Independent Analysts' Estimates of Firm Value

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ABSTRACT

This study provides new evidence on the relative quality of independent analysts' research for firm valuation. While prior research generally finds that the stock recommendations of independent analysts underperform those of non-independents, we show that in an era of increasing investment in and proliferation of independent research, independent analysts predict firm value with less optimism than do investment-bank analysts—potentially fulfilling their mandate from the Global Settlement. Firm and analyst characteristics seem to be associated with the relative quality of these estimates when compared with investment-bank analysts' price targets. We find relatively less optimism in independent analysts' price targets for firms with recent stock price momentum, higher valuations, greater financing needs, and lower stock price volatility. We further find that the relative inaccuracy of independent analysts' price targets stems from their lack of experience and smaller coverage portfolios when compared to non-independents. Investors as well as those interested in extending empirical research into firm valuation can benefit from the analysis undertaken in this study.

1. Introduction

In 2003, amid rising concerns that analysts' conflicting incentives lead to optimistically biased earnings forecasts and stock recommendations (Dugar and Nathan 1995; Lin and McNichols 1998; Dechow, Hutton, and Sloan 2000), 10 large investment banks were involved in a "Global Settlement" and required to pay nearly a half billion dollars to fund and distribute independent analyst research to their clients. At the time, many believed this requirement to be a "waste of money" (Richards 2003), potentially giving investors a "false sense of trust" (Bowman 2016). The influx of capital substantially increased the investment in and availability of independent research; however, consistent with initial concerns, there is mixed evidence regarding the benefits provided by independent research (Barber, Lehavy, and Trueman 2007; Gu and Xue 2008; Buslepp, Casey, and Huston 2014). To date, however, research does not evaluate the relative quality of independent analysts' price targets, which may serve as less optimistic estimates of firm value.

Given the long-term focus and differing incentives of independent analysts, the analysis contained in their research reports may provide unique fundamental insights. At the same time, independent analysts often lack the resources, expertise, and/or access to private information that investment-bank analysts enjoy. We thus investigate the relative quality of independent analysts' estimates of firm value relative to those of analysts employed by investment banks.[1] Specifically, we examine the properties of independent analysts' price targets and whether the relative optimism and accuracy of these forecasts is differentially associated with firm and analyst characteristics, as well as the fundamental inputs underlying analysts' price targets.

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[1] We follow prior literature (e.g., Barber et al. 2007) in using the term "independent" to refer to either pure research firms or firms with research and brokerage activities, but without investment banking business. We refer to analysts employed by investment banks as "investment-bank" analysts. Results throughout are similar when we compare independent analysts' estimates against those provided by all other analysts in I/B/E/S.

Thus, in addition to informing investors and academics about the relative quality of independent analysts' price targets, our research has implications for the firms providing independent research.

While prior literature has investigated the recommendations and earnings forecasts of independent analysts, we know little about their price targets and how they compare with investment-bank analysts' price targets. To date, research provides mixed evidence regarding the usefulness of sell-side analysts' price targets as investment signals (Brav and Lehavy 2003; Asquith, Mikhail, and Au 2005; Bradshaw, Brown, and Huang 2013; Gleason, Johnson, and Li 2013; Bradshaw 2011). With respect to independent analysts, prior research finds that they underperform investment-bank analysts in the returns to their recommendations (Barber et al. 2007) and in accurately forecasting earnings (Gu and Xue 2008; Jacob, Rock, and Weber 2008). At the same time, Barber et al. (2007) find that buy recommendations of independent analysts outperform those of investment-bank analysts. Moreover, independent analysts' reports often differ in scope from other analysts' reports. For example, the analyst reports of Morningstar, a leading provider of independent investment research, consistently include valuation inputs such as cost of capital estimates that sell-side analysts' reports often exclude. In contrast, non-independent analysts generally focus on *near-term* earnings forecasts and stock recommendations due to the pressures of their investing clients and company management (Brown, Call, Clement, and Sharp 2015). Thus, independent analysts' price targets may provide important information to investors evaluating firms' value.

Our analysis is guided by prior literature that compares price targets to future share price (Bradshaw et al. 2013). Given prior findings on the incentives facing analysts – in particular, analysts employed by investment banks – we assess independent analysts' price targets as

predictors of future price relative to the price targets of those I/B/E/S analysts who are employed by investment banks. We then cross-sectionally compare independent analysts' price targets with those of investment-bank analysts to determine whether independent analysts are also subject to optimistic bias that has been shown to be associated with recent returns, external financing, and accruals (Abarbanell 1991; Bradshaw, Richardson, and Sloan 2001, 2006). Next, we examine whether resources and expertise are differentially associated with independent analysts' price target bias and accuracy when compared with those of investment-bank analysts. Finally, to better understand independent analysts' price targets, we evaluate their fundamental inputs, i.e., LTG and EPS forecasts, relative to those of investment-bank analysts.

We use a sample of over 61,000 analysts' price targets from 2010 to 2015, and we find the following.[2] First, independent analysts predict future price with less optimism than investment-bank analysts. In particular, independent analysts' price targets are met or exceeded 74% of the time, whereas investment-bank analysts' price targets are met or exceeded 70% of the time (over the next 12 months). Second, this difference in price target optimism is particularly pronounced (i.e., independent analysts' price targets are even less optimistic) for firms with recent stock price momentum, higher market-to-book ratios, greater financing needs, or lower stock price volatility. Third, we find that analysts' forecast experience and frequency, brokerage size, and number of firms followed are all associated with price target optimism. More importantly, after controlling for these analyst characteristics, independent analysts' price targets are still less optimistic but no less accurate when compared with investment-bank analysts' price targets. Finally, in evaluating the fundamental inputs from which independent analysts form their price targets, we find that independent analysts' LTG forecasts may be

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[2] Our sample begins in 2010 due to the greater availability of independent analysts' price targets in recent years. We describe our sample selection process in section 3.

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responsible for the lower relative optimism in their price targets, insomuch as their LTG forecasts predict realized earnings growth with less optimism than do investment-bank analysts' LTG forecasts.[3]

Collectively, our results suggest that independent analysts, who may lack both the resources and many of the incentives facing investment-bank analysts, produce less optimistic price targets, in particular for firms with recent stock price momentum, higher valuation, or lower stock price volatility. Moreover, some of their firm valuation inputs – in particular, long-term growth forecasts – are less optimistic relative to investment-bank analysts' estimates. Prior research on financial analysts' outputs often examines only selected elements from their research reports, such as earnings forecasts, stock recommendations, or price targets—Asquith et al. (2005), which catalogs the contents of All-Star analysts' reports, is an exception.[4] Our study is the first to comprehensively examine independent analysts' price targets in conjunction with their fundamental inputs. Given the increasing investment in and proliferation of independent research following the Global Settlement, evidence on the relative quality of independent analysts' price targets is timely and relevant for investors and regulators. Additionally, our research explores how analysts' estimates of firm valuation vary based on the different incentives facing independent versus investment-bank analysts while controlling for analyst characteristics. Accordingly, investors as well as those interested in extending empirical research into firm valuation can benefit from the analysis undertaken in this study.

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[3] Consistent with prior literature on EPS forecasts (Gu and Xue 2008; Jacob et al. 2008), independent analysts' EPS forecasts exhibit less accuracy than investment-bank analysts' forecasts.

[4] A number of studies examine the interplay between analysts' *recommendations* and earnings forecasts (Bradshaw 2004; Ertimur, Sunder, and Sunder 2007; Brown and Huang 2013; Malmendier and Shanthikumar 2014; Kecskes, Michaely, and Womack 2016), while Bandyopadhyay, Brown, and Richardson (1995) and Da, Hong, and Lee (2016) investigate the relation between EPS forecast revisions and price target revisions. However, we are unaware of a study that examines both analysts' *price targets* and their fundamental inputs.

2. Development of Research Questions

Around the turn of the century, concerns about analysts' conflicting incentives led to calls for increased availability of independent analyst research and, eventually, the Global Analyst Research Settlement (the Global Settlement). Reached in April 2003, the Global Settlement required the payment of nearly $1.5 billion by 10 large investment banks, including $432.5 million to fund and distribute independent research to their clients over the next five years. Since 2003, the availability of independent analyst research has increased substantially. Given the proliferation of independent research since the Global Settlement, various academic studies investigate the quality of independent research. These studies generally conclude that the analysis provided by independent researchers underperforms that of sell-side analysts. For example, research suggests that independent analysts provide less accurate earnings forecasts (Gu and Xue 2008) and less predictive 'Hold' and 'Sell' stock recommendations (Barber et al. 2007) compared to investment-bank analysts.[5] In a recent working paper, Buslepp et al. (2014) conclude that independent analysts who were funded by the Global Settlement issue lower quality recommendations than those of non-funded independent research providers and non-independent providers in a 2004 to 2009 sample. Moreover, institutional anecdotes question the quality of research provided by independent providers.[6] Although free from many of the incentives facing investment-bank analysts, independent analysts may lack the resources, expertise, or access to private information that investment-bank analysts enjoy. For example,

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[5] Gu and Xue (2008) find evidence that independent analysts' EPS forecasts might better represent the market's earnings expectations, based on earnings-response coefficient tests.

[6] In an interview with one of this study's co-authors, a former managing director with a sanctioned investment bank referred to the funding of independent research required under the Global Settlement as "a waste of money."

Chen and Martin (2011) conclude that analysts whose employers lend to the companies they follow benefit from private information in forming EPS forecasts for those companies.

Despite these criticisms, we know very little about independent analysts' assessments of firm value. Prior literature evaluates sell-side analysts' price targets as predictors of price. Although these analysts' price targets are value relevant (Brav and Lehavy 2003; Asquith et al. 2005), Bradshaw et al. (2013) show that only 38% are met after a 12-month horizon, with 64% met at some time during the forecast horizon.[7] Gleason et al. (2013) suggest two explanations for why prior research finds analysts' published price targets to be of limited value as investment signals. First, analysts may set their price targets in order to justify their Buy-Sell recommendations. Second, even when analysts derive their price targets using accepted valuation techniques, price target quality can be compromised by inaccurate forecasts or other valuation model inputs. In their study, Gleason et al. (2013) infer valuation model use from the observed correlation between sell-side analysts' price targets and researcher-constructed stock valuation estimates. They find significant improvements in price target performance when analysts are inferred to be using a valuation model rather than a heuristic. This echoes the Bradshaw (2004) finding that DCF models based on analysts' consensus earnings forecasts may provide superior holding returns relative to solely relying on analysts' stock recommendations.[8]

Because independent analysts face different incentives than investment-bank analysts, they may form less biased and, therefore, higher quality price targets. However, independent analysts' lack of resources, expertise, and access to private information may hinder the quality

[7] Using an earlier, hand-collected sample, Asquith et al. (2005) find that 54% of price targets provided by Institutional Investor (II)-ranked analysts are met at some point during a 12-month horizon.
[8] Analysts' price targets were not considered in Bradshaw (2004) because of data availability limitations at the time.

of their price targets. Given these potentially conflicting effects, our first research question examines the extent to which independent analysts' price targets predict future price, as follows:

RQ1: How well do independent analysts' price targets predict future stock price relative to investment-bank analysts' price targets?

We next investigate firm characteristics that may be associated with the relative performance of independent and investment-bank analysts' price targets, independently as well as differentially. Optimism in analysts' forecasts and estimates has been associated with factors including recent returns (Abarbanell 1991; Ali, Klein, and Rosenfeld 1992; Elgers and Lo 1994), market-to-book ratio (Frankel and Lee 1998; Doukas, Kim, and Pantzalis 2002), firm size (Easton and Sommers 2007), external financing needs (Bradshaw et al. 2006), and accruals (Bradshaw et al. 2001).[9] Prior literature finds that optimism is associated with these factors for the broad population of sell-side financial analysts. However, it is unclear whether (1) independent analysts are subject to similar biases (given their differing incentives), or (2) whether the accuracy of independent and/or investment-bank analysts' price targets also vary based on these factors. We thus cross-sectionally compare independent analysts' price targets with those of investment-bank analysts to evaluate our second research question:

RQ2: How does the relative performance of independent analysts' and investment-bank analysts' price targets vary with firm characteristics?

We next investigate analyst characteristics that may be associated with the performance of independent and investment-bank analysts' price targets. Prior research has documented that expertise, resources, and access to private information is associated with the quality of analysts' forecasts. Mikhail, Walther, and Willis (1997) and Clement (1999) investigate whether

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[9] A related branch of literature ties analysts' optimism to incentives including investment banking affiliation (Ljungqvist, Marston, Starks, Wei, and Yan 2007) and trading volumes (Irvine 2000).

analysts' forecasts become more accurate with experience. They find that analyst forecast accuracy improves as analysts gain forecasting experience. Together they suggest that the positive relation between experience and performance is attributable to an improvement in analysts' ability to (1) analyze financial statements or recognize economic trends over time, or (2) establish better relationships with managers and thereby gain better access to private information (Drake and Myers 2011). Jacob, Lys, and Neale (1999) find that forecast accuracy increases with forecast frequency (a proxy for the amount of effort the analyst devotes to following a company), even after controlling for forecast timeliness.

Prior research also investigates the relation between the size of the brokerage house and the properties of analyst forecasts. Jacob et al. (1999) and Clement (1999) find that analysts from larger brokerage houses provide more accurate forecasts on average, and Drake and Myers (2011) find limited evidence that brokerage size is associated with the extent to which analysts incorporate available accounting information into their forecasts. Finally, Clement (1999) and Jacob et al. (1999) also find that analysts provide more accurate forecasts when they follow fewer firms and industries, seemingly because this smaller portfolio of firms may allow them to form closer relationships with managers.

In our third research question, we assess the optimism and accuracy of independent and investment-bank analysts' price targets while controlling for cross-sectional differences in the characteristics of the analysts:

RQ3: How well do independent analysts' price targets predict future stock price relative to investment-bank analysts' price targets after controlling for analyst characteristics?

Finally, to better understand independent analysts' price targets, we evaluate their fundamental inputs, i.e., LTG and EPS forecasts, relative to those of investment-bank analysts.

Fundamental analysis suggests that firm value is a function of forecasted earnings or cash flows, long-term growth, and an assumed discount rate or cost of capital (Wahlen, Baginski, and Bradshaw 2014; McKinsey & Company Inc., Koller, Goedhart, and Wessels 2010). Thus, an estimate of firm value is only as good as the estimates of its underlying components. Accordingly, whereas the literature currently focuses on financial analysts' price targets as predictors of firm value (Bradshaw et al. 2013; Gleason et al. 2013) or uses analysts' earnings forecasts as inputs to help estimate firm value (Frankel and Lee 1998), we attempt to comprehensively evaluate independent analysts' fundamental value estimates by assessing both price targets and their inputs concurrently. Thus, we build on literature that investigates the predictive power of EPS and LTG forecasts (e.g., Dechow et al. 2000; Botosan, Plumlee, and Wen 2011) to compare independent and investment-bank analysts' forecasts.[10]

With respect to LTG forecasts, prior literature generally finds that sell-side analysts' LTG forecasts are optimistically biased, in part due to the incentives facing analysts, and are of limited usefulness for valuation. Dechow et al. (2000) deem analysts' LTG forecasts as "overly optimistic", particularly the LTG forecasts issued by affiliated analysts. Similarly, Chan, Karceski, and Lakonishok (2003) find that I/B/E/S long-term growth forecasts are overly optimistic and are generally poor predictors of future growth, and Bradshaw, Drake, Myers, and Myers (2012) show that a random walk time-series forecast is more accurate than analysts' LTG forecasts for 2- and 3-year ahead earnings. In addition, analysts' LTG forecasts help explain the variation in their stock recommendations and are negatively associated with future excess returns (see Bradshaw 2004; Barniv, Hope, Myring, and Thomas 2009; La Porta 1996). Liu and Thomas (2000) find that, in explaining the variation in annual returns, analysts' LTG forecast

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[10] We are able to observe the cost of capital estimates of a subset of independent analysts but, to our knowledge, such estimates are generally not available for investment-bank analysts.

revisions add little to revisions in forecasts of next year's earnings. Reviews by Ramnath et al. (2008a; 2008b) suggest that analysts' LTG forecasts do not provide investors with useful information about firms' long-term earnings prospects. However, Gao and Wu (2014) find some evidence that LTG forecasts reflect analysts' expertise and contain some value-relevant information.

Given evidence in the broader analyst literature that sell-side analysts' recommendations and forecasts generally reflect analysts' incentives to stimulate investment banking business, generate trading commissions, and gain access to managers' private information, it is likely that the subset of investment-bank analysts' LTG forecasts are similarly affected by such biases.[11] Because independent analysts presumably lack these incentives, their LTG forecasts may predict future firm growth with less bias.[12] However, independent analysts may also have less expertise than investment-bank analysts, and as a result, may be less able to predict future earnings growth.

Prior research provides more clarity on the differences between the EPS estimates of independent analysts and investment-bank analysts, albeit for an earlier time period. Gu and Xue (2008) show that investment-bank analysts forecast earnings more accurately than do independent analysts in a 1989 to 2002 sample. Interestingly, Gu and Xue also find that independent analysts' forecasts better represent ex ante market expectations, relative to the forecasts of non-independent analysts. However, given the regulatory changes (e.g., Regulation Fair Disclosure and The Global Settlement) implemented since the turn-of-the-century, it is

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[11] See, for example, Lin and McNichols (1998), Irvine (2000), and Francis and Philbrick (1993). Asquith et al. (2005) note that analysts' favorable outlooks may stem from their concerns over personal compensation, relationships with company management, or underwriting pressures.

[12] Szakmary, Conover, and Lancaster (2008) document large positive bias in Value Line long-term earnings forecasts. As Value Line is a source of independent analyst research, these findings suggest that optimism in long-term forecasts is not entirely a result of sell-side incentives.

important to assess the optimism and accuracy of independent analysts' EPS forecasts during

our sample period in order to reconcile our sample with findings from prior literature.

Our fourth research question broadly investigates whether independent analysts provide

fundamental inputs that differ in quality from those provided by investment-bank analysts, as

follows:

> **RQ4: How well do independent analysts' EPS and LTG forecasts predict future earnings and earnings growth, respectively, relative to investment-bank analysts' EPS and LTG forecasts?**

3. Sample

To form the sample, we identify 300,832 analysts' price targets from 2010 to 2015.[13]

Our primary source of price targets is I/B/E/S; we supplement these with 17,741 price targets

obtained directly from Morningstar, an independent research provider, for the same time period.

We match the price targets to CRSP to obtain 12-month-ahead realized price as well as to

Compustat to measure several firm characteristics.

We are interested in the optimism and accuracy of independent analysts' price targets

relative to non-independent analysts. Our benchmarks for independent analysts' price targets,

as well as their long-term growth and EPS forecasts, are the estimates put forward by analysts

employed by investment banks, as these analysts are more likely to face the type of incentives

shown to be associated with the performance of analysts' forecasts and recommendations. We

thus limit the price target sample to the 129,470 analysts' price targets made for the 1,338

unique firms that are followed by both independent analysts and investment-bank analysts. We

define investment-bank analysts as those analysts employed by the top 25 investment banks,

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[13] We select this time period due to the substantial increase in the availability of independent analyst research beginning in 2010.

according to their equity underwriting, debt underwriting, or M&A advising market share rank, as in Corwin, Larocque, and Stegemoller (2017).

We also assess independent analysts' LTG and EPS forecasts relative to those of investment-bank analysts. Given that analysts generally update their EPS forecasts more frequently than their price targets (Bradshaw, Huang, and Tan 2014), and their price targets more frequently than their LTG forecasts, we allow for differences in the timing with which we obtain the most recent analyst LTG forecast or price target. That is, for price targets and LTG forecasts, we obtain the most recent estimates outstanding as of the first quarter announcement date. For EPS forecasts, we find the median of annual EPS forecasts made between the earnings announcement date for the fourth quarter of year t-1 and the first quarter earnings announcement date of year t. Our sample of EPS forecasts from 2010 to 2015 encompasses 42,385 forecasts for 1,395 firms while our sample of LTG forecasts from 2010 to 2014 comprises 7,542 forecasts for 808 firms. Table 1 Panel A provides details of our sample selection process.

[INSERT TABLE 1 HERE]

Table 1 Panel B also provides simple descriptive statistics for the price targets, EPS forecasts, and LTG forecasts in our sample. Panel B shows that the relative frequencies of the different forecasts vary substantially and documents that there is substantial optimism in *LTG* with average (median) expected earnings growth of 11.51 (11.33) percent.

4. Empirical Tests and Results

4.1 Price targets

To empirically test RQ1, we evaluate the performance of independent analysts' price targets. Our benchmark is the performance of investment-bank analysts' price targets, which

prior literature suggests are associated with analysts' stock recommendations (Bradshaw 2011) and have some success in predicting future stock price (Bradshaw et al. 2013) – particularly those price targets based on rigorous valuation models (Gleason et al. 2013).

We conduct this analysis for the sample of price targets for which we have non-missing price in the year following formation of the price targets.[14] For each analyst-firm combination, we take the average price target within six month periods (Jan – June, July – Dec, etc.) following Bradshaw et al. (2013). This results in 10,111 analyst-firm-periods for independent analysts and 51,346 analyst-firm-periods for investment-bank analysts, as shown in Panel A. Panel B then limits the sample to those 8,382 firm-periods with both independent and investment-bank analysts issuing price targets.

Like Bradshaw et al. (2014), we evaluate analysts' price targets on both an ex ante and ex post basis. We do this for both independent price targets (*PT_IND*) and investment-bank analysts' price targets (*PT_IB*). Ex ante, we compare independent analysts' and investment-bank analysts' price targets with concurrent price, whereas ex post we compare these price targets with future stock price.

Panel A of Table 2 shows that mean (median) *PT_IND* in our sample is 58.4 (41.5), and mean (median) *PT_IB* is 70.9 (48.5). This compares with mean (median) price of 52.0 (40.8) when the independent analysts' price targets are issued and of 57.5 (45.7) when the investment-bank analysts' price targets are issued.

[INSERT TABLE 2 HERE]

We measure price target optimism and accuracy using variables from the price target literature (Gleason et al. 2013; Bradshaw et al. 2013; Bradshaw et al. 2014). These include

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[14] We remove 9,270 price targets from the sample that experience a stock split within 12 months of the price target forecast. *PT_IND* and *Price* are truncated at 1% and 99%.

PT_OPT1, an ex ante measure of optimism, which is the implied return of the independent analyst's or the median investment-bank analyst's price target relative to current price, and is calculated as ($PT/P - 1$), where P is actual price on the date of the price target issuance. *PT_OPT2* is the percentage of trading days in the next 12 months that stock prices are below *PT*. *PT_OPT3* is an indicator variable equal to one if the maximum stock price over the next 12 months is below *PT*. Both *PT_OPT2* and *PT_OPT3* are ex post measures of price target optimism. As a measure of accuracy, *PT_ACCU* is calculated as –1 multiplied by the absolute value of ($P12 - PT$)/P, where $P12$ is the stock price from 12 months following the price target release date. In Panel B of Table 2, medians are reported for all measures except for *PT_OPT3*, where we report the mean. *Difference* is calculated as the independent measure less the investment-bank analysts' measure so that higher *Difference* for the optimism measures (*PT_OPT1*, *PT_OPT2*, and *PT_OPT3*) indicates that the independent forecast is more optimistic than the investment-bank analysts' forecast, whereas higher *Difference* for *PT_ACCU* indicates that the independent price target is more accurate than the investment-bank analysts' price target.

In Panel B of Table 2, we find that implied returns relative to current price (in *PT_OPT1*) are lower for independent analysts' price targets than for investment-bank analysts' price targets in 2011 through 2015 as well as overall, suggesting less ex ante optimism from independent analysts. Specifically, from the *PT_OPT1* variable we can see that when price targets are issued, the implied return for independent analysts is 5.5%, which is statistically lower than the implied return for investment-bank analysts of 11.0%. This compares with evidence in the Asquith et al. (2005) 1997 to 1999 sample, in which price targets by All-Star analysts average 133% percent of stock price; the lower price targets in our sample may reflect a more recent time

period or that we do not limit the sample to All-Star analysts. Consistent with this interpretation, our ex post analysis reveals significantly fewer instances of the independent price target not being reached in the ensuing 12 months (in *PT_OPT2* and *PT_OPT3)* relative to the investment-bank analysts' price target.[15] With respect to price target accuracy, we find that *PT_ACCU* is lower for independent analysts' price targets than for investment-bank analysts' price targets in 2010 and each year from 2012 through 2014, as well as overall.[16]

While much of our analysis is limited to those firms for which we can observe both independent and investment-bank analyst estimates in I/B/E/S, in additional analyses, we also consider the price targets made for firms covered only by independent analysts or only by investment-bank analysts. Panel C of Table 2 presents the price target optimism and accuracy measures for each of the following groups: all firms covered by independent analysts (column 1); firms covered by independent but not investment-bank analysts (column 2); firms covered by both independent and investment-bank analysts (columns 3 and 4); and firms covered by investment-bank but not independent analysts (column 5). In general, we observe similar levels of optimism and accuracy by independent analysts, for all the firms covered by independent analysts and the firms covered by both independent and investment-bank analysts. Interestingly, for the investment-bank analysts, we observe some evidence of lower levels of optimism for the firms covered by both independent and investment-bank analysts than for the firms covered

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[15] Given that independent analysts' fundamental value estimates are generally lower than investment-bank analysts' price targets (as shown in Panel A of Table 2), we are mindful of Gleason et al.'s (2013, 84) commentary: "the probability of a stock attaining the price target is inversely related to the level of optimism exhibited by the analyst, as measured by the projected stock price change at publication of the research report."

[16] The aggregation principle (Brown 1993) may work in favor of the investment-bank analysts' price targets, to the extent that using an aggregate of multiple targets results in a reduction of idiosyncratic noise or errors (Philbrick and Ricks 1991; Ramnath, Rock, and Shane 2005). In untabulated analyses, we compare individual independent analysts' price targets with individual investment-bank analyst's price target. We continue to find that independent analysts provide less optimistic but less accurate price targets than investment-bank analysts.

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only by investment-bank analysts, which appears to be consistent with the disciplining role of independent analysts documented in Gu and Xue's (2008) study of earnings forecasts.

Taken together, our findings suggest that independent analysts' price targets predict future stock price with less optimism than do investment-bank analysts' price targets, consistent with independent analysts facing different incentives than investment-bank analysts. Our results also suggest that independent analysts predict future stock price with less accuracy than do investment-bank analysts. Our ensuing tests evaluate research questions two through four.

4.2 Cross-sectional analysis of independent and investment-bank analysts' price targets and firm characteristics

We now evaluate cross-sectional differences in the optimism and accuracy of independent analysts' and investment-bank analysts' price targets. In this analysis, our variable of interest is the difference in optimism between the independent analyst and the investment-bank analysts. Specifically, we calculate the difference between each of *PT_OPT1*, *PT_OPT2*, and *PT_ACCU* for the median independent analyst and for the median investment-bank analyst. For *PT_OPT3*, we calculate the difference between *PT_OPT3* for the independent analyst and for the mean investment-bank analyst. We regress these difference variables on recent returns, market-to-book, firm size, accruals, and external financing needs following prior literature that associates optimistic bias in analysts' forecasts and estimates with these factors, as in the following equation:

$$Difference_{it} = \alpha_0 + \alpha_1 \Delta XFIN_{it} + \alpha_2 logMV_{it} + \alpha_3 MTB_{it} + \alpha_4 TAcc_{it} \quad (1)$$
$$+ \alpha_5 BHR_{it} + \alpha_6 STD\_RET_{it} + \alpha_7 NANALYST_{it} + \epsilon_{it}$$

We perform this analysis to compare independent analysts' price targets with those of investment-bank analysts to determine whether independent analysts are also subject to the optimistic bias that has been shown to be associated with recent returns, external financing, and accruals (Abarbanell 1991; Bradshaw et al. 2001, 2006). In equation (1), $\Delta XFIN$ is a measure of changes in the firm's external (i.e., equity and debt) financing based on the statement of cash flows, as in Bradshaw et al. (2006). *MV* is the market value of equity; *MTB* is the market to book ratio; and *TAcc* is total accruals. *BHR* is the recent buy-and-hold return, and *STD_RET* is the standard deviation of returns for the firm over the six months prior to the measurement of price target performance, while *NANALYST* is the logarithm of the number of I/B/E/S analysts issuing price targets in the prior twelve months.

Table 3 presents our findings. Panels A, B, and C respectively present the results for the *PT_OPT1*, *PT_OPT2*, and *PT_OPT3* optimism measures while Panel D presents the results for the *PT_ACCU* accuracy measure. Across the three optimism measures, we find consistent evidence of a negative relation between the difference in optimism between independent and investment-bank analysts and recent returns (*BHR*). In other words, independent analysts' price target optimism is relatively lower for firms whose stock prices have recently performed well.[17] We find evidence for two of the optimism measures, *PT_OPT1* and *PT_OPT2*, that independent analysts' price target optimism is relatively higher for firms with greater stock price volatility (*STD_RET*). For two of the optimism measures, *PT_OPT2* and *PT_OPT3*, we find that independent analysts' price target optimism is relatively lower for firms with greater financing needs (*$\Delta XFIN$*) and higher valuations (*MTB*). In Panel D, we do not find evidence of cross-sectional differences in independent analysts' relative price target accuracy (i.e., the difference

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[17] In additional, untabulated analyses we find that this association with recent returns is significantly stronger for firms with negative recent returns.

in *PT_ACCU* across independent and investment-bank analysts). From this analysis we conclude that, in response to RQ2, independent analysts provide price targets that are even less optimistic than those of investment-bank analysts for firms with higher recent returns, higher valuations, greater financing needs, and lower return volatility. This suggests that independent analysts are less subject to some of the optimistic biases that have been documented in prior literature for sell-side analysts.

[INSERT TABLE 3 HERE]

4.3 Cross-sectional analysis of independent and investment-bank analysts' price targets and analyst characteristics

Our tests of RQ1 suggest that independent analysts' price targets predict future stock price both with less optimism and with less accuracy, than do investment-bank analysts. We motivate our tests of optimism by suggesting that independent analysts face different incentives than investment-bank analysts, and thus, may lack the inventive to issue optimistic forecasts. At the same time, we suggest that independent analysts may issue relatively less accurate price targets because they lack the expertise, resources, and access to private information possessed by investment-bank analysts.

In order to provide additional insights on the factors associated with the differential optimism and accuracy of independent vs. investment-bank analysts' price targets, we compare the average experience (*FEXP*), frequency of EPS forecast issuance (*FREQ*), brokerage size (*BSIZE*), and number of firms covered (*NFIRMS*) for independent analysts and investment-bank analysts, as well as the significance of comparisons of these variables across our subsamples. Panel A of Table 4 provides descriptive statistics for *FEXP*, *FREQ*, *BSIZE*, *NFIRMS*. We note

that, on average, independent analysts have significantly less experience and less frequent EPS

forecasts, come from smaller brokerages, and cover fewer firms than investment-bank analysts

(all $p < 0.01$), generally consistent with a relative lack of experience and available resources for

independent analysts.

[INSERT TABLE 4 HERE]

Next, we regress each of our optimism measures and our measure of accuracy on an

indicator variable (*IND*) equal to 1 if the analyst is independent or 0 if the analyst is from an

investment bank. We expect a negative coefficient on *IND* in both the price target optimism and

accuracy tests. We then re-estimate each regression of price target optimism/accuracy on *IND*

after including our measures of analyst characteristics as controls. We estimate versions of the

following equation:

$$PT\_OPT_{it} / PT\_ACCU_{it} = \begin{array}{l} \alpha_0 + \alpha_1 IND_{it} + \alpha_2 FEXP_{it} + \alpha_3 FREQ_{it} + \alpha_4 BSIZE_{it} \\ + \alpha_5 NFIRMS_{it} + \epsilon_{it} \end{array} \quad (2)$$

This regression analysis provides insights on whether differences in optimism and

accuracy across our subsamples are driven by (1) differences in the characteristics (e.g.,

experience and resources) of these analysts, or (2) other differences between independent and

investment-bank analysts. We do not hypothesize signs for the analyst characteristics variables.

Although prior literature generally finds that analysts' earnings forecast accuracy is positively

associated with analyst experience, forecast frequency, and broker size, and negatively

associated with the size of the analyst's coverage portfolio, it is unclear whether analysts' *price*

target optimism and accuracy will be similarly associated with these analyst characteristics.

In Panel B of Table 4, for ex ante price target optimism (*PT_OPT1*), we find a significant

negative association with each of experience, brokerage size, and the number of firms covered

(all p < 0.01). Controlling for these characteristics, we find that independent analysts' price targets remain less optimistic than investment-bank analysts' price targets (p < 0.01). For the ex post measures of optimism (i.e., *PT_OPT2* and *PT_OPT3*), we find that more frequent EPS forecasts are positively associated with optimism, whereas brokerage size is negatively correlated with optimism. Additionally, for the *PT_OPT3* measure, we find that experience is positively associated with ex post optimism (p < 0.01). Controlling for all of these measured analyst characteristics, we continue to find evidence that independent analysts provide less optimistic forecasts than investment-banks analysts (all p < 0.01).[18]

Finally, with respect to price target accuracy, *PT_ACCU*, we find that analysts with more experience and more firms covered issue more accurate price targets (all p < 0.01). Interestingly, when we control for all of the measured analyst characteristics, we no longer find that independent analysts issue less accurate price targets than those issued by investment-bank analysts (p > 0.10). In combination, our results suggest that independent analysts provide less accurate forecasts due to their relative lack of experience and lower coverage compared to investment-bank analysts.[19] However, the measurable characteristics of independent analysts do not explain the relatively lower optimism of their price targets compared with those of investment-bank analysts.

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[18] In untabulated analyses, we find that *BSIZE* has a significantly stronger association with both the ex ante and ex post price target optimism measures, while *FEXP* has a significantly stronger association with the ex post price target price optimism measures, of independent analysts.

[19] In untabulated analyses, we observe that the significant negative coefficient on *IND* for the *PT_ACCU* model becomes insignificant after controlling for only *FEXP*, only *NFIRMS*, or both *FEXP* and *NFIRMS*. Thus, it appears that independent analysts' relative inaccuracy is a function of both their forecast experience and coverage portfolios.

4.4 EPS and LTG forecasts

In order to investigate the factors contributing to differences in price targets for independent vs. investment-bank analysts, we analyze independent analysts' EPS and LTG forecasts – the inputs to their price targets – as part of RQ4.

EPS

Although prior research suggests that investment-bank analysts forecast earnings more accurately than do independent analysts in a pre-Global Settlement sample, it is important to assess the optimism and accuracy of independent analysts' EPS forecasts during our sample period in order to reconcile our sample with findings from prior literature.

For this analysis, we calculate both EPS forecast optimism and forecast accuracy for each of the median independent analyst and the median investment-bank analyst following the same firm-year in our sample. EPS optimism (*EPS_OPT*) is defined as (Forecast – Actual)/Price, the signed EPS forecast error, and is increasing in optimism relative to actual realized earnings, while EPS accuracy (*EPS_ACCU)* is defined as -|*EPS_OPT*|, the reverse-coded unsigned EPS forecast error, and thus is increasing in accuracy relative to realized earnings.[20] We also evaluate *Difference*, which is the independent analyst's forecast optimism or accuracy less the median investment-bank analyst forecast optimism or accuracy. Positive *Difference* for *EPS_OPT* indicates greater optimism for the independent analyst's forecast relative to the median investment-bank analyst forecast, whereas positive *Difference* for *EPS_ACCU* indicates the independent forecast is more accurate than the median investment-bank analyst forecast.

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[20] Inferences are similar using unscaled EPS forecast errors.

Table 5 shows no statistical difference between independent analysts' and investment-bank analysts' EPS forecasts based on means. Based on medians, however, independent analysts appear to forecast EPS less optimistically and less accurately than do investment-bank analysts. Median *EPS_OPT* for independent analysts is -0.0001 and for the median investment-bank analyst is -0.0003; this difference in accuracy is statistically significant ($p < 0.01$). Median *EPS_ACCU* for independent analysts is -0.0058 and for the median investment-bank analyst is -0.0051; this difference in accuracy is statistically significant ($p < 0.01$). The latter result echoes the Gu and Xue (2008) conclusion that independent analysts' EPS forecasts are less accurate.

[INSERT TABLE 5 HERE]

LTG

We next evaluate independent analysts' long-term growth forecasts. We evaluate long-term growth forecasts relative to realized EPS growth across varying horizons, similar to (Dechow et al. 2000). We compare independent analysts' LTG forecasts (*LTG_IND*) in our sample with the median of LTG forecasts made by investment-bank analysts (*LTG_IB*) following the same firm in the same year. Following Dechow and Sloan (1997), we calculate actual growth (*GROWTH$_{it-T}$*) by fitting a least-squares growth line through the logarithm of the four, five, or six annual actual earnings observations in I/B/E/S from year *t* (the year in which the LTG forecasts are published) through year *T*, where *T* = 3 or 4 or 5. In other words, we compare independent analysts' LTG forecasts and concurrent investment-bank analysts' LTG forecasts with realized EPS growth for the ensuing 3, 4, and 5 years.[21] If I/B/E/S actual earnings

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[21] For 3-year growth, we fit a least squares growth line through the logarithm of the four annual earnings observations from year *t* through year *t + 3*. For 4-year (5-year) growth, we fit a least squares growth line through the logarithm of the five (six) annual earnings observations from year *t* through year *t + 4* (*t+5*).

per share are missing or negative for year t or year 3 (or 4 or 5), then a 3-year (or 4- or 5-year) growth rate is not calculated for that observation.

Focusing on the 2,428 LTG firm-year observations for which we have a consensus independent and investment bank forecast in the sample and for which 3-year realized EPS growth can be calculated, Panel A of Table 6 shows that independent analysts' LTG forecasts have a mean (median) value of 8.00% (10.30%). This compares with a mean (median) value of 13.59% (11.80%) for the median investment-bank analysts' LTG forecasts. Mean (median) 3-year realized EPS growth is 7.36% (8.02%) across our sample. Comparisons are similar for both the 4- and 5-year realized EPS growth horizon.

[INSERT TABLE 6 HERE]

Both the independent and investment-bank analysts' LTG forecasts are positively correlated (at the 1% level) with realized long-term EPS growth based on Pearson correlation coefficients. As shown in Panel B of Table 6, the Pearson correlation between *LTG_IND* and *GROWTH$_{it-3}$*, is 0.28 and the Pearson correlation between *LTG_IB* and *GROWTH$_{it-3}$* is 0.27. The Spearman correlation coefficients are not significantly different from zero at the 1% level, but they are positive and significant at the 5% level.

We next turn to LTG forecast optimism and forecast accuracy for independent and investment-bank analysts. As above, *LTG_OPT* equals (Forecast – Actual), or the signed forecast error, and *LTG_ACCU* equals -|*LTG_OPT*|, or the reverse-coded absolute forecast error. *Difference* is the independent analysts' LTG forecast error less investment-bank analysts' forecast error; positive *Difference* for *LTG_OPT* indicates higher optimism for the median independent analyst's forecast relative to the median investment-bank analyst's forecast,

whereas positive *Difference* for *LTG_ACCU* indicates the independent analyst's forecast is more accurate than the median investment-bank analyst's forecast.

Panels C and D of Table 6 respectively show mean and median accuracy (*LTG_ACCU*) and optimism (*LTG_OPT*) for independent and investment-bank analysts relative to realized EPS growth for the 3, 4, and 5 years following the date of LTG forecasts. Focusing on the 3-year horizon, analysis of *LTG_OPT* shows that independent analysts' LTG forecasts are significantly less optimistic than the median investment-bank analyst's LTG forecasts based on both mean and medians, whereas the accuracy (*LTG_ACCU*) of independent analysts' LTG forecasts is significantly lower than that of investment-bank analysts' forecasts. At the 4- and 5-year horizon, independent analysts' LTG forecasts are again significantly less optimistic and significantly less accurate based on both means and medians. Panel E provides yearly analysis of long-term growth forecasts for 2010 through 2014. Overall, our results suggest that independent analysts' LTG forecasts are less optimistic and less accurate than LTG forecasts provided by investment-bank analysts.

5. Conclusion

This study provides new evidence regarding the relative quality of independent analyst research for firm valuation in a post-Global Settlement period. Using a dataset containing independent and investment-bank analysts' price targets from 2010 to 2015, we examine the optimism and accuracy of independent analysts' price targets relative to investment-bank analysts' price targets, as well as the effects of cross-sectional firm and analyst differences on the relative optimism and accuracy of these analysts' price targets. Finally, we examine the

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optimism and accuracy of independent analysts' long-term growth forecasts and EPS forecasts (i.e., the fundamental inputs to their price targets).

Consistent with the motivation behind the Global Settlement, we find that independent analysts predict firm value with less optimism than do investment-bank analysts, particularly for firms with recent stock price momentum, higher valuations, and greater stock price volatility. The lower accuracy of independent analysts' price targets reflect their relative lack of experience and resources. Subsequent analyses suggest that independent analysts' less optimistic price targets stem from their less optimistic long-term growth forecasts.

In addition to validating the more valuation-driven analysis of independent analysts, our results inform the broad literatures that use estimates of expected firm value, EPS, and LTG to test other relationships in the accounting and finance domains. Our paper suggests alternative proxies for price targets and LTG estimates that are less optimistically biased than more commonly used proxies. Collectively, our results suggest that independent analysts provide incrementally useful estimates of firm value and long-term growth.

APPENDIX

Variable Definitions

Variable	Definition
BHR	Buy and hold returns over the six months preceding the six months for which we average price target performance
BSIZE	The number of analysts appearing in I/B/E/S during year t for analyst i's brokerage house
EPS_ACCU	-|EPS Forecast – Actual|/Price
EPS_IB	EPS forecast for the upcoming fiscal year, formed from the median of the most recent EPS forecast in I/B/E/S for each investment-bank analyst following the firm, for forecasts issued between the earnings announcement date (RDQ in Compustat) for quarter 4 of year t-1 and the earnings announcement date for quarter 1 of year t.
EPS_IND	EPS forecast for the upcoming fiscal year, formed from the median of the most recent EPS forecast in I/B/E/S for each independent analyst following the firm, for forecasts issued between the earnings announcement date (RDQ in Compustat) for quarter 4 of year t-1 and the earnings announcement date for quarter 1 of year t.
EPS_OPT	(EPS Forecast – Actual)/Price
FEXP	The number of consecutive years for which analyst i appears in I/B/E/S following firm j as of year t
FREQ	The number of EPS forecasts that analyst i issues for firm j during year t
GROWTH$_{it-T}$	Calculated following Dechow and Sloan (1997) by fitting a least-squares growth line through the logarithm of the four or five or six annual actual earnings observations in I/B/E/S from year *t*, the year in which the price target is issued, through year *T*, where *T* = 3 or 4 or 5

Variable	Definition
IND	Indicator variable equal to 1 if the analyst is independent or 0 if the analyst is from an investment bank
LTG_ACCU	-|LTG Forecast – Actual|
LTG_IB	Long-term growth forecast formed from the median of the most recent LTG forecast in I/B/E/S for each investment-bank analyst following the firm, that is issued in the twelve months preceding the first quarter earnings announcement date (RDQ) for year *t*
LTG_IND	Long-term growth forecast formed from the median of the most recent LTG forecast in I/B/E/S for each independent analyst following the firm, that is issued in the twelve months preceding the first quarter earnings announcement date (RDQ) for year *t*
LTG_OPT	(LTG Forecast – Actual)
MTB	MV divided by book value of equity (CEQQ in Compustat) from the last fiscal quarter prior to the six months for which we average price target performance
MV	Market value of equity calculated as the absolute value of prc × shrout as of the quarter-end prior to the six months for which we average price target performance, retrieved from CRSP
NANALYST	Logarithm of the number of analysts issuing price targets in I/B/E/S in the twelve months prior to the six months for which we average price target performance
NFIRMS	The number of firms followed by analyst i in I/B/E/S during year t
Price	Stock price on the date of the price target issuance, retrieved from the CRSP daily stock file
PT_ACCU	Price target accuracy, calculated as –1 multiplied times the absolute value of (P12 – PT)/P, where P12 is the stock price from 12 months following the price target release date

Variable	Definition
PT_IB	Median price target formed from the outstanding price targets in I/B/E/S for investment-bank analysts following the firm
PT_IND	Median price target formed from the outstanding price targets for independent analysts following the firm
PT_OPT1	Price target optimism, measured as the implied return of the independent analyst's or investment-bank analysts' price target relative to current price, calculated as (PT/P – 1), where P is actual price at the time of the price target issuance
PT_OPT2	Price target optimism, measured as the percentage of trading days in the next 12 months that stock prices are below PT
PT_OPT3	Price target optimism, measured as an indicator variable equal to one if the maximum stock price over the next 12 months is below PT
STD_RET	Standard deviation of returns over the six months prior to the six months for which we average price target performance
TAcc	Total accruals, measured using Compustat variables (IBC - OANCF)/SALE at the fiscal year end prior to the six months for which we average price target performance
ΔXFIN	ΔEquity + ΔDebt where ΔEquity = (SSTK - PRSTKC - DV)/AVG_AT and ΔDebt = (DLTIS - DLTR - DLCCH)/AVG_AT, as in Bradshaw, Richardson, and Sloan (2006). Measured over the fiscal year overlapping the six months for which we average price target performance.

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TABLE 1

Sample selection and descriptive statistics

This table presents details of our sample selection (in Panel A) as well as descriptive statistics for the period 2010 to 2015 (in Panel B). In Panel B, number of observations refers to the total number of individual price targets or EPS/LTG forecasts in our sample. Variable descriptions are in the Appendix.

Panel A: Sample selection

Total price targets issued by investment banks and independents in 2010 to 2015	300,832
Number of price targets with non-missing 12-month ahead CRSP price, without stock splits	256,676
Number of price targets after merging with Compustat	246,630
Number of price targets after removal of investment-bank price targets without a corresponding independent price target in the same period (or vice-versa)	129,470
Number of investment-bank analysts' price targets	107,743
Number of independent analysts' price targets	21,727

Panel B: Descriptive statistics

	Number of obs	Mean	Std Dev	Min	25%	Median	75%	Max
Price Target	129,470	72.18	205.67	0.30	29.60	48.73	76.00	8,592.27
EPS Forecast	42,385	2.79	17.67	-1,557.00	1.30	2.40	4.00	92.10
LTG Forecast	7,542	11.51	31.49	-372.10	7.00	11.33	16.11	1,436.40

TABLE 2
Analysis of price targets

This table assesses 129,470 independent analysts' price targets (*PT_IND*) and investment-bank analysts' price targets (*PT_IB*). For each analyst-firm combination in the sample, we take the average of *PT_OPT1*, *PT_OPT2*, *PT_OPT3*, and *PT_ACCU* within six month periods (Jan – June, July – Dec, etc.) following Bradshaw et al. (2013). This results in 10,111 analyst-firm-periods for independent analysts and 51,346 analyst-firm-periods for investment-bank analysts, as shown in Panel A. Panel B then limits the sample to those 8,382 firm-periods with both independent and investment-bank analysts issuing price targets. Panel C considers the following samples: all firms covered by independent analysts (column 1); those firms covered by independent analysts but not covered by investment-bank analysts (column 2); those firms covered by both independent and investment-bank analysts (columns 3 and 4); and those firms covered by investment-bank analysts but not covered by independent analysts (column 5).

Panel A presents descriptive statistics for each of *PT_IND* and *PT_IB*, as well as price on the date that the independent or investment-bank price target is issued. Panels B and C provide price target optimism and accuracy measures, following prior literature. *PT_OPT1* is the implied return of the price target relative to current price, computed as ($PT/P - 1$). *PT_OPT2* is the percentage of trading days in the next 12 months that stock prices are less than the price target. *PT_OPT3* is an indicator variable equal to one if the maximum stock price over the next 12 months is smaller than the price target. *PT_ACCU* is the absolute price target forecast error, calculated as $-|(P12 - PT)/P|$. *Difference* is calculated as the independent measure less the investment-bank analysts' measure; positive *Difference* for *PT_OPT* indicates greater optimism for the independent price target relative to the median investment-bank analyst price target while positive *Difference* for *PT_ACCU* indicates greater accuracy for the independent analyst price target. In Panels B and C, medians are reported for all measures except for the *PT_OPT3* indicator variable, where we report the mean.

*, **, and *** represent significance at the 10%, 5%, and 1% level, respectively. Variable descriptions are in the Appendix.

TABLE 2 (continued)

Panel A: Median independent analyst and median investment-bank analyst price targets, and actual price at the time the price target is issued

	Number of analyst-firm periods	Mean	Std Dev	Min	25%	Median	75%	Max
PT_IND	10,111	58.4	147.2	0.3	25.0	41.5	66.8	6,806.9
Price	10,111	52.0	55.7	0.9	23.5	40.8	64.4	1,317.3
PT_IB	51,346	70.9	185.6	0.5	30.0	48.5	76.0	8,592.3
Price	51,346	57.5	61.9	0.8	27.2	45.7	70.5	1,351.8

Panel B: Price target optimism and accuracy measures

		Number of firm periods	PT_OPT1		PT_OPT2		PT_OPT3		PT_ACCU	
2010	*PT_IND*		0.146		0.644		0.293		-0.264	
	PT_IB	1,031	0.137		0.645		0.258		-0.244	
	Difference		0.007		0.000		0.036	***	-0.012	***
2011	*PT_IND*		0.102		0.768		0.360		-0.246	
	PT_IB	1,557	0.130		0.791		0.381		-0.230	
	Difference		-0.018	***	0.000	***	-0.021	**	-0.003	
2012	*PT_IND*		0.085		0.500		0.238		-0.267	
	PT_IB	1,402	0.117		0.578		0.223		-0.214	
	Difference		-0.018	*	-0.006	***	0.015		-0.019	***
2013	*PT_IND*		0.004		0.249		0.132		-0.239	
	PT_IB	1,431	0.085		0.494		0.188		-0.194	
	Difference		-0.061	***	-0.137	***	-0.056	***	-0.030	***
2014	*PT_IND*		0.004		0.378		0.194		-0.241	
	PT_IB	1,492	0.104		0.693		0.287		-0.201	
	Difference		-0.089	***	-0.166	***	-0.093	***	-0.020	***
2015	*PT_IND*		0.047		0.703		0.294		-0.213	
	PT_IB	1,469	0.109		0.845		0.417		-0.208	
	Difference		-0.064	***	-0.064	***	-0.123	***	0.010	
All Years	*PT_IND*		0.055		0.536		0.251		-0.243	
	PT_IB	8,382	0.110		0.689		0.296		-0.214	
	Difference		-0.043	***	-0.041	***	-0.045	***	-0.013	***

TABLE 2 (continued)

Panel C: Price target optimism and accuracy measures across varying samples of firms

	All firms covered by independent	Firms covered by independent but not IB	Firms covered by independent and IB		Firms covered by IB but not independent
	1	2	3	4	5
	PT_IND	**PT_IND**	**PT_IND**	**PT_IB**	**PT_IB**
# of firm periods	9,324	942	8,382	8,382	28,454
PT_OPT1	0.058	0.114	0.055	0.110	0.135
PT_OPT2	0.552	0.736	0.536	0.689	0.768
PT_OPT3	0.261	0.343	0.251	0.296	0.167
PT_ACCU	-0.247	-0.296	-0.243	-0.214	-0.258

TABLE 3
Analysis of firm characteristics

This table assesses cross-sectional variation in the difference in optimism and accuracy for the price targets formed by independent analysts and investment-bank analysts for the 5,993 firm periods for which we have a median price target for both independent and investment-bank analysts and non-missing independent variables. Panel A presents results for *PT_OPT1*, which measures ex ante optimism. Panel B presents results for *PT_OPT2,* which measures ex post optimism based on the percentage of trading days in the next 12 months that stock prices are below PT. Panel C presents results for *PT_OPT3*, which measures ex post optimism based on an indicator variable equal to one if the maximum stock price over the next 12 months is below PT. Panel D presents results for *PT_ACCU*, which measures ex post price target accuracy. In all of these panels, the 'difference' column is calculated by subtracting the investment-bank analyst measure from the independent analyst measure. Thus, positive *Difference* for optimism measures indicates greater optimism for the independent price target relative to the median investment-bank analyst price target, whereas positive *Difference* for accuracy measures indicates greater accuracy for the independent analyst price target.

Following prior literature that associates optimistic bias in analysts' forecasts with several firm-specific factors, we regress the difference variables on external financing needs, firm size, market-to-book, accruals, recent returns, the standard deviation of returns, and analyst following. The sample is based on our sample of independent price targets for which there are non-missing investment-bank analyst price targets, and is limited to those firms for which we have non-missing values of the independent variables in the regression equation below:

$$Difference_{it} = \alpha_0 + \alpha_1\, \Delta XFIN_{it} + \alpha_2\, logMV_{it} + \alpha_3\, MTB_{it} + \alpha_4\, TAcc_{it} + \alpha_5 BHR_{it}$$
$$+ \alpha_6 STD_{RET_{it}} + \alpha_7 NANALYST_{it} + \epsilon_{it}$$

*, **, and *** represent significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are clustered by firm and t-statistics are reported in parentheses. Variable descriptions are in the Appendix.

TABLE 3 (continued)

Panel A: Optimism (*PT_OPT1*) regressions

	Difference in PT_OPT1		PT_OPT1_IND		PT_OPT1_IB	
	(1)		(2)		(3)	
Intercept	-0.057		0.092		0.149	
	(-0.80)		(0.72)		(1.21)	
ΔXFIN	-0.027		1.487		1.515	
	(-0.17)		(0.99)		(1.12)	
log(MV)	-0.015		-0.096		-0.080	
	(-1.28)		(-1.02)		(-0.95)	
MTB	0.000		-0.004		-0.004	
	(-0.08)		(-0.93)		(-0.83)	
TAcc	-0.017		-2.221		-2.204	
	(-0.05)		(-1.09)		(-1.19)	
BHR	-0.104	*	0.066		0.169	
	(-1.73)		(0.20)		(0.57)	
STD_RET	0.635	***	1.370	***	0.735	**
	(2.96)		(4.52)		(2.42)	
NANALYST	0.040		0.234		0.194	
	(1.36)		(1.03)		(0.94)	
N	5,993		5,993		5,993	
Adjusted R^2	0.002		0.011		0.012	

TABLE 3 (continued)

Panel B: Optimism (*PT_OPT2*) regressions

	Difference in PT_OPT2		PT_OPT2_IND		PT_OPT2_IB	
	(1)		(2)		(3)	
Intercept	-0.082		0.225	***	0.307	***
	(-1.42)		(3.54)		(6.03)	
ΔXFIN	-0.182	***	-0.013		0.169	**
	(-2.66)		(-0.16)		(2.53)	
log(MV)	-0.015	**	0.009		0.024	***
	(-2.14)		(1.13)		(3.94)	
MTB	-0.005	***	-0.007	***	-0.001	
	(-2.95)		(-3.43)		(-1.06)	
TAcc	0.004		-0.074		-0.078	*
	(0.07)		(-1.22)		(-1.80)	
BHR	-0.233	***	-0.235	***	-0.002	
	(-12.14)		(-10.51)		(-0.09)	
STD_RET	0.826	***	1.839	***	1.013	***
	(5.49)		(10.92)		(7.78)	
NANALYST	0.027		0.037	*	0.010	
	(1.58)		(1.92)		(0.67)	
N	5,993		5,993		5,993	
Adjusted R^2	0.040		0.056		0.023	

TABLE 3 (continued)

Panel C: Optimism (PT_OPT3) regressions

	Difference in PT_OPT3		PT_OPT3_IND		PT_OPT3_IB	
	(1)		(2)		(3)	
Intercept	0.081		-0.021		-0.101	**
	(1.41)		(-0.35)		(-2.16)	
$\Delta XFIN$	-0.163	**	-0.010		0.153	**
	(-2.50)		(-0.15)		(2.43)	
log(MV)	-0.013	*	0.022	***	0.035	***
	(-1.75)		(2.84)		(5.76)	
MTB	-0.004	***	-0.006	***	-0.002	
	(-2.61)		(-3.44)		(-1.27)	
$TAcc$	-0.011		-0.069		-0.058	
	(-0.19)		(-1.13)		(-1.20)	
BHR	-0.218	***	-0.210	***	0.007	
	(-9.01)		(-8.72)		(0.36)	
STD_RET	0.204		1.255	***	1.050	***
	(1.34)		(7.92)		(7.67)	
$NANALYST$	0.000		-0.003		-0.003	
	(0.00)		(-0.17)		(-0.18)	
N	5,993		5,993		5,993	
Adjusted R^2	0.021		0.031		0.024	

TABLE 3 (continued)

Panel D: Accuracy (*PT_ACCU*) regressions

	Difference in PT_ACCU		PT_ACCU_IND		PT_ACCU_IB	
	(1)		(2)		(3)	
Intercept	-0.098		-0.529	***	-0.431	***
	(-1.50)		(-4.16)		(-3.48)	
ΔXFIN	-0.067		-1.621		-1.554	
	(-0.42)		(-1.08)		(-1.15)	
log(MV)	0.011		0.115		0.104	
	(0.98)		(1.23)		(1.23)	
MTB	-0.001		-0.001		0.000	
	(-0.40)		(-0.17)		(0.09)	
TAcc	0.063		2.236		2.172	
	(0.19)		(1.09)		(1.17)	
BHR	-0.045		-0.301		-0.257	
	(-0.75)		(-0.91)		(-0.86)	
STD_RET	0.069		-1.191	***	-1.260	***
	(0.34)		(-3.91)		(-3.98)	
NANALYST	-0.002		-0.220		-0.217	
	(-0.08)		(-0.96)		(-1.06)	
N	5,993		5,993		5,993	
Adjusted R^2	0.000		0.012		0.014	

TABLE 4
Analysis of analyst characteristics

This table assesses the impact of independent and investment-bank analysts' characteristics on our measures of price target optimism and accuracy for the period 2010 to 2015 for the sample of 6,182 analyst-firm-years for which there are both investment-bank analyst and independent analyst price targets for the same firm in the same year and for which we have non-missing analyst characteristic variables. Mean *PT_OPT1*, *PT_OPT2*, *PT_OPT3*, and *PT_ACCU* are calculated for each analyst firm-year combination and then matched to the analyst characteristics for that firm-year.

Panel A reports mean values for the analyst characteristics for both independent and investment-bank analysts. In Panel B we regress each of *PT_OPT1*, *PT_OPT2*, *PT_OPT3*, and *PT_ACCU* on the analyst characteristics as in the following equation:

$$PT\_OPT_{it} / PT\_ACCU_{it} = \alpha_0 + \alpha_1 IND_{it} + \alpha_2 FEXP_{it} + \alpha_3 FREQ_{it} + \alpha_4 BSIZE_{it}$$

$$+ \alpha_5 NFIRMS_{it} + \epsilon_{it}$$

Robust standard errors are clustered by analyst and t-statistics are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively. Variable descriptions are in the Appendix.

Panel A: Descriptive statistics for analyst characteristics

Variable	N	Independent Sample Mean	N	Investment Bank Sample Mean	Difference	
FEXP	6,182	1.41	34,243	1.69	-0.29	***
FREQ	6,182	4.41	34,243	7.06	-2.66	***
BSIZE	6,182	64.88	34,243	99.55	-34.67	***
NFIRMS	6,182	17.21	34,243	19.45	-2.24	***

TABLE 4 (continued)

Panel B: Analyst characteristics regressions

	PT_OPT1		PT_OPT2		PT_OPT3		PT_ACCU	
Intercept	15.266 ***	23.076 ***	64.336 ***	65.709 ***	30.608 ***	31.598 ***	-32.479 ***	-40.795 ***
	(31.89)	(12.44)	(157.34)	(55.47)	(69.89)	(23.80)	(-61.28)	(-20.30)
FEXP		-1.618 ***		0.260		0.176 ***		2.054 ***
		(-7.51)		(1.49)		(0.94)		(9.07)
FREQ		0.224		0.530 ***		0.631 ***		-0.033
		(1.07)		(6.63)		(6.67)		(-0.15)
BSIZE		-0.042 ***		-0.056 ***		-0.049 ***		0.012
		(-4.04)		(-7.07)		(-5.68)		(1.10)
NFIRMS		-0.128 ***		0.000		-0.044		0.199 ***
		(-2.75)		(0.01)		(-0.97)		(3.82)
IND	-2.798 **	-4.400 ***	-9.199 ***	-9.653 ***	-3.487 ***	-3.559 ***	-2.237 *	-0.874
	(-2.17)	(-3.28)	(-6.40)	(-7.14)	(-2.80)	(-2.96)	(-1.86)	(-0.66)
Adj. R^2	0.000	0.005	0.009	0.019	0.001	0.009	0.000	0.005

TABLE 5
Analysis of EPS forecasts

This table assesses independent and investment-bank analysts' forecasts of current-year EPS relative to I/B/E/S actual EPS for the 4,889 firm years from 2010 to 2015 for which we have median EPS forecasts for independent and investment-bank analysts as well as actual earnings. EPS forecast optimism (*EPS_OPT*) equals (Forecast – Actual)/Price, and EPS forecast accuracy (*EPS_ACCU*) equals -|*EPS_OPT*|. *Difference* is the median independent analyst's forecast error less the median investment-bank analyst's forecast error; positive *Difference* for *EPS_OPT* indicates greater optimism for the independent analysts' forecasts relative to the investment-bank analysts' forecasts, while positive *Difference* for *EPS_ACCU* indicates greater accuracy for the independent analysts' forecasts. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively. Variable descriptions are in the Appendix.

Panel A: Descriptive statistics

	N	Mean	Std Dev	Min	25%	Median	75%	Max
EPS_IND	4,889	2.49	15.50	-1047.00	1.08	2.16	3.66	77.79
EPS_IB	4,889	2.38	19.56	-1335.00	1.08	2.14	3.64	79.66
ACTUAL	4,889	2.51	4.78	-196.12	1.02	2.10	3.65	58.33

Panel B: Year-ahead EPS forecast optimism and accuracy

		N	Mean		Median			
			EPS_OPT	EPS_ACCU	EPS_OPT		EPS_ACCU	
2010	*EPS_IND*	714	0.0027	-0.0421	-0.0030		-0.0082	
	EPS_IB		0.0001	-0.0401	-0.0027		-0.0069	
	Difference		0.0027	-0.0020	0.0000		-0.0002	***
2011	*EPS_IND*	926	-0.6805	-0.7384	-0.0009		-0.0064	
	EPS_IB		-0.9243	-0.9717	-0.0008		-0.0055	
	Difference		0.2437	0.2334	0.0000		-0.0003	***
2012	*EPS_IND*	836	0.0178	-0.0571	0.0008		-0.0070	
	EPS_IB		0.0096	-0.0361	0.0006		-0.0060	
	Difference		0.0082	-0.0210	0.0001	**	-0.0003	***
2013	*EPS_IND*	836	0.0188	-0.0591	0.0001		-0.0053	
	EPS_IB		-0.0051	-0.0417	0.0000		-0.0045	
	Difference		0.0238	-0.0174	0.0001	***	-0.0003	***
2014	*EPS_IND*	783	0.0119	-0.0286	0.0000		-0.0042	
	EPS_IB		0.0061	-0.0201	0.0000		-0.0037	
	Difference		0.0058	-0.0085	0.0001	***	-0.0002	***
2015	*EPS_IND*	794	-0.0055	-0.0732	0.0011		-0.0050	
	EPS_IB		-0.0255	-0.0577	0.0004		-0.0043	
	Difference		0.0201	-0.0155	0.0003	***	-0.0003	***
All Years	*EPS_IND*	4,889	-0.1212	-0.1823	-0.0001		-0.0058	
	EPS_IB		-0.1774	-0.2158	-0.0003		-0.0051	
	Difference		0.0562	0.0335	0.0001	***	-0.0003	***

TABLE 6
Analysis of long-term growth forecasts

This table assesses independent and investment-bank analysts' long-term growth forecasts relative to realized long-term EPS growth across varying horizons for the period 2010 to 2015 for the sample of independent LTG forecasts for which there are non-missing investment-bank analyst LTG forecasts. The sample in this table is further restricted to forecasts with non-missing realized long-term EPS growth (*GROWTH*). *GROWTH* is calculated following Dechow and Sloan (1997) by fitting a least squares growth line through the logarithm of the four annual earnings observations from year t through year t + 3 (for 3-year LTG). If I/B/E/S actual earnings per share are missing or negative for year t or year t + 3, then a growth rate is not calculated for that observation.

Panel A provides mean and median *LTG_IND*, *LTG_IB*, and *GROWTH* where the latter is estimated using each of a 3-, 4-, and 5-year horizon. Panel B provides correlations among these variables based on 3 year realized EPS growth, with Pearson (Spearman) correlations presented below (above) the diagonal. Correlations that are significant at the 1% level are shown in bold. Panel C presents mean and median forecast errors for independent and investment-bank analysts' LTG forecasts relative to realized growth. LTG forecast optimism (*LTG_OPT*) equals (Forecast – Actual) and LTG forecast accuracy (*LTG_ACCU*) equals -|Forecast – Actual|. In Panel C, *Difference* is the independent analyst's optimism or accuracy less the median investment-bank analyst's optimism or accuracy; positive *Difference* for *LTG_OPT* indicates greater optimism for the independent relative to the median investment-bank forecast while positive *Difference* for *LTG_ACCU* indicates more accuracy for the independent analyst forecast.

*, **, and *** represent significance at the 10%, 5%, and 1% level, respectively. Variable descriptions are in the Appendix.

Panel A: Independent and investment-bank analysts' LTG forecasts and realized LTG

	3 Year			4 Year			5 Year		
	N	Mean	Median	N	Mean	Median	N	Mean	Median
LTG_IND	2,428	8.00%	10.30%	1,893	6.98%	10.50%	1,376	4.77%	10.40%
LTG_IB	2,428	13.59%	11.80%	1,893	13.38%	12.00%	1,376	14.67%	12.00%
GROWTH	2,428	7.36%	8.02%	1,893	7.53%	7.88%	1,376	7.01%	7.50%

Panel B: Correlations

	LTG_IND	*LTG_IB*	*GROWTH*
LTG_IND		**0.50**	**0.28**
LTG_IB	**0.12**		**0.27**
GROWTH	0.04	0.08	

TABLE 6 (continued)

Panel C: Long-term growth optimism and accuracy – means

| | 3 Year | | | 4 Year | | | 5 Year | | |
	LTG_OPT	LTG_ACCU		LTG_OPT	LTG_ACCU		LTG_OPT	LTG_ACCU	
LTG_IND	0.64%	-18.49%		-0.55%	-18.48%		-2.24%	-20.11%	
LTG_IB	6.24%	-13.42%		5.85%	-11.97%		7.67%	-12.50%	
Difference	-5.59% ***	-5.08% ***		-6.40% ***	-6.51% ***		-9.91% ***	-7.62% ***	

Panel D: Long-term growth optimism and accuracy – medians

| | 3 Year | | | 4 Year | | | 5 Year | | |
	LTG_OPT	LTG_ACCU		LTG_OPT	LTG_ACCU		LTG_OPT	LTG_ACCU	
LTG_IND	2.15%	-7.31%		2.57%	-7.27%		2.66%	-6.86%	
LTG_IB	3.13%	-6.51%		3.35%	-6.65%		4.00%	-6.42%	
Difference	-0.95% ***	-0.15% ***		-1.00% ***	-0.30% ***		-1.01% ***	-0.30% ***	

Panel E: 3-Year long-term growth optimism and accuracy by year

| | | | Mean | | | | Median | | |
		N	LTG_OPT	LTG_ACCU			LTG_OPT	LTG_ACCU	
	LTG_IND		-4.82%	-22.70%			-0.24%	-8.62%	
2010	*LTG_IB*	415	0.97%	-13.65%			0.35%	-7.29%	
	Difference		-5.79% **	-9.06% ***			-0.40%	-0.70%	
	LTG_IND		-4.64%	-23.37%			1.84%	-8.27%	
2011	*LTG_IB*	563	7.23%	-13.11%			3.20%	-6.49%	
	Difference		-11.87% ***	-10.26% ***			-1.70% ***	-0.50% ***	
	LTG_IND		-1.22%	-17.92%			2.36%	-6.66%	
2012	*LTG_IB*	538	7.79%	-14.43%			3.78%	-6.21%	
	Difference		-9.01% ***	-3.49%			-1.09% ***	-0.12%	
	LTG_IND		6.19%	-12.73%			2.92%	-6.56%	
2013	*LTG_IB*	468	5.51%	-13.03%			3.35%	-6.60%	
	Difference		0.68%	0.30%			-0.81% *	0.45%	
	LTG_IND		8.86%	-15.15%			3.80%	-7.28%	
2014	*LTG_IB*	444	8.79%	-12.76%			3.93%	-6.83%	
	Difference		0.07%	-2.39% ***			-0.78% *	0.07%	