs, namely, I/B/E/S?

Our next research question addresses the average and relative quality of analysts' street CFO exclusions. Following prior street earnings research, we assess the quality of street CFO exclusions based on the persistence and informativeness of the excluded items. Given the inherent relation between earnings and CFO (i.e., CFO is equal to earnings plus non-cash add-backs and changes in working capital and other accruals), one could argue that the quality of street CFO exclusions should mirror that of street earnings exclusions. However, given conflicting evidence on the sophistication of analysts' derivation of their street CFO forecasts (DeFond and Hung 2003; Givoly et al. 2009; Call et al. 2009, 2013), we refrain from predicting ex ante whether street CFO exclusions are of high or low quality. Further, when analysts exclude items from both their street earnings and CFO forecasts, they provide an implicit estimate of their accrual exclusions. As discussed previously, Givoly et al. (2009) find that analysts' implied accrual forecasts are poor estimates of unexpected accruals, whereas Call et al. (2013) find that these implied accrual forecasts outperform time-series accrual estimates. This contrasting evidence calls into question the quality of analysts' derivation of accruals when forecasting street earnings and CFO. Therefore, we assess the quality (persistence and informativeness) of implied accrual exclusions and how it differs from the quality of street CFO exclusions. This discussion leads to our second research question:

RQ2 What is the average quality of analysts' street CFO exclusions, and how does it compare to the average quality of analysts' implied accrual exclusions?

Our third and final research question investigates specific factors that influence the average and relative quality of street CFO and implied accrual exclusions. Givoly et al. (2009) argue that the quality of analysts' street CFO forecasts (and, in turn, the quality of their implied accrual forecasts) is likely to be affected by analysts' economic incentives and the greater inherent volatility of firms' CFO series, which makes CFO forecasting more difficult than the forecasting of accrual-based earnings. Yoo et al. (2011) provide field evidence that some analysts issue upward-biased CFO forecasts to please management and other interested parties including the investment banks for

which the analysts work. Yoo et al. (2011) also report that some analysts feel pressured by management and interested parties to present rosy CFO forecasts in order to cast forecasted earnings in a more favorable light. In addition, the street earnings literature suggests that incentives to generate investment banking business influence analysts' earnings exclusion decisions (Baik et al. 2009) and that some analysts may exclude hard-to-predict earnings items, due to either opportunistic or information-related motives (Lambert 2004). Given these arguments, we explore whether (1) analyst conflicts of interest arising from investment banking pressures and (2) greater inherent CFO volatility influence the quality of street CFO and implied accrual exclusions.

We refrain from making ex ante predictions of the influence of analyst conflicts of interest given mixed evidence on the effect of analyst incentives on the quality of street earnings exclusions (Baik et al. 2009; Barth et al. 2012). The influence of greater CFO volatility is also unclear. On the one hand, while some analysts could exclude more volatile cash items in an attempt to provide a more value-relevant CFO measure to investors, others may opportunistically exclude these hard-to-forecast items to appear more accurate than they really are (Lambert 2004). In both cases, analysts would appear to make high-quality exclusions of more volatile cash items, despite different motives. On the other hand, the effect of various economic events on CFO can be harder to identify and predict (Givoly et al. 2009), thus making it more difficult for analysts to forecast volatile cash items. If this argument holds, then some analysts could get it wrong when attempting to identify and exclude more transitory cash items, irrespective of their motives. Therefore, we could find lower quality CFO exclusions due to analysts' inability to correctly identify and exclude more volatile cash items.

Since FDP-adjusted metrics are determined using the majority rule (analyst-specific exclusions are not available in I/B/E/S), we conduct firm-level analyses of analyst conflicts of interest based on an aggregate measure of the extent to which analysts issuing CFO forecasts for the firm are susceptible to investment banking-related incentives. We also conduct firm-level analyses of CFO volatility based on the volatility of firms' CFO series relative to earnings.[5] This leads to our final research question:

RQ3 Do analyst conflicts of interest and greater inherent CFO volatility influence the average and relative quality of analysts' street CFO and implied accrual exclusions?

3 Sample selection, variable definitions, and descriptive evidence

3.1 Data and sample selection

We obtain annual FDP-adjusted street earnings and CFO information from the I/B/E/S split-unadjusted database for the 1993–2008 period. We begin our sample in

[5] The quality of analyst street metrics may change over time due to several factors including regulatory intervention, procedural and definitional changes undertaken by FDPs, changes in accounting standards over time, and other time trend effects. We address the potential influence of these time-related factors in our empirical tests to follow.

1993 since this is the first year analyst CFO information is available in I/B/E/S. We require each firm-year to have non-missing actual street earnings and CFO figures, which we use to estimate analysts' earnings and CFO exclusions. To provide empirical evidence on analysts' implied accrual exclusions, our sample is comprised solely of firm-year observations with comparative actual street earnings and CFO information in I/B/E/S. As prior studies indicate, the actual CFO figures are missing for a large number of observations in I/B/E/S. Hence, our sample of annual street earnings and CFO data is relatively small compared to prior studies that solely examine street earnings measures. We also require each firm-year to have available data for our regression variables in the Compustat and CRSP databases, from which we gather financial statement and stock return information, respectively. These data criteria result in a final sample of 8,518 firm-years for 3,385 firms. Our sample reduces to 7,601 and 3,031 firm-years, respectively, when we exclude observations with missing data for the calculation of relative CFO volatility and street forecast errors.

3.2 Variable definitions

3.2.1 Earnings and CFO per share

We collect the following street metrics as reported by I/B/E/S: (1) the FDP-adjusted actual street earnings per share (EPS_{IBES}) and (2) the actual street cash flow from continuing operations per share (CFO_{IBES}). We also compute the following actual GAAP earnings and CFO metrics from Compustat: (1) GAAP earnings per share from operations ($EPS_{GAAP\text{-}OP}$), (2) GAAP earnings per share before extraordinary items and discontinued operations ($EPS_{GAAP\text{-}BXI}$), and (3) GAAP cash flow from continuing operations per share ($CFO_{GAAP\text{-}COP}$).[6] "Appendix 1" summarizes the definition of all of our variables.

3.2.2 Total street earnings and CFO exclusions

We define *EARNEXC* (*CFOEXC*) as the total amount excluded by analysts (on a per share basis) in arriving at the street earnings (CFO) figure. As Fig. 1 illustrates (adapted partly from Brown et al. 2012a, b), we calculate the total amount of earnings items excluded by analysts (*EARNEXC*), including special items, as EPS_{IBES} minus $EPS_{GAAP\text{-}BXI}$. Similarly, we compute analysts' total CFO exclusions (*CFOEXC*) as CFO_{IBES} minus $CFO_{GAAP\text{-}COP}$. We note that *EARNEXC* comprises those operating and special (one-time) earnings items that analysts ignore when

[6] $EPS_{GAAP\text{-}OP}$ and $EPS_{GAAP\text{-}BXI}$ are the applicable basic or diluted per share figure matched to the I/B/E/S definition. We compute $CFO_{GAAP\text{-}COP}$ as follows: we begin with Compustat's cash flow from operations (annual data item OANCF) and subtract the cash portion of extraordinary items and discontinued operations (annual data item XIDOC). We then divide this value by the number of common shares used to calculate basic EPS (annual data item CSHPRI) if the I/B/E/S figures are reported on a primary share basis. If the I/B/E/S figures are reported on a diluted share basis, we multiply the cash flow value by the inverse of the ratio of basic EPS to diluted EPS, both before extraordinary items and discontinued operations (annual data item EPSPX ÷ data item EPSFX), or the inverse of the dilution factor reported in I/B/E/S if data item EPSPX or EPSFX is missing or equal to zero.

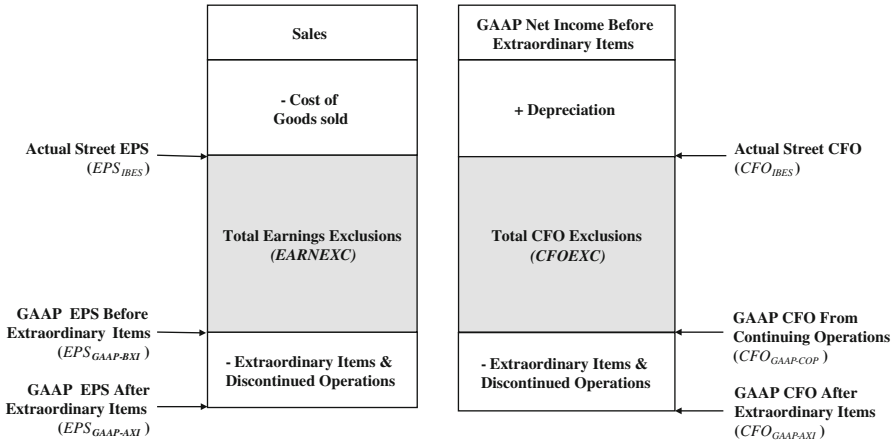


Fig. 1 Exclusions for analysts' street earnings and CFO metrics

forecasting core earnings. *CFOEXC* comprises non-cash and accrual adjustments that analysts do not incorporate when adjusting forecasted earnings to arrive at forecasts of core or recurring CFO. In essence, *EARNEXC* and *CFOEXC* capture the discrepancy between the street and GAAP earnings and CFO per share measures, respectively.

3.2.3 Future operating performance, stock market return, and analyst forecast errors

We operationalize future operating performance ($FUTURE_{GAAP\text{-}OP}$) as one-year-ahead GAAP operating earnings per share ($EPS_{GAAP\text{-}OP}$).[7] For our informativeness tests, we compute the contemporaneous market return (*BHAR*) as the compounded buy-and-hold return over the three-day window centered on the earnings announcement date less the value-weighted market return over the same three-day window. We measure unexpected CFO news or forecast error based on the actual GAAP ($FE\_CFO_{GAAP\text{-}COP}$) and street CFO per share (FE_CFO_{IBES}) figures. Likewise, we measure the unexpected earnings news or forecast error based on the actual GAAP ($FE\_EPS_{GAAP\text{-}OP}$) and street earnings (FE_EPS_{IBES}) metrics. We compute the CFO and earnings forecast errors by subtracting the most recent analyst forecast before the announcement date from the respective actual figure. For each metric, we require the most recent analyst forecast to be issued at most 90 days before the announcement date.

3.2.4 Relative volatility of firms' CFO series

Following Givoly et al. (2009), we focus our analyses on the ratio of the volatility of firm's CFO series to the volatility of earnings. For each firm-year, we compute the

[7] We find similar evidence when we define future operating performance as one-year-ahead GAAP CFO per share or one-year-ahead street earnings or street CFO per share.

standard deviation of the firm's CFO series scaled by the standard deviation of earnings (*SDC/SDE*). We deflate both CFO and earnings by total assets at year-end and require firms to have non-missing CFO and earnings information over at least three of the prior 8 years. Values of *SDC/SDE* greater (less) than 1.0 indicates that the firm's CFO is more (less) volatile than earnings, which in turn indicates that accruals increase (decrease) the smoothness of earnings. We rank our sample into quintiles based on the values of *SDC/SDE* and then create an indicator variable, *HI_SDC/SDE*, for those firm-years in the top quintile. We focus on the top quintile since these firm-years are most likely to consist of accruals that mitigate transitory CFO (Dechow and Ge 2006), which are presumably more difficult to forecast.[8]

3.2.5 Analyst conflicts of interest

We measure analyst conflicts of interest by constructing a firm-level measure of the extent to which the analysts issuing CFO forecasts in each firm-year are susceptible to investment banking-related incentives. Following Ertimur et al. (2007), we use the reputation ranking of brokerage firms with investment banking business to proxy for the importance of investment banking revenues to the brokerage firm, which in turn gives rise to analyst conflicts of interest. We measure the reputation of investment banking business using the Carter–Manaster (CM) rankings developed in Carter and Manaster (1990) and later modified by Loughran and Ritter (2004).[9] The modified CM rankings, which range from 1.1 to 9.1, are based on the hierarchy of the listing of underwriters in the prospectus of equity offerings.

For each analyst-level observation, we assign a reputation rank (*RANK*) based on the designated CM ranking for the brokerage firm employing the analyst. Analysts employed by brokerage firms without a CM ranking are assigned a *RANK* of zero. We then compute the average firm-level *RANK* of all analysts issuing one-year-ahead CFO forecasts for the current fiscal year. Next, we construct a binary variable, *TOPTIER*, which equals one if the average firm-level *RANK* is greater than 8.1 and zero otherwise. Consistent with Ertimur et al. (2007), *TOPTIER* identifies those firm-years in which the majority of analysts issuing CFO forecasts face strong conflicts of interest arising from investment banking business.

Our proxy for analyst conflicts of interest is similar to alternative proxies used in prior research. For instance, the *TOPTIER* variable mirrors Barber et al.'s (2007) classification of conflicted analysts based on employment by brokerage firms with investment banking business. Moreover, the reputation ranking proxy offers two advantages over measures based on analysts' affiliation with an investment bank underwriting the firm's current or prior equity issues. First, as Ertimur et al. (2007) argue, firms issuing equity purposely hire underwriters whose analysts are more biased about the firm's future performance. Our *TOPTIER* proxy is less prone to this selection problem since it accounts for analysts whose brokerage firms do not have

[8] In robustness tests, we find similar results when we use the raw values of *SDC/SDE* rather than the *HI_SDC/SDE* indicator variable. Thus, our results are not sensitive to the use of the top quintile threshold.

[9] We thank Jay Ritter for sharing the modified Carter-Manaster reputation rankings (available at http://bear.warrington.ufl.edu/ritter/ipodata.htm).

current or prior underwriting relationships with the firm. Second, our use of the reputation ranking proxy ensures that our results are not restricted solely to firms that engage in current or prior equity issues.

3.2.6 Control variables

We control for several correlated factors (*Controls*) in our empirical tests including firm growth (*GROWTH*), the occurrence of losses (*LOSS*), firm size (*SIZE*), earnings volatility (*SDE*), and the book-to-market ratio (*BOOKMKT*). Consistent with Kolev et al. (2008), we also control for SEC scrutiny (*POSTSEC*) into the use of non-GAAP measures. *POSTSEC* equals one for all firm-years following the December 2001 SEC cautionary advice on the use of non-GAAP measures and zero otherwise.

3.3 Descriptive evidence

Table 1 provides summary statistics for our empirical measures. For ease of interpretation, we do not deflate the per share values of the various earnings, CFO, street exclusions, and forecast error variables. However, our inferences are unchanged when we scale these variables by total assets per share.[10] The mean street CFO (CFO_{IBES}) is \$3 per share, while the mean GAAP CFO ($CFO_{GAAP\text{-}COP}$) is about \$2.86 per share. This evidence indicates that the street CFO measure is, on average, more favorable than the corresponding GAAP CFO measure and that analysts tend to make CFO-increasing exclusions. Consistent with prior street earnings research (e.g., Bradshaw and Sloan 2002; Doyle et al. 2003; Kolev et al. 2008), we find that the mean EPS_{IBES} exceeds the means of both $EPS_{GAAP\text{-}OP}$ and EPS_{GAAP_BXI}. The mean earnings and CFO forecast errors yield similar evidence on both the GAAP and street bases. For example, the mean FE_CFO_{IBES} is about −\$1.31, while the mean $FE\_CFO_{GAAP\text{-}COP}$ is about −\$1.58. We also note that analysts' CFO forecast errors are significantly higher than their earnings forecast errors on both the street and GAAP bases. The street and GAAP differences are significant at the 3 and 8 % levels, respectively. This evidence follows from prior research (e.g., Melendrez et al. 2008; Givoly et al. 2009) and indicates that analysts' CFO forecasts are substantially less accurate than their earnings forecasts.

The mean CFO exclusions (*CFOEXC*) is 14 cents per share, indicating that analysts tend to ignore a sizable amount of accrual and non-cash adjustments to net income when deriving the street CFO figure. We note that, although the median *CFOEXC* is close the zero, the level of CFO exclusions is sizable at the mean as well as at the 25th and 75th percentiles of the sample. The mean earnings exclusions (*EARNEXC*) indicates that analysts exclude about 40 cents per share of recurring and nonrecurring expenses from street earnings. Since the difference between *EARNEXC* and *CFOEXC* represents analysts' implied accrual exclusions, these results indicate that a substantial portion (65 % at the mean) of street earnings exclusions is comprised of operating accruals. Consistent with Givoly et al. (2009),

[10] We compute total assets per share by scaling total assets with the applicable number of common or diluted shares used to calculate basic or diluted EPS as matched to the I/B/E/S/definition (see footnote 6 for further details).

Table 1 Summary statistics

	Mean	SD	25th	Median	75th	N
Panel A: Primary variables						
$FUTURE_{GAAP\text{-}OP}$	1.2700	2.8620	0.1700	1.0800	2.1982	8,518
CFO_{IBES}	3.0012	10.5783	0.9490	2.1935	4.0800	8,518
$CFO_{GAAP\text{-}COP}$	2.8578	4.6584	0.8895	2.1934	4.0941	8,518
EPS_{IBES}	1.4164	2.3839	0.3600	1.2000	2.2300	8,518
$EPS_{GAAP\text{-}OP}$	1.3211	2.7460	0.2500	1.1396	2.1908	8,518
$EPS_{GAAP\text{-}BXI}$	1.0122	3.0748	0.0900	1.0400	2.0900	8,518
FE_CFO_{IBES}	−1.3104	31.2531	−0.2900	0.0340	0.4200	3,031
$FE\_CFO_{GAAP\text{-}COP}$	−1.5791	31.4498	−0.4574	0.0194	0.5563	3,031
FE_EPS_{IBES}	−0.0853	3.8686	−0.0200	0.0100	0.0600	3,031
$FE\_EPS_{GAAP\text{-}OP}$	−0.5994	4.5058	−0.3600	−0.0300	0.0500	3,031
CFOEXC	0.1434	10.3313	−0.2809	−0.0006	0.2640	8,518
EARNEXC	0.4043	2.0916	0.0000	0.0000	0.2700	8,518
TOPTIER	0.0857	0.2799	0.0000	0.0000	0.0000	8,518
HI_SDC/SDE	0.2000	0.4000	0.0000	0.0000	0.0000	7,601
Panel B: Control variables						
GROWTH	2.4022	15.6993	0.0011	1.1418	3.3382	8,518
LOSS	0.2247	0.4174	0.0000	0.0000	0.0000	8,518
SIZE	7.4260	2.0416	5.9861	7.4687	8.8278	8,518
SDE	0.0727	0.1611	0.0179	0.0353	0.0728	8,518
BOOKMKT	0.5887	1.7078	0.2710	0.4673	0.7507	8,518
POSTSEC	0.7563	0.4294	1.0000	1.0000	1.0000	8,518

All variables are defined in "Appendix 1"

untabulated statistics reveal that almost all of our sample (99.7 %) has non-zero *CFOEXC* values, which is considerably higher than the sample proportion (66 %) with non-zero *EARNEXC*. Following Givoly et al., we find (not reported) that the mean absolute magnitude of *CFOEXC* scaled by $EPS_{GAAP\text{-}OP}$ is significantly larger than that of *EARNEXC* also scaled by $EPS_{GAAP\text{-}OP}$ (1.28 versus 0.90, *t*-statistic = −4.42). This result is consistent with Givoly et al.'s evidence that most analysts exclude items when preparing their CFO forecasts and that these exclusions are economically large. Table 1 presents summary statistics for our control variables, but we do not discuss them for the sake of brevity.

4 Empirical results

4.1 RQ1: The components and economic significance of analysts' street CFO exclusions

In this section, we provide empirical evidence on the most common types of items excluded by individual analysts when deriving the street CFO figure (RQ1a). Due to

the unavailability of detailed I/B/E/S data on specific street exclusions, we identify the types of items analysts exclude by analyzing a hand-collected sample of full-text reports prepared by analysts providing CFO forecasts to I/B/E/S. We begin our search by randomly selecting 160 firm-years over our 16-year sample period (10 random observations from each year). We cross-match each firm-year with the I/B/E/S Detailed History and Broker Translation Files from which we gather, respectively, the CFO forecast dates and the names of the brokerage/research firms employing each analyst.[11] We retain the most recent CFO forecast date before the earnings announcement for those analysts issuing multiple CFO forecasts for the fiscal year. We focus on the most recent CFO forecast to ensure that analysts' forecast derivation is the most comprehensive.[12] This selection process yields 431 analyst-level observations for 160 firm-years. For each observation, we search the Investext database for the analyst's report using the brokerage/research firm name and the CFO forecast date. Of the 431 observations, we can determine the computation of analysts' CFO forecasts from 110 full-text reports. The reports for the remainder of the observations are either missing in Investext or provide insufficient details to determine the CFO items excluded by analysts.[13] Many of the analyst reports we inspect do not provide a clear definition of CFO, nor do they provide details of their derivation of the CFO forecast. Givoly et al. (2009) and Yoo et al. (2011) discuss similar difficulties in determining the derivations of CFO forecasts from full-text analyst reports.

From each of the 110 full-text reports, we code information on the analyst's definition of street CFO and the items excluded in preparing the street CFO forecast.[14] We classify the types of exclusions into seven categories: (1) changes in working capital accruals (*ΔWC*), (2) deferred income tax (*DEFTAX*), (3) stock-based and other deferred compensation (*DEFCOMP*), (4) equity income/loss in unconsolidated subsidiaries (*EQUITYINC*), (5) gain/loss on the sale of fixed assets (*GAINLOSS*), (6) other nonrecurring items (*NONRECUR*), and (7) capital expenditures (*CAPEX*). *NONRECUR* includes cash items such as restructuring charges, litigation payments, one-time pension cash contributions, and nonrecurring changes

[11] We obtained the Broker Translation File from I/B/E/S in 2005. For firm-years after 2005, we supplement our identification of brokerage/research firm names using the I/B/E/S recommendation detail file, which include analyst names and abbreviated broker names (see Bradshaw et al. 2012 for a similar approach).

[12] This approach is consistent with Givoly et al. (2009), who find some improvement in analysts' incorporation of working capital and other accruals into their CFO forecasts over the fiscal year. To validate our approach, we inspect the reports of a small subset of analysts issuing multiple CFO forecasts for the same firm-year. We observe that some analysts do not incorporate certain accruals when deriving early-year CFO forecasts but begin to include them in later-year forecasts. From these reports, it appears that some analysts begin to incorporate these items after firms either release an earnings report or provide management forecast guidance. This anecdotal evidence is consistent with Christensen et al. (2011), who find that analysts' computation of street earnings is influenced by management earnings guidance.

[13] Of the 110 reports, about 87 % cover the 2004–2008 period. This data sampling reflects (1) a large number of missing reports in Investext prior to 2004 and (2) the higher frequency of CFO forecasts for each firm in later years.

[14] In some cases, we refer to the analyst's computation of actual CFO for the prior fiscal year along with the firm's prior-year cash flow statement to help identify the items excluded from the analyst's current-year CFO forecast.

in working capital accruals. *CAPEX* refers to the deduction of capital expenditures from forecasted CFO to arrive at a free cash flow measure. We also code those reports with no clear identifiable exclusion (*NO_EXCL*), i.e., those cases where the street CFO derivation appears to be comprehensive and consistent with the standard GAAP CFO definition. Finally, we identify those reports that derive a naïve CFO forecast by simply adding back depreciation to forecasted earnings (*NI* + *DEPR*).

Our inspection of the hand-collected reports reveals that 100 % of the reports use the indirect method or a variant of the indirect method to derive the CFO forecast. That is, analysts derive the CFO forecast as forecasted earnings (or in some cases, forecasted EBIT or EBITDA) adjusted for non-cash add-backs and changes in working capital and other accruals. However, we find that analysts' CFO computations vary widely from the standard GAAP method and that many analysts do not adjust net income for certain accruals or non-cash add-backs. Also, analysts use several nomenclatures to describe their CFO metrics including "cash flow from operations," "cash earnings," "discretionary cash flow," "cash flow before working capital," and "after-tax cash flow." This evidence is consistent with Yoo et al. (2011), who also find substantial variation in street CFO nomenclatures and definitions used in full-text analyst reports. "Appendix 2" provides several examples of analysts' street CFO derivation and the nomenclature used in the full-text report.

Table 2 presents descriptive evidence on the percentage of analyst reports that reveal an exclusion based on the seven previously defined categories. We also report the percentage of reports with no identifiable exclusions (*NO_EXCL*) and those with a naïve CFO definition (*NI* + *DEPR*). We find that 67 % of the full-text reports do not incorporate changes in working capital accruals when forecasting street CFO. This evidence contrasts with Call et al. (2013), who find that 88 % of their hand-collected reports incorporate changes in working capital accruals in the CFO forecast. However, our evidence is consistent with Givoly et al. (2009), who report that analyst CFO forecasts generally do not incorporate working capital accruals, and also Yoo et al. (2011), who find that majority of the CFO definitions commonly used by analysts do not adjust for working capital accruals.[15] We find that 32 % of the reports ignore deferred taxes, while 13 % ignore stock-based and other deferred compensation. About 19 % of the reports do not subtract (add-back) one-time gains (losses) on asset sales from forecasted earnings, or alternatively, add-back (subtract) gains (losses) on asset sales to forecasted CFO.[16] Overall, these results suggest that many analysts do not account for working capital accruals and other non-cash add-backs when adjusting forecasted earnings to arrive at their street CFO forecasts. Based on the street earnings literature, we would consider these types of exclusions as low in quality given the recurring nature of working capital accruals (Barth et al. 2001).

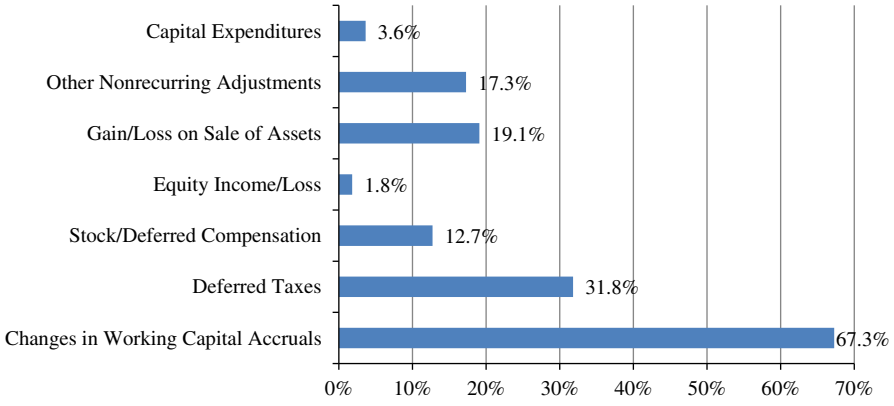
[15] Yoo et al. (2011) list seven CFO definitions commonly used by analysts. Five of these definitions distinctly exclude changes in working capital accruals as an adjustment to forecasted net income.

[16] For example, the 2004 CIBC World Markets analyst report for Exxon Mobil defines street CFO as forecasted CFO plus gains on asset sales and dispositions.

Table 2 The components of street CFO exclusions from full-text analyst reports

	No. of reports	% of 110 reports
Panel A: Summary statistics		
Items excluded from street CFO		
Changes in working capital accruals (*ΔWC*)	74	67.3
Deferred taxes (*DEFTAX*)	35	31.8
Stock/deferred compensation (*DEFCOMP*)	14	12.7
Equity income/loss (*EQUITYINC*)	2	1.8
Gain/loss on sale of assets (*GAINLOSS*)	21	19.1
Other nonrecurring adjustments (*NONRECUR*)	19	17.3
Capital expenditures (*CAPEX*)	4	3.6
No exclusions identified (*NO_EXCL*)[a]	12	10.9
Street CFO = Net income + Depreciation (*NI + DEPR*)[b]	20	18.2

Panel B: Figure of components of street CFO exclusions



This table summarizes items excluded from or not incorporated in analysts' derivation of the street CFO forecast figure based on a hand-collected sample of 110 full-text reports issued by 28 analyst firms covering 39 randomly selected companies. We classify the types of exclusions into seven categories: changes in working capital accruals (*ΔWC*), deferred income tax (*DEFTAX*), stock-based and other deferred compensation (*DEFCOMP*), equity income/loss in unconsolidated subsidiaries (*EQUITYINC*), gains/losses on the sale of assets (*GAINLOSS*), other nonrecurring adjustments (*NONRECUR*), and capital expenditures (*CAPEX*). *NONRECUR* includes nonrecurring cash items such as restructuring charges, litigation payments, one-time pension cash contributions, and nonrecurring changes in working capital accruals. *CAPEX* refers to the deduction of capital expenditures from CFO to arrive at a measure of free cash flow. The random sample of hand-collected reports represents firms from 20 Fama–French industries over the 1997–2008 period

[a] This category includes full-text reports in which the analyst's street CFO calculation does not exclude any clear identifiable CFO item. In these cases, the analyst's computation appears to be comprehensive and in line with the standard GAAP indirect method of computing CFO

[b] *NI + DEPR* indicates those analyst reports in which the street CFO forecast is derived by adding back depreciation expense to the forecasted earnings figure

Table 2 also indicates that only 11 % of the reports have no clearly identifiable exclusion (*NO_EXCL*). This percentage indicates that about 89 % of our reports disclose at least one type of exclusion, which is consistent with our previous evidence that almost the entire I/B/E/S sample contains an actual CFO metric that differs from the actual GAAP figure. We note that 17 % of the analyst reports exclude other nonrecurring cash items (*NONRECUR*), suggesting that some analysts make relatively sophisticated exclusions when forecasting CFO. Lastly, 18 % of the reports compute a naïve CFO forecast (*NI* + *DEPR*) by adding back depreciation expense to forecasted earnings.

The actual street CFO figure reported by FDPs reflects a majority rule adjustment process and as such may not reflect the exclusions made by individual analysts. To address RQ1b, we use our hand-collected sample to examine the association between total CFO exclusions (*CFOEXC*) computed using I/B/E/S actual street CFO metrics and the types of CFO items excluded by individual analysts. A significant association between *CFOEXC* and individual analysts' CFO exclusions would indicate that the I/B/E/S data (on which we base our large-sample results) reflect the CFO exclusion decisions of analysts themselves. Table 3 presents correlation statistics for *CFOEXC* and indicator variables for the seven exclusion categories described above. We present Spearman (Pearson) correlation coefficients above (below) the diagonal. We find significantly positive associations between *CFOEXC* and *ΔWC*, *DEFTAX*, and *GAINLOSS*. These results suggest that most analysts do not incorporate these items in their street CFO forecasts and that the I/B/E/S-adjusted CFO metric reflects these common exclusions.

Using our hand-collected sample, we assess the economic significance of the various types of exclusions by regressing *CFOEXC* on the indicator variables for each exclusion category as follows[17]:

$$\begin{aligned} CFOEXC = {} & \theta_0 + \theta_1 \Delta WC + \theta_2 DEFTAX + \theta_3 DEFCOMP + \theta_4 GAINLOSS \\ & + \theta_5 EQUITYINC + \theta_6 NONRECUR + \theta_7 CAPEX + \theta_8 SIZE + \varepsilon \end{aligned} \quad (1)$$

We control for size effects by scaling *CFOEXC* by total assets per share and including *SIZE* as an additional explanatory variable. The statistical significance of the coefficients on the exclusion variables indicates whether the respective CFO exclusion plays an important role in determining the firm's total street CFO exclusions as reported by I/B/E/S. Further, the magnitude of the coefficients provides information about the economic significance of the various types of CFO exclusions.

Column 1 of Table 4 presents the estimated results for Eq. (1). We winsorize *CFOEXC* and *SIZE* at the 1 and 99 % levels to mitigate the effect of extreme outliers.[18] We also present robust *t*-statistics corrected for heteroskedasticity and clustering by analyst firm to control for within-analyst-firm effects. We find that *ΔWC* and *DEFTAX* are significantly associated with *CFOEXC*. Consistent with our evidence in Tables 2 and 3, these results suggest that *ΔWC* and *DEFTAX* account for the majority of items excluded from analysts' street CFO forecasts. The results also suggest a strong interplay between the exclusion decisions of individual

[17] See Black and Christensen (2009) for a similar approach in assessing the average magnitude and statistical significance of the items excluded from manager-adjusted pro forma earnings.

[18] Our results are unchanged if we do not winsorize these variables at the 1 and 99 % levels.

Table 3 Correlation table of components of street CFO exclusions from full-text analyst reports

	CFOEXC	*ΔWC*	*DEFTAX*	*DEFCOMP*	*EQUITYINC*	*GAINLOSS*	*NONRECUR*	*CAPEX*
CFOEXC	–	**0.2577**	**0.2338**	−0.0739	−0.1180	**0.1593**	−0.0690	−0.0918
ΔWC	**0.2392**	–	0.1021	**−0.1987**	**−0.1951**	**0.1909**	−0.0913	**−0.1750**
DEFTAX	**0.2252**	0.1021	–	0.1491	0.0531	0.1151	−0.1056	−0.1327
DEFCOMP	0.0148	**−0.1987**	0.1491	–	0.1522	−0.0467	−0.0302	−0.0742
EQUITYINC	0.0461	**−0.1951**	0.0531	0.1522	–	−0.0661	−0.0622	−0.0264
GAINLOSS	0.1143	**0.1909**	0.1151	−0.0467	−0.0661	–	−0.0384	0.0292
NONRECUR	−0.1235	−0.0913	−0.1056	−0.0302	−0.0622	−0.0384	–	−0.0888
CAPEX	−0.0233	**−0.1750**	−0.1327	−0.0742	−0.0264	0.0292	−0.0888	–

Spearman (Pearson) correlation coefficients are presented above (below) the diagonal. The coefficients highlighted in bold are statistically significant at the 10 % level or higher

All variables are defined in "Appendix 1"

Table 4 Multivariate analyses of the components of street CFO exclusions

Full-text analyst reports[a]		Compustat GAAP CFO line items[b]	
Dependent variable: *CFOEXC*	Coefficients (1)	Dependent variable: *CFOEXC*	Coefficients (2)
Intercept	−0.0079	*Intercept*	0.0296
	(−0.31)		(1.17)
ΔWC	0.0148	*ΔREC*	0.6322
	(2.16)**		(3.67)***
DEFTAX	0.0133	*ΔINV*	0.6661
	(2.61)**		(4.14)***
DEFCOMP	0.0034	*ΔAP*	0.7014
	(0.62)		(3.91)***
EQUITYINC	−0.0055	*ΔTAX*	0.9703
	(−0.65)		(5.16)***
GAINLOSS	0.0041	*ΔOTHER*	0.6109
	(0.99)		(3.30)***
NONRECUR	−0.0068	*DEPR*	0.0650
	(−0.54)		(4.00)***
CAPEX	0.0057	*DEFINCTAX*	0.0665
	(0.96)		(1.24)
SIZE	−0.0002	*EQUITYSUB*	0.4664
	(−0.10)		(3.36)***
		GAINPPE	0.2738
			(4.93)***
		SIZE	−0.0004
			(−1.09)
		Fixed industry effects	Included
No. of analyst reports	110	No. of firm-years	8,518
No. of analyst firms	28	No. of firms	3,385
Adjusted R-squared	0.039	Adjusted R-squared	0.287

All variables are defined in "Appendix 1"

*, **, and *** indicate significance at the 10, 5, and 1 % level, respectively. All continuous variables are winsorized at the 1 and 99 % levels

[a] Column 1 presents regression results for the hand-collected sample of full-text analyst reports. We scale *CFOEXC* by total assets by share to control for scaling effects. Robust *t*-statistics clustered by analyst firm are in parentheses

[b] Column 2 presents regression results for the full I/B/E/S sample based on GAAP CFO line items reported in Compustat. We convert each GAAP CFO line item to per share values and then scale *CFOEXC* and each line item by total assets per share. Robust *t*-statistics clustered by firm and year are in parentheses

analysts and FDPs such as I/B/E/S. The combined coefficients on *ΔWC* and *DEFTAX* indicate that these exclusions account for roughly 3 % of total assets ($\theta_1 + \theta_2 = 0.0281$, F test p value $= 0.00$). This result is economically significant

when we consider that the median *CFOEXC* for our hand-collected sample is about 1 % of total assets per share. The coefficients on the remaining indicator variables are insignificant and could be due to low sample power, which we address next.

Given the challenge in identifying all types of CFO exclusions from full-text analyst reports, we further gauge the economic significance of various exclusions based on large-sample analysis of the association between *CFOEXC* and specific GAAP CFO line items reported in Compustat. For our full sample, we regress *CFOEXC* on specific changes in working capital accruals–accounts receivable (*ΔREC*), inventory (*ΔINV*), accounts payable (*ΔAP*), income tax (*ΔTAX*), and other assets and liabilities (*ΔOTHER*)–and on non-cash add-backs and subtractions such as depreciation (*DEPR*), deferred income tax (*DEFINCTAX*), equity income/loss in unconsolidated subsidiaries (*EQUITYSUB*), and gain/loss on the sale of fixed assets and investments (*GAINPPE*). We estimate the regression model below:

$$CFOEXC = \delta_0 + \delta_1 \Delta REC + \delta_2 \Delta INV + \delta_3 \Delta AP + \delta_4 \Delta TAX + \delta_5 \Delta OTHER + \delta_6 DEPR + \delta_7 DEFINCTAX + \delta_8 EQUITYSUB + \delta_9 GAINPPE + \delta_{10} SIZE + \varepsilon \quad (2)$$

To control for scaling effects, we convert each GAAP CFO line item to per share values and then scale *CFOEXC* along with each line item by total assets per share. We reverse the sign on *GAINPPE* so that positive (negative) values reflect gains (losses) on the sale of fixed assets and investments. Estimated coefficients that are significant and close to 1.0 indicate that analysts, on average, ignore the respective adjustments to net income needed to compute GAAP CFO.

Column 2 of Table 4 presents the results from Eq. 2 for the full I/B/E/S sample. We report *t*-statistics based on robust standard errors clustered by firm and calendar year and include fixed industry effects to control for within-industry correlations. Consistent with our hand-collected evidence, the coefficients on the changes in working capital accruals are significant and close to 1.0 (ranging from 0.6109 to 0.9703). This result indicates that working capital accruals account for a significant proportion of analysts' street CFO exclusions. For instance, for every $1 increase in *ΔREC*, analysts exclude, on average, about 63 cents of that accrual when adjusting net income to arrive at the street CFO figure. Of the various categories of working capital accruals, we find that the coefficient on *ΔTAX* is closest to and not significantly different from 1.0 ($\delta_4 = 0.9703$, *t*-statistic = 5.16; *F* test $\delta_4 = 1.0$, *p* value = 0.87), indicating that analysts often ignore tax accruals when computing the street CFO figure.[19] The coefficient on *DEPR* ($\delta_6 = 0.0650$, *t*-statistic = 4.00) is far below 1.0 (*F* test $\delta_6 = 1.0$, *p* value = 0.00), suggesting that many analysts do not ignore the depreciation add-back to net income when deriving street CFO. Lastly, the coefficient on *GAINPPE* ($\delta_9 = 0.2738$, *t*-statistic = 4.93) is significantly positive, which indicates that some analysts do not subtract nonrecurring gains on asset sales from earnings when deriving street CFO.[20]

[19] Consistent with practitioners' recommendations, this result could partly reflect the exclusion of tax benefits and payments arising from nonrecurring transactions (see e.g., Fink 2002; Mulford and Comiskey 2005).

[20] In robustness tests, we include excess tax benefits from employee stock options (*ESOTAX*) as an additional GAAP CFO adjustment. We conduct this analysis for firm-years with non-missing values of

In summary, our evidence for RQ1 suggests that, while some analysts appear to make sophisticated adjustments for one-time or nonrecurring items, many analysts fail to incorporate working capital accruals and other standard non-cash adjustments when deriving the street CFO figure. Our evidence also indicates that analysts' exclusions are economically significant and that the street CFO figures reported by FDPs, in particular I/B/E/S, reflect the major types of exclusions made by individual analysts. Finally, we provide evidence of the interplay between street and GAAP CFO figures in that our results suggest that many analysts provide a street CFO forecast that is not consistent with the GAAP CFO definition, consistent with prior studies (Givoly et al. 2009; Yoo et al. 2011; Call et al. 2013).

4.2 RQ2: The average and relative quality of analysts' street CFO and implied accrual exclusions

4.2.1 Persistence tests

Our next research question addresses the average and relative quality of analysts' street CFO and inferred accrual exclusions (RQ2). Using our full I/B/E/S sample, we first examine the persistence of the excluded CFO and implied accrual items. Following the street earnings literature (e.g., Doyle et al. 2003; Gu and Chen 2004; Landsman et al. 2007; Kolev et al. 2008), we define high-quality exclusions as those that are transitory or have the least predictive power for future operating performance. Conversely, we define low-quality exclusions as those that persist in future periods and therefore are not fully transitory.

Since the difference between earnings and CFO is accruals, we can use the following regression model to examine the persistence of the excluded CFO and implied accrual items:

$$FUTURE_{GAAP-OP} = \rho_0 + \rho_1(EPS_{IBES} - CFO_{IBES}) + \rho_2 CFO_{IBES} + \rho_3(EARNEXC - CFOEXC) + \rho_4 CFOEXC + Controls + \varepsilon \quad (3)$$

where $(EPS_{IBES} - CFO_{IBES})$ represents the implicit accrual component of the actual street earnings figure. Likewise, $(EARNEXC - CFOEXC)$ represents analysts' implied accrual exclusions from street earnings. To focus on the relative quality of the CFO and implied accrual exclusions, we estimate a modified version of Eq. 3 in which the coefficient for *EARNEXC* reflects the persistence of analysts' implied

Footnote 20 continued
ESOTAX as reported in the operating activities section of the cash flow statement. This data item is missing for most of our firm-years prior to 2002, primarily due to changes in accounting for stock options coinciding with the 2001 financial reporting scandals and the 2004 release of FAS 123R. Also, we exclude firm-years in which *ESOTAX* is reported as a cash flow from financing activities. We do not find a significant association between *CFOEXC* and *ESOTAX*, indicating that most analysts do not exclude this tax benefit when forecasting street CFO. Analysts' failure to exclude this tax benefit from CFO would be considered unsophisticated since prior evidence suggests that *ESOTAX* is nonrecurring and not relevant for forecasting core CFO performance (Fink 2002; Mulford and Comiskey 2005; Hribar and Nichols 2008).

accrual exclusions. Similarly, the coefficient of EPS_{IBES} reflects the persistence of the implied accrual component of street earnings. This modified version of Eq. 3 is written as follows[21]:

$$FUTURE_{GAAP-OP} = \rho_0 + \rho_1(EPS_{IBES}) + (\rho_2 - \rho_1)CFO_{IBES} + \rho_3(EARNEXC) + (\rho_4 - \rho_3)CFOEXC + Controls + \varepsilon \quad (4)$$

Equation 4 can be further modified as:

$$FUTURE_{GAAP-OP} = \beta_0 + \beta_1 EPS_{IBES} + \beta_2 CFO_{IBES} + \beta_3 EARNEXC + \beta_4 CFOEXC + Controls + \varepsilon \quad (5)$$

where, in terms of the parameters in Eq. 3, $\beta_1 = \rho_1$, $\beta_2 = \rho_2 - \rho_1$, $\beta_3 = \rho_3$, and $\beta_4 = \rho_4 - \rho_3$. The advantage of estimating Eq. 5 is that β_1 (β_3) provides a direct estimate of the persistence of the accrual component of EPS_{IBES} ($EARNEXC$) without the need to deconstruct the variable into separate accrual and CFO components. This advantage is imperative for two reasons: (1) many analysts do not forecast an explicit accruals measure, and (2) the quality of analysts' street CFO measures is unclear. Thus, the use of CFO_{IBES} ($CFOEXC$) to estimate actual street accruals (street accrual exclusions) could induce measurement error in our empirical results. A second advantage of estimating Eq. 5 is that β_2 (β_4) directly estimates the *incremental* persistence (i.e., relative quality) of CFO_{IBES} ($CFOEXC$).[22]

Column 1 of Table 5 presents empirical results of the average and relative persistence of analysts' street CFO and implied accrual exclusions. We scale $FUTURE_{GAAP-OP}$, EPS_{IBES}, CFO_{IBES}, and each of the street exclusion variables by total assets per share to control for scaling effects. The coefficient (β_1) on EPS_{IBES} is 0.4271 (t-statistic = 14.28), indicating that the accrual component of analysts' street earnings has positive implications for forecasting $FUTURE_{GAAP-OP}$. The coefficient on CFO_{IBES} ($\beta_2 = 0.2714$; t-statistic = 11.23) is significantly positive, indicating that street CFO exhibits *incremental* power in forecasting $FUTURE_{GAAP-OP}$. Consistent with prior research (e.g., Sloan 1996; Dechow et al. 1998), this evidence suggests that the CFO component of street earnings is more persistent than the implicit accrual component. The estimated coefficient on $EARNEXC$ is significantly negative ($\beta_3 = -0.0943$; t-statistic = −4.94), suggesting that analysts' implied accrual exclusions are, on average, recurring expenses that have negative implications for forecasting $FUTURE_{GAAP-OP}$. We therefore interpret this result as evidence that analysts' accrual exclusions are not perfectly transitory and thus are of low quality. The coefficient on $CFOEXC$ is significant and negative ($\beta_4 = -0.1456$; t-statistic = −11.83), indicating that street CFO exclusions have negative *incremental* predictive power. We note that the total persistence of $CFOEXC$ ($\beta_3 + \beta_4 = -0.2399$; F test p value = 0.00) suggests a 2.40 cent decrease in $FUTURE_{GAAP-OP}$ for every 10

[21] See Richardson et al. (2005) for a similar specification of the relative persistence of accruals and cash flows.

[22] In robustness tests, we find similar results when we use Eq. 4 to estimate our results.

Table 5 The persistence of analysts' street CFO and implied accrual exclusions

Dependent variable: $FUTURE_{GAAP\text{-}OP}$	Coefficients	
	(1)	(2)
Intercept	0.0079	0.0084
	(0.70)	(0.76)
$fEPS_{IBES}$	0.4271	0.4265
	(14.28)***	(14.59)***
CFO_{IBES}	0.2714	0.2726
	(11.23)***	(11.72)***
EARNEXC	−0.0943	−0.0641
	(−4.94)***	(−1.15)
CFOEXC	−0.1456	−0.1809
	(−11.83)***	(−11.40)***
EARNEXC × *POSTSEC*		−0.0355
		(−0.63)
CFOEXC × *POSTSEC*		0.0547
		(2.61)***
GROWTH	0.0002	0.0002
	(2.30)**	(2.35)**
LOSS	−0.0146	−0.0146
	(−4.85)***	(−4.82)***
SIZE	0.0018	0.0018
	(5.70)***	(5.62)***
SDE	−0.0014	−0.0016
	(−0.15)	(−0.18)
BOOKMKT	−0.0025	−0.0025
	(−2.30)**	(−2.31)**
POSTSEC	0.0044	0.0049
	(0.73)	(0.83)
Fixed industry effects	Included	Included
No. of firm-years	8,518	8,518
No. of firms	3,385	3,385
Adjusted R-squared	0.605	0.605

We scale $FUTURE_{GAAP\text{-}OP}$, EPS_{IBES}, CFO_{IBES}, and each of the street exclusion variables by total assets per share to control for scaling effects. Robust *t*-statistics clustered by firm and year are in parentheses All variables are defined in "Appendix 1"

*, **, and *** indicate significance at the 10, 5, and 1 % level, respectively. All continuous variables are winsorized at the 1 and 99 % levels

cents increase in *CFOEXC*. This effect is economically larger than the total persistence of analysts' implied accrual exclusions ($\beta_3 = -0.0943$), which indicates a decrease in $FUTURE_{GAAP\text{-}OP}$ of about 1 cent for every 10 cent increase in analysts' accrual exclusions.

These results suggest that the CFO component of analysts' street earnings exclusions are more transitory and thus of lower quality than their implicit accrual exclusions.[23]

We follow Kolev et al. (2008) and directly test for changes in the quality of analysts' street CFO and implied accrual exclusions following SEC scrutiny into the use of non-GAAP metrics. We re-estimate Eq. 5 after including interactions between *POSTSEC* and each of the street exclusion variables. The estimated coefficients on *EARNEXC* and the interaction, *EARNEXC* × *POSTSEC*, are both negative but insignificant. In contrast, the coefficient on the interaction, *CFOEXC* × *POSTSEC*, is significantly positive ($\beta_6 = 0.0547$; *t*-statistic = 2.61), suggesting an improvement in the relative quality of street CFO exclusions following SEC scrutiny. Interestingly, this evidence indicates that the post-intervention improvement in the quality of street earnings exclusions documented by Kolev et al. (2008) is attributable largely to an increase in the quality of the CFO component of analysts' earnings exclusions.

4.2.2 Informativeness tests

We further assess the quality of street CFO and implied accrual exclusions based on the relative informativeness of the street CFO metric and investors' perceptions of the excluded items. Our first empirical specification examines the informativeness of street CFO relative to GAAP CFO. We regress short-window abnormal returns separately on forecast errors based on the GAAP and street CFO metrics:

$$BHAR = \alpha_0 + \alpha_1 FE\_CFO_{GAAP-COP} + Controls + \varepsilon \quad (6)$$

$$BHAR = \alpha_0 + \alpha_1 FE\_CFO_{IBES} + Controls + \varepsilon \quad (7)$$

where *BHAR* is the compounded buy-and-hold return over the three-day window centered on the earnings announcement date less the value-weighted market return over the three-day window. $FE\_CFO_{GAAP\text{-}COP}$ and FE_CFO_{IBES} measure the unexpected CFO news or forecast error based on the actual GAAP per share ($CFO_{GAAP\text{-}COP}$) and street CFO per share (CFO_{IBES}) measures, respectively.

We also re-estimate Eqs. 6 and 7 after controlling for street earnings news as follows:

$$BHAR = \alpha_0 + \alpha_1 FE\_EPS_{IBES} + \alpha_2 FE\_CFO_{GAAP-COP} + Controls + \varepsilon \quad (8)$$

$$BHAR = \alpha_0 + \alpha_1 FE\_EPS_{IBES} + \alpha_2 FE\_CFO_{IBES} + Controls + \varepsilon \quad (9)$$

where FE_EPS_{IBES} is the unexpected earnings news or forecast error based on the actual street earnings figure (EPS_{IBES}). Following prior studies (e.g., Dechow 1994; Bhattacharya et al. 2003), we use Vuong's (1989) likelihood ratio test to compare the explanatory power (adjusted R-squared values) of Eqs. 6 and 7 and of Eqs. 8 and 9. Equations 6 and 7 assess the relative informativeness of analysts' street CFO information by comparing the explanatory power of the stand-alone CFO forecast errors, whereas Eqs. 8 and 9 assess the relative informativeness, controlling for unexpected street earnings news.

[23] In robustness tests, we continue to find a significantly negative coefficient on *CFOEXC* when we control for the differential persistence of the recurring and special items components of analysts' street earnings exclusions.

Our second specification examines investors' perceptions of the excluded items by estimating the average and relative market response to analysts' street CFO and implied accrual exclusions. We estimate the following regression, which extends Eq. 9 above:

$$BHAR = \alpha_0 + \alpha_1 FE\_EPS_{IBES} + \alpha_2 FE\_CFO_{IBES} + \alpha_3 EARNEXC + \alpha_4 CFOEXC + Controls + \varepsilon \quad (10)$$

The independent variables in Eq. 10 correspond to those in our persistence model (see Eq. 5) with the exception of FE_EPS_{IBES} and FE_CFO_{IBES}, which control for the street earnings and CFO surprise, respectively. The coefficient on *EARNEXC* (α_3) represents the market response to analysts' implicit accrual exclusions, while the coefficient on *CFOEXC* (α_4) represents the *incremental* market response to analysts' CFO exclusions. If investors understand the differential persistence of analysts' implied accrual and CFO exclusions as documented earlier, then we expect the respective exclusion variables to be differentially associated with announcement period abnormal returns.

Panel A of Table 6 presents empirical results of the relative informativeness tests of the street and GAAP CFO measure. Columns 1 and 2 present the estimated results for Eqs. 6 and 7, while columns 3 and 4 present the results for Eqs. 8 and 9. The last row of the table presents the Vuong's test statistic for comparing Eqs. 6 and 7, and alternatively, Eqs. 8 and 9. The results indicate that the estimated coefficients on $FE\_CFO_{GAAP\text{-}COP}$ in Eqs. 6 and 8 are positive and statistically significant, while the estimated coefficients on FE_CFO_{IBES} in Eqs. 7 and 9 are not significant at conventional levels. The Voung *z*-statistic also indicates that Eq. 6 (Eq. 8) has significantly more explanatory power than Eq. 7 (Eq. 9), suggesting that investors view the GAAP CFO measure as more informative than the street CFO figure even after controlling for FE_EPS_{IBES}. Moreover, these results suggest that investors perceive street CFO to be low-quality measures that provide no incremental information content relative to GAAP-defined CFO measures. This evidence is striking since it contrasts with prior evidence suggesting that investors perceive street earnings to be more informative than GAAP earnings, despite the low-quality nature of some forms of earnings exclusions.

Panel B of Table 6 presents the estimated results for Eq. 10. The estimated coefficients on FE_EPS_{IBES} ($\alpha_1 = 0.9530$; *t*-statistic = 9.13) and FE_CFO_{IBES} ($\alpha_2 = 0.0749$; *t*-statistic = 2.42) are significantly positive, indicating that investors react differentially to the accrual and CFO components of street earnings news, controlling for analysts' street earnings and CFO exclusions. We find significantly negative coefficients on *EARNEXC* ($\alpha_3 = -0.0803$; *t*-statistic = −6.89) and *CFOEXC* ($\alpha_4 = -0.1278$; *t*-statistic = −2.60). We note that the total negative response to *CFOEXC* is significantly stronger than the negative response to *EARNEXC* ($\alpha_3 + \alpha_4 = -0.2081$ vs. $\alpha_3 = -0.0803$; *F* test *p* value = 0.00). This evidence suggests that investors discount analysts' street CFO exclusions to a much greater extent than analysts' implied accrual exclusions, which in turn indicates that investors understand (at least to some extent) the differential persistence of analysts' implied accrual and CFO exclusions. Further, the results suggest that investors

Table 6 Relative informativeness and investor reaction to street and GAAP CFO metrics

Panel A: Relative informativeness of street and GAAP CFO measures

Dependent variable: *BHAR*	Coefficients			
	(1)	(2)	(3)	(4)
Intercept	0.0405	0.0433	0.0406	0.0432
	(1.17)	(1.25)	(1.19)	(1.26)
FE_EPS_{IBES}			0.9354	0.9439
			(8.96)***	(9.04)***
$FE\_CFO_{GAAP\text{-}COP}$	0.1135		0.1045	
	(2.68)**		(2.57)**	
FE_CFO_{IBES}		0.0502		0.0360
		(1.48)		(1.15)
Control variables[3]	Included	Included	Included	Included
Fixed industry effects	Included	Included	Included	Included
No. of firm-years	3,031	3,031	3,031	3,031
No. of firms	1,362	1,362	1,362	1,362
Adjusted R-squared	0.026	0.022	0.043	0.040
Voung's *z*-statistic	(−1.73)*		(−1.70)*	

Panel B: Investor reaction to analysts' street CFO and implied accrual exclusions

Dependent variable: *BHAR*	Coefficients (1)
Intercept	0.0420
	(1.21)
FE_EPS_{IBES}	0.9530
	(9.13)***
FE_CFO_{IBES}	0.0749
	(2.42)***
EARNEXC	−0.0803
	(−6.89)***
CFOEXC	−0.1278
	(−2.60)**
Control variables[a]	Included
Fixed industry effects	Included
No. of firm-years	3,031
No. of firms	1,362
Adjusted R-squared	0.046

We scale the forecast errors and each of the street exclusion variables by total assets per share to control for scaling effects. Robust *t*-statistics clustered by firm and year are in parentheses

All variables are defined in "Appendix 1"

*, **, and *** indicate significance at the 10, 5, and 1 % level, respectively. All continuous variables are winsorized at the 1 and 99 % levels

[a] We do not report the coefficients for the control variables for the sake of brevity. The control variables include firm growth (*GROWTH*), the occurrence of losses (*LOSS*), firm size (*SIZE*), earnings volatility (*SDE*), the book-to-market ratio (*BOOKMKT*), and SEC regulatory intervention (*POSTSEC*)

perceive analysts' street CFO exclusions to be of lower quality than their implicit accrual exclusions, consistent with our persistence tests.[24]

In sum, our results for RQ2 indicate that analysts make low-quality exclusions when deriving the street CFO figure and that these exclusions lead to street CFO measures that are uninformative to investors relative to GAAP CFO. Moreover, our combined evidence for RQ1 and RQ2 suggests that analysts' street CFO derivations are, on average, unsophisticated, consistent with Givoly et al. (2009).

4.3 RQ3: Analyst conflicts of interest, relative CFO volatility, and the quality of analysts' street CFO and implied accrual exclusions

Our final research question investigates the influence of analyst conflicts of interest and relative CFO volatility on the quality of analysts' street CFO and implied accrual exclusions. Before turning to this issue, we examine whether the components and economic significance of analysts' street CFO exclusions vary for firms with high CFO volatility (*HI_SDC/SDE*) and those firms whose analysts face strong conflicts of interest (*TOPTIER*). We re-estimate Eq. 2 for our full I/B/E/S sample after interacting *TOPTIER* and *HI_SDC/SDE* with the various GAAP CFO line items reported in Compustat.

Table 7 presents the re-estimated results for Eq. 2. Columns 1 and 2 report the stand-alone interaction effects of *TOPTIER* and *HI_SDC/SDE*, respectively. Column 3 presents results including both sets of interactions. In column 1, the interactions of *TOPTIER* with *ΔREC* and *ΔAP* are significantly positive, indicating that analysts facing strong conflicts of interest ignore greater proportions of accounts receivable and accounts payable accruals when forecasting CFO. The results also suggest an economically significant effect of analysts' incentives on the exclusion of working capital accruals. For instance, the sum of the coefficients for *TOPTIER* and $\Delta AP \times TOPTIER$ is not significantly different from 1.0 ($\delta_3 + \delta_{12} = 1.17$; F test $\delta_3 + \delta_{12} = 1.0$, p value $= 0.17$), indicating that strongly conflicted analysts tend to ignore cash payments to suppliers when deriving street CFO.

The results in column 2 indicate that relative CFO volatility also plays a role in determining the components of street CFO exclusions. We find significantly positive coefficients for the interactions of *HI_SDC/SDE* with the following variables: *ΔREC*, *ΔINV*, *ΔOTHER*, and *DEFINCTAX*. These results indicate that changes in working capital and tax accruals comprise a greater proportion of analysts' street CFO exclusions when the firm's CFO series is more volatile. In column 3, we find that analyst conflicts of interest and relative CFO volatility both influence the types and economic significance of certain working capital and tax-related cash flows that analysts do not incorporate in their street CFO forecasts.

We find similar qualitative results (not tabulated) when we examine the interaction effect of analyst conflicts of interest and relative CFO volatility using our hand-collected sample of individual analyst reports. We measure conflicts of interest at the analyst-level using *HIRANK*, which equals 1 for analysts employed by investment

[24] In unreported results, we do not find a significant difference in investors' reaction to *EARNEXC* and *CFOEXC* following SEC scrutiny into the use of non-GAAP financial metrics. This result suggests that investors do not perceive street CFO exclusions to be of higher quality following SEC scrutiny, despite post-intervention improvements in the transitory nature of these exclusions.

Table 7 Analyst conflicts of interest, relative CFO volatility, and street CFO exclusions

Dependent variable: *CFOEXC*	Coefficients		
	(1)	(2)	(3)
Intercept	0.0304	0.0341	0.0345
	(1.23)	(1.23)	(1.25)
ΔREC	0.6190	0.6074	0.5952
	(3.55)***	(3.43)***	(3.32)***
ΔINV	0.6655	0.5858	0.5849
	(4.08)***	(3.88)***	(3.79)***
ΔAP	0.6786	0.6584	0.6363
	(3.77)***	(3.42)***	(3.33)***
ΔTAX	0.9637	0.9739	0.9616
	(4.99)***	(6.14)***	(5.85)***
ΔOTHER	0.6103	0.6098	0.6113
	(3.21)***	(3.16)***	(3.07)***
DEPR	0.0641	0.0674	0.0668
	(3.80)***	(4.20)***	(4.18)***
DEFINCTAX	0.0671	0.0485	0.0492
	(1.21)	(1.14)	(1.08)
EQUITYSUB	0.4503	0.6586	0.6457
	(3.28)***	(4.12)***	(3.97)***
GAINPPE	0.2858	0.2796	0.2944
	(5.06)***	(5.14)***	(5.52)***
TOPTIER	0.0036		0.0029
	(1.68)*		(1.98)**
ΔREC × *TOPTIER*	0.2292		0.1952
	(1.75)*		(1.47)
ΔINV × *TOPTIER*	0.0661		0.0521
	(0.57)		(0.45)
ΔAP × *TOPTIER*	0.4937		0.4457
	(2.44)**		(2.70)***
ΔTAX × *TOPTIER*	0.0950		0.1341
	(0.53)		(0.71)
ΔOTHER × *TOPTIER*	0.0592		0.0043
	(0.38)		(0.03)
DEPR × *TOPTIER*	0.0220		0.0070
	(0.38)		(0.17)
DEFINCTAX × *TOPTIER*	0.0462		0.0647
	(1.29)		(0.73)
EQUITYSUB × *TOPTIER*	0.1526		0.2042
	(0.25)		(0.32)
GAINPPE × *TOPTIER*	−0.1939		−0.2166
	(−1.47)		(−1.37)

Table 7 continued

Dependent variable: *CFOEXC*	Coefficients		
	(1)	(2)	(3)
HI_SDC/SDE		0.0024	0.0023
		(0.77)	(0.77)
ΔREC × *HI_SDC/SDE*		0.1945	0.1968
		(3.31)***	(3.60)***
ΔINV × *HI_SDC/SDE*		0.2567	0.2570
		(3.73)***	(3.59)***
ΔAP × *HI_SDC/SDE*		0.1946	0.1944
		(1.36)	(1.36)
ΔTAX × *HI_SDC/SDE*		−0.0522	−0.0472
		(−0.30)	(−0.28)
ΔOTHER × *HI_SDC/SDE*		0.1828	0.1838
		(3.20)***	(3.19)***
DEPR × *HI_SDC/SDE*		0.0442	0.0439
		(0.52)	(0.53)
DEFINCTAX × *HI_SDC/SDE*		0.3739	0.3725
		(1.89)**	(1.88)*
EQUITYSUB × *HI_SDC/SDE*		−0.5561	−0.5616
		(−0.65)	(−0.64)
GAINPPE × *HI_SDC/SDE*		0.1473	0.1402
		(0.92)	(0.88)
SIZE	−0.0005	−0.0005	−0.0005
	(−1.25)	(−1.19)	(−1.34)
Fixed industry effects	Included	Included	Included
No. of firm-years	8,518	7,601	7,601
No. of firms	3,385	2,927	2,927
Adjusted R-squared	0.288	0.307	0.308

Robust *t*-statistics clustered by firm and year are in parentheses

*, **, and *** indicate significance at the 10, 5, and 1 % level, respectively. All continuous variables are winsorized at the 1 and 99 % levels. All variables are defined in "Appendix 1"

banks with a Carter-Manaster (CM) rank greater than or equal to 8.1 and zero otherwise. We re-estimate Eq. 1 after interacting *HIRANK* and *HI_SDC/SDE* with each indicator variable for the types of CFO exclusions made by individual analysts. We find that changes in working capital accruals (*ΔWC*) comprise a greater proportion of street CFO exclusions when analysts face strong conflicts of interests. We also find weak evidence that gains/losses on asset sales (*GAINLOSS*) account for a greater proportion of analysts' CFO exclusions when firms' CFO series are more volatile.

We now turn to directly assessing the influence of analyst conflicts of interest and greater CFO volatility on the quality of street CFO and implied accrual exclusions. To address this issue, we re-estimate our persistence model (see Eq. 5) for our full

Table 8 Analyst conflicts of interest, relative CFO variability, and the persistence of analysts' street CFO and implied accrual exclusions

Dependent variable: $FUTURE_{GAAP\text{-}OP}$	Coefficients		
	(1)	(2)	(3)
Intercept	0.0073	0.0066	0.0063
	(0.65)	(0.58)	(0.54)
EPS_{IBES}	0.4270	0.4319	0.4318
	(14.31)***	(10.18)***	(10.19)***
CFO_{IBES}	0.2714	0.2654	0.2656
	(11.26)***	(9.70)***	(9.78)***
EARNEXC	−0.0967	−0.0969	−0.0995
	(−5.04)***	(−5.22)***	(−5.30)***
CFOEXC	−0.1419	−0.1284	−0.1223
	(−11.13)***	(−6.78)***	(−6.16)***
TOPTIER	0.0029		0.0030
	(1.29)		(1.35)
EARNEXC × *TOPTIER*	0.0723		0.0650
	(1.21)		(1.19)
CFOEXC × *TOPTIER*	−0.0639		−0.1053
	(−2.03)**		(−2.87)***
HI_SDC/SDE		0.0023	0.0024
		(1.23)	(1.28)
EARNEXC × *HI_SDC/SDE*		−0.0194	−0.0199
		(−0.15)	(−0.15)
CFOEXC × *HI_SDC/SDE*		−0.0451	−0.0432
		(−1.70)*	(−1.56)
Control variables[a]	Included	Included	Included
Fixed industry effects	Included	Included	Included
No. of firm-years	8,518	7,601	7,601
No. of firms	3,385	2,927	2,927
Adjusted R-squared	0.605	0.585	0.586

We scale $FUTURE_{GAAP\text{-}OP}$, EPS_{IBES}, CFO_{IBES}, and each of the street exclusion variables by total assets per share to control for scaling effects. Robust *t*-statistics clustered by firm and year are in parentheses

*, **, and *** indicate significance at the 10, 5, and 1 % level, respectively. All continuous variables are winsorized at the 1 and 99 % levels. All variables are defined in "Appendix 1"

[a] We do not report the coefficients for the control variables for the sake of brevity. The control variables include firm growth (*GROWTH*), the occurrence of losses (*LOSS*), firm size (*SIZE*), the book-to-market ratio (*BOOKMKT*), and SEC regulatory intervention (*POSTSEC*)

I/B/E/S sample after interacting *TOPTIER* and *HI_SDC/SDE* with our *EARNEXC* and *CFOEXC* variables. Table 8 presents the re-estimated results. Columns 1 and 2 present the results for the stand-alone interaction effects of *TOPTIER* and *HI_SDC/SDE*, respectively; while column 3 report results for both sets of interactions. In column 1, we find significantly negative coefficients on *EARNEXC* ($\beta_3 = -0.0967$,

t-statistic = −5.04) and *CFOEXC* ($\beta_4 = -0.1419$, *t*-statistic = −11.13), indicating that, for firms followed by less-conflicted analysts, implied accrual exclusions exhibit low quality, and even lower quality for CFO exclusions. The coefficient on *EARNEXC* × *TOPTIER* ($\beta_6 = 0.0723$, *t*-statistic = 1.21) is insignificant, suggesting that conflicts of interest do not have a major effect on accrual exclusion quality. Nonetheless, the coefficient on *CFOEXC* × *TOPTIER* is significantly negative ($\beta_7 = -0.0639$, *t*-statistic = −2.03), suggesting that analysts facing strong conflicts of interest make lower quality CFO exclusions when deriving the street CFO metric. Consistent with prior research (Baik et al. 2009; Yoo et al. 2011), this evidence suggests that conflicted analysts make more biased street CFO exclusion decisions, presumably to generate investment banking business.

In column 2, we find an insignificant interaction of *EARNEXC* with *HI_SDC/SDE*, indicating that greater CFO volatility has little effect on accrual exclusion quality. The interaction of *CFOEXC* and *HI_SDC/SDE* is negative and marginally significant ($\beta_{10} = -0.0451$, *t*-statistic = −1.70), providing some evidence that analysts make poorer CFO exclusion decisions when firms' CFO series are more volatile. If analysts exclude volatile cash items for information-related reasons or to appear more accurate than they really are (Lambert 2004), then we should find more transitory CFO exclusions for firms with more volatile CFO. We instead find the opposite; thus, our results likely reflect analysts' inability to correctly identify and exclude more volatile CFO items, which are more difficult to forecast (Givoly et al. 2009). In column 3, we consistently find a negative effect of analyst conflicts of interest on CFO exclusion quality, while controlling for the effect of relative CFO volatility. We however note that the interaction effect of relative CFO volatility becomes insignificant at the 12 % level, suggesting that the low-quality nature of analysts' CFO exclusions is weakly attributable to the difficulty in forecasting CFO.[25]

In unreported tests, we do not find a significant difference in investors' reaction to street CFO and implied accrual exclusions, conditional on analyst conflicts of interest and relative CFO volatility. This result could reflect investors' failure to understand the differential quality of CFO items excluded by strongly conflicted analysts and those analysts following firms with more volatile CFO series.

4.3.1 Controlling for SEC regulatory intervention and time trends in street exclusion quality

Prior evidence suggests that the quality of street metrics provided by analysts, FDPs, or both may have changed over time due to several factors. First, prior studies suggest improvements in the quality of street earnings metrics following SEC scrutiny into the use of non-GAAP metrics (Kolev et al. 2008). Consistent with this evidence, our results in Table 5 suggest a positive influence of SEC scrutiny on the quality of street CFO exclusions. Second, prior research suggests that time trends in the quality of street measures may be associated with (1) procedural and definitional

[25] In untabulated results, we find that the magnitude of analysts' street CFO exclusions is positively associated with both *TOPTIER* and *HI_SDC/SDE*. This result suggests that strongly conflicted analysts and analysts following firms with high CFO volatility tend to make *larger* CFO-increasing exclusions when deriving the street CFO metric.

changes undertaken by FDPs, especially during the early 1990s (Abarbanell and Lehavy 2007), (2) mandatory changes in accounting standards over time (Entwistle et al. 2006), and (3) time trends in firm performance (Bhattacharya et al. 2004).

Given these factors, we re-examine RQ3 while controlling for time trend effects and the impact of SEC scrutiny. Specifically, we re-estimate the results presented in Tables 7 and 8 after including interactions of our variables of interest with *POSTSEC* and a yearly time trend variable for the 1993–2008 period (*TREND*). Untabulated results consistently indicate positive effects of *TOPTIER* and *HI_SDC/SDE* on analysts' exclusion of working capital and tax accruals, while controlling for the interaction effects of *POSTSEC* and *TREND*. We find significantly negative (positive) interactions between *TREND* (*POSTSEC*) and specific changes in working capital accruals. This evidence likely reflects an improvement in analysts' incorporation of working capital accruals over time as well as post-intervention improvements in their exclusion of nonrecurring working capital cash flows.

Our re-estimated persistence tests (not reported) similarly suggest significantly lower quality CFO exclusions for firms followed by strongly conflicted analysts. However, the interaction effect of relative CFO volatility becomes insignificant (p value $= 0.17$) when we control for the effects of SEC scrutiny and other time trend effects. Similar to our results in Table 5, the interaction effect of *CFOEXC* and *POSTSEC* indicates an increase in CFO exclusion quality following SEC scrutiny. We do not find evidence of significant time trend effects on CFO exclusion quality. Also, the interaction effects regarding the quality of implied accrual exclusions remain consistently insignificant. In sum, our results suggest that analyst incentives contribute strongly to the low-quality nature of street CFO exclusions, despite regulatory-driven improvements in the quality of these exclusions.

5 Conclusion

We investigate the quality of adjusted street CFO metrics with specific focus on the persistence and informativeness of analysts' exclusions in deriving the street CFO figure. When analysts exclude items from both their street earnings and CFO forecasts, they also provide an implicit estimate of their accrual exclusions. Consequently, we assess the average and relative quality of analysts' street CFO and implied accrual exclusions. We also provide evidence on the components and economic significance of street CFO exclusions identified from the full-text reports of individual analysts and whether these exclusions are reflected in the actual street CFO values reported in I/B/E/S. Finally, we investigate the influence of analyst conflicts of interest and greater inherent CFO volatility on the average and relative quality of analysts' street CFO and implied accrual exclusions.

We find that the street CFO number is generally higher than the GAAP CFO number, indicating that analysts typically make CFO-increasing exclusions. Our inspection of analysts' full-text reports indicates that, while some analysts appear to make sophisticated exclusions of one-time or nonrecurring cash transactions, many analysts ignore changes in working capital and other accruals when adjusting forecasted earnings to arrive at their street CFO forecasts. Multivariate analyses also

confirm the descriptive evidence from our hand-collected sample of analyst reports: street CFO exclusions computed using I/B/E/S actual CFO values are strongly associated with the exclusion of changes in working capital and other accruals made by individual analysts. This evidence suggests a strong interplay between the CFO exclusion decisions of individual analysts and the adjustment decisions of I/B/E/S. Large-sample tests of the association between street CFO exclusions computed using I/B/E/S data and specific GAAP CFO adjustments reported in Compustat indicate that many analysts ignore GAAP-defined working capital and other accruals when deriving the street CFO measure. This result is consistent with the notion that analysts often derive street CFO measures that do not conform to standard GAAP CFO metrics.

We find that analysts' CFO exclusions are negatively associated with future operating earnings, suggesting that these exclusions are not fully transitory or unimportant in forecasting future firm performance. We also find that analysts' street CFO exclusions are *less* transitory than their implied accrual exclusions. Tests of relative informativeness indicate that investors do not perceive the street CFO metric to be more informative than GAAP CFO. Further, our results suggest that investors discount street CFO exclusions and that this discount is even greater than that placed on implied accrual exclusions. Together, these results provide evidence that analysts' street CFO exclusions are of such low quality to render street CFO measures incrementally uninformative to investors. Finally, we find that analyst conflicts of interest and the relative CFO volatility influence the quality of analysts' street CFO exclusions. This evidence suggests that analysts' economic incentives and the difficulty in forecasting more volatile cash items both play a role in determining the quality of analysts' street CFO information.

Our study makes three important contributions to the extant literature. First, we extend prior research on street financial measures by providing evidence that analysts' street CFO exclusions are of such low quality that they render street CFO metrics less informative than GAAP CFO metrics. Second, our results contribute to the ongoing debate on the quality of analysts' CFO forecasts. Our evidence of the low-quality nature of analysts' street CFO exclusions (and the actual street CFO figure itself) implies that analysts' derivation of their street CFO forecasts is, on average, unsophisticated, consistent with the conclusion of Givoly et al. (2009). Third, our evidence that analyst conflicts of interest and, to some extent, greater CFO volatility negatively influence the quality of street CFO exclusions improves our understanding of the factors contributing to the low-quality nature of street CFO metrics. Our results have practical implications for academic researchers who rely on FDP-adjusted CFO data to address various research questions and for investors who wish to assess the quality of street CFO information provided by analysts and FDPs. Finally, our study informs standard setters who express concern about the provision of non-standard financial measures that exclude normal operating cash items (Chasan 2012).

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Appendix 1: Variable definitions

Primary variables	
$FUTURE_{GAAP\text{-}OP}$	One-year-ahead GAAP EPS from continuing operations ($EPS_{GAAP\text{-}OP}$).
CFO_{IBES}	Analyst-adjusted cash flow from continuing operations (CFO) per share from the I/B/E/S split-unadjusted actual file
$CFO_{GAAP\text{-}COP}$	GAAP cash flow from continuing operations computed as Compustat's cash flow from operations (annual data item OANCF) minus the cash portion of extraordinary items and discontinued operations (annual data item XIDOC). $CFO_{GAAP\text{-}COP}$ is the applicable basic or diluted per share figure matched to the I/B/E/S definition
EPS_{IBES}	Analyst-adjusted street EPS from the I/B/E/S split-unadjusted actual file
$EPS_{GAAP\text{-}OP}$	GAAP EPS from continuing operations. $EPS_{GAAP\text{-}OP}$ is the applicable basic or diluted per share figure matched to the I/B/E/S definition
$EPS_{GAAP\text{-}BXI}$	GAAP EPS before extraordinary items and discontinued operations. $EPS_{GAAP\text{-}BXI}$ is the applicable basic or diluted per share figure matched to the I/B/E/S definition
FE_EPS_{IBES}	I/B/E/S street earnings forecast error, calculated as EPS_{IBES} minus the most recent analyst street earnings forecast issued within 90 days before the earnings announcement date
$FE\_EPS_{GAAP\text{-}OP}$	GAAP operating earnings forecast error, calculated as $EPS_{GAAP\text{-}OP}$ minus the most recent analyst street earnings forecast issued within 90 days before the earnings announcement date
FE_CFO_{IBES}	I/B/E/S street CFO forecast error, calculated as CFO_{IBES} minus the most recent analyst CFO forecast issued within 90 days before the earnings announcement date
$FE\_CFO_{GAAP\text{-}COP}$	GAAP CFO forecast error, calculated as $CFO_{GAAP\text{-}COP}$ minus the most recent analyst CFO forecast issued within 90 days before the earnings announcement date
CFOEXC	Total street CFO exclusions per share, calculated as CFO_{IBES} minus $CFO_{GAAP\text{-}COP}$
EARNEXC	Total street earnings exclusions per share, calculated as EPS_{IBES} minus $EPS_{GAAP\text{-}BXI}$
BHAR	Compounded buy-and-hold return over the three-day window centered on the earnings announcement date less the three-day value-weighted market return
TOPTIER	Equals 1 if the average Carter-Manaster reputation rank of the analysts issuing CFO forecasts for each firm-year is greater than or equal to 8.1 and 0 otherwise
HIRANK	Equals 1 if the analyst's Carter-Manaster reputation rank is greater than or equal to 8.1 and 0 otherwise
SDC/SDE	The standard deviation of CFO divided by the standard deviation of net income over at least three of the past eight fiscal years. Net income and CFO are both scaled by end-of-year total assets
HI_SDC/SDE	Equals 1 for those firm-years with a *SDC/SDE* value that ranks in the top quintile of the sample and 0 otherwise
Exclusion variables from full-text analyst reports	
ΔWC	Equals 1 if the analyst's full-text report discloses the exclusion of changes in working capital accruals from the analyst's computation of the street CFO forecast and 0 otherwise
DEFTAX	Equals 1 if the analyst's full-text report discloses the exclusion of deferred taxes from the analyst's computation of the street CFO forecast and 0 otherwise

Appendix 1 continued

DEFCOMP	Equals 1 if the analyst's full-text report discloses the exclusion of stock-based and other deferred compensation from the analyst's computation of the street CFO forecast and 0 otherwise
EQUITYINC	Equals 1 if the analyst's full-text report discloses the exclusion of income/loss in equity affiliates from the analyst's computation of the street CFO forecast, and 0 otherwise.
GAINLOSS	Equals 1 if the analyst's full-text report discloses the exclusion of gains/losses on the sale of assets from the analyst's computation of the street CFO forecast and 0 otherwise
NONRECUR	Equals 1 if the analyst's full-text report discloses the exclusion of other nonrecurring items from the analyst's computation of the street CFO forecast and 0 otherwise. These nonrecurring items include restructuring charges, litigation payments, one-time pension cash contributions, and nonrecurring changes in working capital accruals
CAPEX	Equals 1 if the analyst's full-text report discloses the deduction of capital expenditures from CFO to arrive at a forecast of free cash flow and 0 otherwise
NO_EXCL	Equals 1 if the analyst's full-text report discloses a street CFO forecast with no clear identifiable exclusion and 0 otherwise
NI + DEPR	Equals 1 if the analyst's full-text report discloses a naïve CFO forecast by adding back depreciation expense to forecasted earnings and 0 otherwise
GAAP CFO line item variables from Compustat	
ΔREC	Decrease (increase) in accounts receivable (Compustat annual item RECCH)
ΔINV	Decrease (increase) in inventories/stocks (Compustat annual item INVCH)
ΔAP	Increase (decrease) in accounts payable and accrued liabilities (Compustat annual item APALCH)
ΔTAX	Increase (decrease) in accrued income taxes (Compustat annual item TXACH)
ΔOTHER	Net change in other assets and liabilities (Compustat annual item AOLOCH)
DEPR	Depreciation and amortization (Compustat annual item DPC)
DEFINCTAX	Deferred income tax expense (Compustat annual item TXDC)
EQUITYSUB	Equity in the net loss (earnings) of unconsolidated subsidiaries (Compustat annual item ESUBC)
GAINPPE	Loss (gain) on the sale of property, plant, and equipment and investments (Compustat annual item SPPIV)
Control variables	
GROWTH	One-year change in sales scaled by total common shares outstanding
LOSS	Equals 1 if the firm reports a GAAP loss from continuing operations in the current fiscal year; 0 otherwise
SIZE	Log of total assets in $ millions at the end of the fiscal year
SDE	Standard deviation of net income scaled by end-of-year total assets over at least three of the past eight fiscal years
BOOKMKT	The ratio of book to market value of equity at the end of the fiscal year
POSTSEC	Equals 1 for all firm-years following the December 2001 SEC cautionary advice on the use of non-GAAP financial measures; 0 otherwise

Appendix 2: Examples of analyst street CFO definitions

Company name and fiscal year end	Analyst firm and report date	Street CFO definition
Williams Cos. FYE 12/31/2000	Morgan Stanley 10/27/2000	*After-tax cash flow from operations* = Net Income + Depreciation + Deferred Taxes
Exxon Mobil FYE 12/31/2004	A. G. Edwards 07/30/2004	*Cash earnings* = Net Income + Depreciation
Oracle Corp. FYE 05/31/2006	Credit Suisse First Boston 05/30/2006	*Cash flow from operations* = Net Income + Depreciation + Changes in Working Capital Accruals + Other
DHT Holdings FYE 12/31/2008	J. P. Morgan 11/19/2008	*Cash flow from operations* = Net Income + Depreciation + Changes in Working Capital Accruals
Chesapeake Energy FYE 12/31/2008	J. P. Morgan 01/28/2009	*Discretionary cash flow from operations* = Net Income + Depreciation + Deferred taxes + Other
Carrizo Oil & Gas FYE 12/31/2006	RBC Capital Markets 01/22/2007	*Cash flow from operations* = EBIT + Depreciation − Cash Interest − Cash taxes
Unit Corp. FYE 12/31/2008	SunTrust Robinson Humphrey 01/22/2009	*Cash flow from operations before working capital* = Recurring Net Income + Depreciation − Capitalized Interest + Deferred taxes
International Paper FYE 12/31/2007	Buckingham Research 04/18/2007	*Discretionary cash flow from operations* = EBITDA − Cash Taxes & Interest + Changes in Working Capital Accruals − Capital Expenditures

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