Competition among Star Analysts and Firms' Information Environment[*]

Gil Aharoni
University of Melbourne

Joshua Shemesh
University of Melbourne

Fernando Zapatero
University of Southern California

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ABSTRACT

We find that direct competition among star analysts plays a key role in their forecast accuracy. When two or more star analysts cover the same stock (battleground stock), they are roughly 20% more accurate than instances in which only one star covers a firm. Using an exogenous shock to competition among star analysts, our results suggest that the higher accuracy in battleground stocks is not driven by star analysts' ability to pick stocks with a better information environment. We also document that annual rankings from *Institutional Investor* magazine are mainly based on star analysts' performance in battleground stocks.

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1 Introduction

The question of whether analysts affect the firms that they cover has been central in in the academic debate. One of the findings that emerge from this literature is that a positive relation exists between analyst coverage and what can be generally referred to as the transparency of a firm's information environment. Recent evidence suggests that a decrease in analyst coverage is correlated with an increase in analyst optimism (Hong and Kacperczyk (2010)), an increase in earnings management (Yu (2008); Lindsey and Mola (2014)), an increase in information asymmetry (Chang, Dasgupta, and Hilary (2006) and Kelly and Ljungqvist (2012)) and a decrease in monitoring firm activity (Chen, Harford, and Lin (2013)). Irvine (2003) shows that a firm's stock liquidity improves with initiation of analyst coverage. Derrien and Kecskés (2013) document that a decrease in analyst coverage leads to a decrease in corporate investment and financing. The authors suggest that a decrease in analyst coverage increases information asymmetry and thus increases the cost of capital.

Our paper adds to this literature by examining the effect of competition among star analysts on another aspect of the information environment: the ability to estimate a firm's future earnings. Previous papers document that analysts selected for the "All-American Research Team" compiled by *Institutional Investor* (I/I) magazine are much more influential than non-star analysts.[1] We suggest that the star analysts' special status leads the investment community to treat them as a separate group from other analysts. As such, star analysts are not compared with the entire analyst community but primarily with other star

[1] Previous papers document that star analysts are more accurate (Stickel (1992)), are more influential in reducing earnings management (Yu (2008)), have stronger effect on information asymmetry (Kelly and Ljungqvist (2012)), and that their recommendations are more influential (Loh and Stulz (2011) and Fang and Yasuda (2009)).

analysts. According to this premise, the portfolio of stocks that a star analyst covers can be split into two groups depending on whether the same stocks are covered by other star analysts. We refer to stocks that are covered by more than one star analyst as battleground stocks and document that star analysts are more accurate in forecasting earnings of battleground stocks than in forecasting those that they cover as a single star. Star analyst accuracy is not similarly affected by competition with ordinary (non-star) analysts. We find no relation between star analyst accuracy and either the number or the change in the number of ordinary analysts. Using an exogenous shock to the competition among star analysts, we argue that the higher accuracy is unlikely to be driven by the self-selection of star analysts into stocks with a better information environment. Furthermore, our results also suggest that the competition among star analysts plays an important role in the I/I rankings. Specifically, doing well in battleground stocks relative to other star analysts carries much more weight in the I/I rankings than doing well relative to ordinary analysts. Taken together, the higher accuracy in battleground stocks and the stronger effect on I/I rankings suggest that star analysts view other stars as their main competitors and are much less concerned with competition from ordinary analysts.

This study measures the effect of competition among the most influential analysts covering the largest firms. More than half of all battleground stocks are in the highest size quintile. Such large firms are most important to I/I respondents, most of whom are money managers. Conversely, most existing papers report that analysts mainly affect relatively small stocks that are covered by five analysts or less. The existing evidence is consistent with the notion that analyst coverage predominantly affects the information environment of smaller stocks while large firms are hardly affected. We show that star analyst accuracy among the largest firms is strongly dependent on the competition among star analysts.

Another novelty of our setting is that we compare stocks in which there is competition among stars to those in which there is no such competition. Most of the literature examines changes in the level of competition (changes in the number of analysts) and the effect on the information environment. We find that the presence of competition with other stars plays a significant role in star analyst accuracy whereas the intensity of competition plays a minor role if any. The latter result is consistent with Lindsey and Mola (2014), which shows similar findings regarding the effect of (mainly) ordinary analysts on earnings management. Our findings also highlight the importance of star analysts in financial markets. Over 20 ordinary analysts cover the average battleground stock yet the presence of one other star analyst reduces the forecast error by more than 20%. This finding is consistent with other papers that emphasize the strong influence of star analysts (e.g., Loh and Stulz (2011)).

We proceed as follows. First, we identify battleground stocks, which are defined as stocks that are covered by at least two star analysts during the same year. Our findings show that, on average, roughly half of the stocks in a star analyst's portfolio are battleground stocks. Next, we examine whether competition among stars affects the information environment of a firm. To study this, we measure the accuracy of star analysts' forecasts in battleground stocks and compare it with their accuracy in single-star stocks. We find that star analysts are more accurate in battleground stocks. Our results show that, after controlling for common factors that have been shown to affect analyst accuracy, the average forecast error in battleground stocks is about 20% lower than that in single-star stocks.

Similar to many of the papers in the analyst literature, our paper is subject to an endogeneity problem. In our case, the reserve causality argument is that analysts prefer to cover stocks with a better information environment.[2] Because star analysts are more talented in finding these stocks than ordinary analysts, they self-select into stocks with a better information environment, thus suggesting a negative relation between forecast error and the number of stars. We therefore require an exogenous shock to the competition among star analysts in order to distinguish between the two competing explanations.[3] We suggest that the removal of competition among stars, merely due to the loss of star status, can serve as such a shock. The loss of star status is unlikely to be driven by changes in a firm's information environment.[4] We perform an event study using firms that, due to the loss of star status, experience a decrease in the number of star analysts that cover the stock. We show that when a battleground stock becomes a single-star stock, the forecast error of the remaining star analyst increases by roughly one-third. This increase in forecast error is unique to firms that lose battleground status, as stocks that experience a drop in the number of stars but remain battleground stocks do not show an increase. We further match firms that experience a termination in battleground status with similar firms that experience no such shock and show that the difference in the differences in forecast error over time between the treatment and control group is positive and statistically significant. We use

[2] Papers that document the tendency of analysts to choose stocks with better information environment include: Lang and Lundholm (1996), McNichols and O'Brien (1997), Francis, Hanna, and Philbrick (1997), and Bushman, Piotroski, and Smith (2004)).

[3] The most widely used shocks are brokerage house mergers and closures (Hong and Kacperczyk (2010), Kelly and Lundquist (2012)). These are inadequate for our purpose as they mainly relate to the loss of ordinary analyst coverage. For example, using the data set of brokerage house mergers and closures of Derrien and Kecskes (2013), less than 10% (roughly 100 firms) of all firms that lost coverage are related to star analysts. We would like to thank the authors for providing us with this information.

[4] We confirm in the data that the loss of star status is not correlated with observable proxies for the information environment.

several additional tests to try to distinguish between the competition motive and the alternative causality argument. These tests broadly favor the competition explanation over the self-selection argument.

In the second part of this paper, we try to identify the exact mechanism behind our results. We do so by identifying an incentive that leads star analysts to pay special attention to stocks that are covered by other star analyst(s). Arguably, the most important organized competition for star analysts is the I/I ranking that awards the most prestigious star status. I/I star status has been shown to have a substantial effect on both analyst compensation and the ability of the brokerage house to attract new clients (e.g., Groysberg, Healy, and Maber (2011); Clarke, Khorana, Patel, and Rau (2007)). We find that success in battleground stocks is associated with a higher probability of being promoted in the I/I rankings.[5] Furthermore, consistent with the notion that star analysts are mainly compared with other star analysts, we find that performance in battleground stocks relative to other stars is the most influential factor while performance relative to ordinary analysts plays only a minor role. Thus, our results suggest that star analysts are being ranked by I/I mainly according to their performance in battleground stocks. While not excluding other possible explanations, this incentive is likely to contribute to the lower observed forecast error, as it induces star analysts to strategically devote more effort to battleground stocks.

The rest of the paper is organized as follows. In Section 2, we discuss the data and methodology. In Section 3, we study the forecast accuracy in battleground vs. other stocks and we explore whether higher accuracy might be due to the selection of more predictable

[5] The I/I rankings are based on a questionnaire sent out to thousands of professionals in hundreds of institutions on an annual basis. The survey respondents do not receive any type of compensation thus it seems reasonable to assume that they use “rules of thumb” that allow them to respond to the survey in a limited amount of time while providing adequate answers.

stocks by star analysts. In Section 4, we analyze the relation between success in battleground stocks and promotion in the I/I rankings. We close the paper with some conclusions in Section 5.

2 Data, Methodology, and Summary Statistics

2.1 Data and methodology

Our data is drawn from two main sources. The data on analysts' earnings forecasts comes from the Institutional Brokers' Estimate System (I/B/E/S) files. We limit the sample period to 2002–2011 because many papers show that the nature of analyst estimates changed materially after Regulation Fair Disclosure was adopted. Throughout the paper, we concentrate on the earnings per share (EPS) forecast for the next fiscal year. Analysts' rankings are drawn from the files of I/I.

We determine star status according to *Institutional Investor*'s annual All-American Research Team. Each year, *Institutional Investor* proclaims the top three analysts in various industries and sectors. We therefore define stars as those in the first, second, or third place. Although additional runner-up(s) may be nominated, they are excluded from the All-American Research Team and accordingly not considered stars in our analysis. The vast majority of analysts included in the team are selected as stars in a single industry. However, close to 10% of star analysts are selected in more than one industry. In such cases, in order to avoid double counting, we consider the higher ranking as the star analyst's ranking for that year. Throughout our sample period, we have 1,184 unique star analyst-year observations.

In this paper, we want to study the effects of competition among star analysts and thus we divide all stocks in the I/B/E/S universe according to the number of star analysts who cover each stock. Of the 20,293 firm-years in our sample, 63.5% are not covered by any star analyst, while the rest are split almost evenly between stocks that are covered by a single star analyst and those that are covered by two or more star analysts (3,749 and 3,663, respectively). In order to compare analysts' performance across different stocks, we need a measure of accuracy. For this purpose we introduce the metric of forecast error, which we define as the absolute difference between the forecast and realized earnings scaled by the realized earnings. In order to reduce the potential influence of outliers, most of which are driven by obvious data errors, we exclude from our sample all forecasts for which the forecast error is larger than 4. We follow Clement and Tse (2005) in defining the control variables and we normalize them relative to all analysts covering the firm (whether stars or non-stars) using the following formula, in which analyst *i* covers firm *j* at year *t*:

$$Characteristic_{ijt} = \frac{RawCharacteristic_{ijt} - RawCharacteristic\,min_{jt}}{RawCharacteristic\,max_{jt} - RawCharacteristic\,min_{jt}}.$$

As noted by Clement and Tse (2005), the normalization of all variables to a value between 0 and 1 allows us to examine their relative importance by directly comparing the coefficients.

Our focus is on the competition between existing stars and thus we require that the analyst achieve star status one year prior to her forecast's fiscal year end. We then examine the relation between the accuracy of star analysts and their ranking in the subsequent year. For every firm that an analyst covers, we include in our study only the earliest announcement in each year. We focus on the earliest announcement rather than on the last announcement for two reasons. First, the earliest forecast is arguably the most challenging because the forecast horizon is the longest. Second, previous literature shows that analysts' forecasts are likely to cluster toward the end of the fiscal year and hence later announcements carry less information about analysts' quality. Therefore, for each firm an analyst covers, we maintain only the earliest EPS forecast for the next fiscal year as long as it is made before the fiscal year's end.[6]

2.2 Summary statistics

We start our empirical investigation by dividing the I/B/E/S universe into three types of stocks: (1) stocks that are not covered by any star analyst, (2) stocks that are covered by a single star analyst, and (3) stocks that are covered by more than one star analyst (henceforth called "battleground" stocks). In Table 1 we present summary statistics of accounting variables, market performance, and analyst coverage for each category.

(Insert Table 1 about here.)

The first row presents our sample size (in firm-years) under each category. Almost two-thirds of the firms in the I/B/E/S universe are not covered by any star analyst and the rest are divided almost equally between firms that are covered by a single star analyst and those covered by more than one star analyst (i.e., battleground stocks). The second row presents the number of large firms. Throughout the paper, we refer to firms that are larger than the median size of the New York Stock Exchange (NYSE) as large firms. We find that

[6] We note that I/I respondents are required to send back their questionnaires between March and May, thus for firms with a fiscal year end other than December, the actual EPS is not yet available when the survey closes. This suggests that in some cases the respondents need to estimate the winner (possibly based on revisions in analysts' forecasts and quarterly earnings). Such measurement errors in our dependent variables is generally expected to bias the regression coefficients toward 0 and thus they work against finding a relation between the dependent and independent variables. Nevertheless, we can report that when we exclude these firms (roughly 20% of all forecasts) our main results hold.

close to 80% of all large firms are covered by at least one star analyst and that over 50% of all large firms are battleground stocks. Focusing on firm size, our results show that battleground stocks are larger than those covered by a single star analyst which in turn are larger than those not covered by any star analyst. Importantly, the proportion of firms smaller than the lowest NYSE-size quintile in battleground stocks is only 3%.

Battleground stocks are also more profitable than other stocks. The proportion of firms with a negative net income among battleground stocks is only one-fifth of the proportion of firms covered by a single star analyst. Analyst coverage increases with the number of star analysts that cover the stock. The average number of analysts that cover stocks with no star coverage is less than 7 but this number increases to 11.5 for stocks with single-star coverage and further increases to 18.5 for battleground stocks. Furthermore, while analyst coverage increases throughout our sample period, as evidenced by the change in the number of analysts (compared with the previous year), battleground stocks experience the sharpest increase. The average increase in coverage for battleground stocks is almost twice the increase for stocks covered by a single star analyst (1.05 and 0.66, respectively). The average forecast error across all analysts also decreases with coverage by star analysts—from 0.55 for stocks with no star coverage to 0.41 for stocks with single-star coverage and 0.31 for battleground stocks. Finally, Panel B presents data regarding the coverage choice of star analysts. A star analyst covers an average of 12.3 stocks and close to 60% are battleground stocks. A star analyst initiates coverage of 1.8 stocks per year on average and our unreported results show that roughly three-quarters of initiations represent large firms. Most initiations take place within two years after the analyst becomes a star. The last row reports the number of firms that are dropped. Of the 12.3 firms that star analysts cover, only 0.6 firms are dropped each year on average. This suggests that star analysts' coverage portfolios are very sticky, with over 95% of the firms carried over from year to year. Specifically, star analysts are unlikely to drop stocks after they initiate coverage.

3 Forecast Accuracy in Battleground Stocks

Some of the recent literature focuses on the effect of financial analysts on firms that they cover. Several researchers have suggested that analysts may negatively affect firms' information environment either because they bias their reports or because they put pressure on managers to meet earnings targets (e.g., Michaely and Womak (1999); Bartov, Givoly and Hayn (2002)). Despite these concerns, most of the evidence suggests that analyst coverage improves a firm's information environment by monitoring managers' opportunistic behavior (Jensen and Meckling (1976)) and/or reducing information asymmetry (e.g., Chang, Dasgupta, and Hilary (2006)). Hong and Kacperczyk (2010) report that a decrease in the number of analysts covering a firm leads to an increase in optimism bias. Both Yu (2008) and Lindsey and Mola (2014) find that the number of analysts covering a firm is negatively related to earnings management. Kelly and Ljungqvist (2012) provide evidence that analyst coverage reduces information asymmetry by showing that a decrease in analyst coverage leads to a fall in share prices and a reduction in uninformed investors' demand for risky assets. Building on this finding, Derrien and Kecskes (2013) show that a decrease in analyst coverage leads to a decrease in corporate investment and financing. The authors interpret this result as consistent with an increase in information asymmetry. Chen, Harford, and Lin (2013) provide further evidence on the monitoring role of analysts by showing that analyst coverage reduces CEO compensation and leads to better acquisition decisions.

Importantly, most of the existing papers report that analysts have the strongest effect on relatively small stocks that are covered by five analysts or less. This result is not surprising as these papers typically employ the change in the number of analysts following brokerage house mergers or closers as proxies for a change in the information environment. Naturally, stocks with initial low analyst coverage are more affected by a decrease in analyst coverage, which may lead to the conclusion that changes in analyst coverage are less important in large firms. We thus focus entirely on changes in the coverage of arguably the most influential analysts—star analysts—who typically cover very large firms. Specifically, we study whether competition among star analysts improves the information environment of the firm they cover by examining the forecast error of the star analysts themselves.

3.1 Battleground and star analyst accuracy

Our univariate analysis in Table 1 shows that the average forecast error in battleground stocks is smaller than in single-star stocks. The analysis also suggests that battleground stocks are larger, more profitable, and enjoy higher analyst coverage than single-star stocks. It is therefore vital to establish that the smaller error is not solely driven by different characteristics in battleground stocks. To investigate this question further, we perform a series of tests at the forecast level in which we control for common factors that have been shown to affect analyst accuracy. The dependent variable is the forecast error, defined as the absolute difference between the forecast and realized earnings and scaled by the realized earnings. The main independent variable is the binary variable *battleground*, to which we assign a value of 1 if more than one star analyst covers the stock and 0 otherwise. Our analysis, as represented in Table 2, is focused on the effect of competition on star analyst accuracy. Accordingly, only forecasts that are made by star analysts are part of our regression estimations—that is, we include only stocks that are covered by at least one star analyst. In order to mitigate the problem of large differences between small and large stocks, we drop all firms that are in the lowest size quintile (NYSE cutoff points) from our analysis. Table 1 shows that less than 3% of all battleground stocks are in the lowest size quintile, so we are unlikely to lose many observations. There are a total of 12,149 forecasts made by star analysts during our sample period. Control variables include the total number of analysts (whether stars or non-stars) that cover the stock (*No. analyst*); the number of days elapsed since the previous forecast of the analyst (*days elapsed*); the number of days remaining until the announcement of the annual report (*forhorizon*); the order in which analysts submitted their forecast (*order*); the number of analysts employed by the analyst's brokerage house (*brokerage size*); the general experience of the analyst (*generalexp*) as measured by the number of years that the analyst has been in the I/B/E/S database; and the specific experience of the analyst in covering the firm (*firmexp*) as measured by the number of years that the analyst has covered the firm. All control variables are normalized to take a value between 0 and 1, relative to all analysts covering the firm (whether stars or non-stars) as described in the methodology section.

(Insert Table 2 about here.)

Model 1 in Panel A of Table 2 examines the univariate relation between forecast error and battleground status. Consistent with the results shown in Table 1, battleground status has a negative and significant relation with analysts' forecast error. In Model 2, we add the control variables as well as ranking fixed effects (indicating whether the analyst was ranked in the first, second, or third place). The latter ensures that our results are not driven by the possibility that battleground stocks are mainly covered by star analysts of a higher position in the rankings. Consistent with previous findings (Clement and Tse (2005) among others), analysts become more accurate as time approaches the earnings announcement date. Hence, the coefficient of *forecast horizon* is positive and significant in all specifications. Surprisingly, the coefficient of *order* is also positive and significant in some specifications, suggesting that relatively earlier announcements are more accurate. A possible explanation is that some analysts who announce later than others deviate from the consensus to try to stand out (Bernhardt, Campello, and Kutsoati (2006)). Most importantly, the coefficient of the battleground dummy is hardly affected (from -0.055 to -0.063) and remains highly significant after the inclusion of controls.

In Model 3, we add firm fixed effects to account for any residual firm heterogeneity. In essence, firm fixed effects limit the effect of cross-sectional differences between firms, which, in our context, may affect how easy it is to forecast the firm's earnings. Our results show that the coefficient of the *battleground* binary variable decreases slightly from -0.063 to -0.043 and remains statistically significant at the 1% level. Notably, this is the weakest of our results yet even so it remains economically significant: a decrease of 0.043 in absolute error accounts for roughly 15% of the average error of star analysts. In Models 4 and 5, we add analyst fixed effects, which control for the identity of the analyst. This is to ensure that battleground stocks are not just covered by a very few distinct individuals who are highly accurate. In Model 4, we estimate the regression without firm fixed effects whereas in Model 5 we include firm fixed effects. Both tests examine the forecast error of specific analysts in battleground stocks in comparison with their forecast error in single-star stocks. The results show that for both models the coefficient of the binary variable *battleground* is negative and highly significant. In fact, the coefficient of *battleground* slightly increases (in absolute value) to around -0.05 in both models compared with -0.04 in Model 3.

The coefficient of the number of analysts that cover the stock, whether stars or not, changes materially between Models 2 and 3. In Model 2, the coefficient is negative and significant, as it mostly captures the inverse relation between forecast error and firm size. In Model 3, when we control for firm size by including firm fixed effects, the coefficient of the number of analysts loses its statistical significance and becomes positive. The same pattern appears when we compare Models 4 and 5. This suggests that the forecast error of star analysts is unaffected by the competition with analysts in general. Our interpretation is that star analyst accuracy is only affected by the competition among star analysts. This interpretation is further supported by two robustness tests. We first add firm size (market value of equity) as a control variable. Our unreported results show that the coefficient of the number of of analysts is *positive* and insignificant. We also use the change in the level of coverage instead of the level itself and find that star analyst accuracy is unaffected by changes to the competition with all analysts. Importantly, the higher accuracy in battleground stocks remains significant in both specifications.

One possible explanation for the lower forecast error in battleground stocks may be that star analysts condition their information on previous announcements made only by other star analysts and not by the entire analyst community. In this case, star analysts who announce later than other star analysts will have more information on battleground stocks. To examine this possibility, we concentrate only on the earliest forecast in each battleground stock by *any* star analyst. For that purpose, we exclude from the sample all forecasts by star analysts after observing previous forecasts by other star analysts. In this subsample, star analysts do not have previous announcements by other star analysts at their disposal. Thus, if the conditional-information explanation is the main driving force behind our results, performance in battleground stocks should be indistinguishable from that in single-star stocks. In contrast, if higher effort is the driving force behind the higher accuracy in battleground stocks, then our results should hardly change in this subsample. As reported in Model 6, our results favor the special-attention explanation over the conditional-information explanation. When we contrast the accuracy of star analysts in single-star stocks with that of only the earliest forecast by any star analyst in each battleground stock, the coefficient of *battleground* slightly increases (in absolute value) and remains highly significant.

So far, we have established that accuracy improves when more than one star analyst covers a stock. It appears that the presence of competition with other stars is pivotal to star analyst accuracy. Our next test aims to examine whether the intensity of this competition also affects star analysts' accuracy. In Model 7, we examine the relation between forecast error and the number of stars *within* battleground stocks. We limit the sample to include only battleground stocks and examine whether a larger number of star analysts is associated with a lower forecast error within these stocks. Our empirical findings do not support this relation, as the coefficient of the number of star analysts that cover a battleground stock is small and insignificant. We can report that when we replace the total number of star analysts with a binary variable, to which we assign a value of 1 if the number of star analysts is larger than two and 0 otherwise, our results still hold. Therefore, the drop in forecast error in adding a second star to a single-star stock does not extend to the third star and so on. The irrelevance of the number of analysts within battleground stocks is consistent with Lindsey and Mola (2014), who show that earnings management decreases when two analysts cover a particular stock. When the number of analysts covering a firm goes above two, however, there are no material differences in earnings management.

In Panel B of Table 2, we limit the sample to firms that are larger than the NYSE median. Focusing on large stocks has two advantages. First, it limits the effect of cross-sectional differences between small and large stocks. Second, it focuses the empirical analysis on the same stocks that are likely to be most important to I/I respondents, most of whom are money managers. The results show that the coefficient of the binary variable *battleground* does not decrease (in absolute value) and in some models increases by up to 50%. We note that the negative coefficient of *battleground* accounts for roughly 20% of the average forecast error in large firms.

We conduct various robustness tests. We verify that the higher accuracy in battleground stocks is not unique to firms that experience a drop in earnings. Hong and Kacperczyk (2010) suggest that competition can improve the information environment, as an increase in the number of analysts makes it harder for the firm to suppress unfavorable information. The authors suggest two possible explanations for the above conjuncture. First, a larger number of analysts increase the total cost the firm needs to incur in order to suppress unfavorable information. Second, a larger number of analysts increases the probability that (at least) one of the analysts covering the firm will not surrender to any pressure to suppress unfavorable information. Consistent with their conjecture, Hong and Kacperczyk (2010) report that a decrease in the number of analysts increases optimism bias and that this increase is concentrated in firms that experience a drop in earnings. Both channels proposed by Hong and Kacperczyk (2010) are especially relevant to star analysts because they are likely to be the most expensive to solicit and the incentive to maintain their star status is likely to hinder their bias. For example, a firm covered by a single star analyst can suppress unfavorable news by offering future deals for the brokerage house. A firm covered by multiple stars, however, may find it too difficult to provide a similar incentive to multiple brokerage houses. Our empirical results (not reported) show that star analysts are more accurate in battleground stocks regardless of a change in earnings. Thus, the withholding of negative information is unlikely to be the sole driving force behind the higher accuracy in battleground stocks.

Next, we repeat the tests shown in Table 2 while defining a star analyst as ranked first or second, but not as third place. The results (unreported) show only minor differences from Table 2. The coefficient of *battleground* is negative and significant in most specifications. We also include industry fixed effects (both Fama-French 12 industries and two-digit SIC codes), which do not affect our results materially. Finally, we change the dependent variable from the absolute difference to the square of the difference between the forecast and the realized earnings (scaled by the realized earnings in both cases). Our unreported results show that the coefficient of *battleground* is significant in all 12 specifications of Panels A and B.

3.2 Reverse causality

Our results so far suggest that star analysts have a lower forecast error in battleground stocks relative to stocks that involve no direct competition between star analysts. It is possible that the effect of competition leads star analysts to allocate more effort to battleground stocks, which would explain the smaller error. A smaller error, however, may also arise from the coverage choice of star analysts. The existing literature shows that analysts tend to cover firms with a better information environment (e.g., Lang and Lundholm (1996); McNichols and O'Brien (1997); Francis, Hanna, and Philbrick (1997);

and Bushman, Piotroski, and Smith (2004)). Hence, the alternative causal argument suggests that like other analysts, stars actively choose stocks that are easier to predict. Notably, we have already established that the higher accuracy in battleground stocks is not sensitive to the inclusion of the total number of analysts as a control. However, it is possible that star analysts (and those that aspire to be stars) are more aggressive in seeking stocks with better information environments. It may also be that star analysts are more talented in recognizing changes in a firm's information environment.[7] Both of these assumptions are likely to lead to a positive correlation between battleground status and forecast accuracy.

The inclusion of firm fixed effects ensures that our results are not driven by cross-sectional differences in information environments. In essence, a firm's fixed effect accounts for heterogeneity in the complexity of forecasting the firm's earnings. A firm's information environment, however, may also be time varying and thus the self-selection argument may still hold. According to this argument, star analysts are expected to constantly change their stock coverage in response to changes in individual firms' information environment. In practice, however, the coverage choice of star analysts is very sticky. Our previous results (cf. Table 1) highlight the fact that star analysts hardly modify their coverage portfolio. Star analysts drop 0.6 stocks per year on average, which accounts for 5% of the number of firms in their portfolio. Furthermore, slightly more than half of all star analysts do not drop any large stock throughout the entire period during which they maintain star status. Our unreported results do not show any relation between star-analyst coverage changes and her

[7] This strategy, however, is unlikely to improve their relative accuracy. Still, it is possible that more talented analysts seek less noisy stocks because success in such stocks will be attributed to their ability rather than to luck.

accuracy in battleground stocks. For instance, when we drop from the sample any star analyst that abandons a large stock, the coefficient of *battleground* hardly changes.

Nevertheless, the endogeneity of coverage choice outlined above has already been acknowledged in the literature on changes in analyst coverage and their effect on a firm. In order to differentiate between the hypothesis that analyst coverage affects the firm and the alternative that analysts self-select into firms with certain characteristics, researchers have used instrumental variables. Two such variables are brokerage house mergers (Hong and Kacperczyk (2010)) and brokerage house closures (Kelly and Ljungqvist (2012)), both of which represent an exogenous negative shock to analyst coverage.[8] These papers document that a decrease in analyst coverage is largely associated with a deterioration of the firm's information environment.

For our research question, however, the use of brokerage house mergers and closures is not appropriate as both mergers and closures are not likely to have a broad effect on star analyst coverage. For example, using the data set of brokerage house mergers and closures of Derrien and Kecskes (2013), merely 100 stocks lose star analyst coverage.[9] We therefore introduce a novel instrumental variable in order to separate between the two alternative stories—the decrease in the number of star analysts that cover a stock due to the loss of star status. We argue that the loss of star status is unlikely to be correlated with changes in the information environment. Analysts are ranked in the I/I rankings within specific industries, with roughly 65 industries in total. For this reason, any market- or industry-wide shock is likely to affect all competing analysts similarly. As such, any

[8] Other instrumental variables used include the addition of the stock to the S&P 500 Index (Yu (2008)) and loss of coverage due to death of analysts in 9/11 (Kelly and Ljungqvist (2012)).

[9] We thank the authors for providing us with their data.

differences in the changes in information environment across competing stars are likely to be driven by idiosyncratic shocks. One may still argue that idiosyncratic shocks in information environment—i.e., deterioration in the information environment of one particular firm in the star analyst's portfolio—may increase the probability of demotion. Nonetheless, taking into account that a star analyst typically covers as many as 10 to 15 stocks, it is likely that idiosyncratic changes in information environment will offset each other at the portfolio level. It is therefore unlikely that star analysts are selected according to *changes* in the characteristics of the stock they cover. We confirm in the data that the loss of star status is uncorrelated with observable proxies for the information environment.[10]

Next, we examine whether changes in star-analyst coverage are related to changes in forecast accuracy. Specifically, we examine whether an increase in forecast error exists when a stock switches from battleground to single-star. We choose to focus on the termination of battleground status rather than on the initiation of one, as the former is less predictable. Star analysts may be able to predict who will be promoted through the rankings and challenge their positions. Reigning stars will therefore gradually increase their effort (and thus improve their forecast error) accordingly. In contrast, the loss of star status is more unexpected and should thus have a stronger effect. We start by dividing the sample into three groups according to the change in star analyst coverage. Evidently, the number of star analysts that cover a stock can decrease, increase, or remain unchanged relative to the

[10] Since a firm's information environment is unobservable, we examine variables that are likely to be correlated with changes in the information environment. These variables include the change in the number of analysts covering the firm (McNichols and O'Brien (1997)), the change in firm earnings (Basu (1997)), and the change in market value (Chang, Dasgupta, and Hilary (2006)). We find no apparent relation between the number of star analysts that cover a stock and our proxies for information environment.

previous year. For each stock a star analyst covers, we calculate the difference in its forecast error between the year of portfolio formation and the preceding year. For every firm-year, we then calculate the average difference in forecast error across all star analysts covering the firm. Hence, in order to be included in this test, a stock needs to have star coverage in both the year of portfolio formation and the preceding year and the star analyst needs to cover the firm over these two years.

(Insert Table 3 about here)

Results are presented in Table 3. The first three columns present the average forecast error one year prior to portfolio formation, the average forecast error in the year of portfolio formation, and the difference in forecast error between the two years. The first row presents the forecast error among stocks in which the level of star coverage remains unchanged. With no change in the number of star analysts, the competition between star analysts is unlikely to change materially and hence there should be no material difference in the average forecast error between the two consecutive years. Results of Table 3 confirm the above argument by showing that the difference in the forecast error between one year prior to portfolio formation and the subsequent year is small and insignificant. The next row presents the results for stocks that experience an increase in star coverage. As previously argued, star analysts are likely to put more effort as soon as they are able to detect up-and-coming analysts that may jeopardize their star status. Hence star analysts are likely to put more effort into stocks before they become battlegrounds. Indeed, our results show that these stocks had a very slight decrease in forecast error (-0.007).

Our main treatment group consists of stocks that experience a decrease in star coverage. Results show that the average forecast error in these stocks is 0.26 one year before the portfolio formation. The forecast error increases materially to 0.31 in the year of portfolio formation. This difference, close to 0.05, is significant at the 5% level. In the next two rows, we divide all stocks that experience a decrease in star coverage into two subgroups. In the first subgroup we include stocks in which only one star analyst remains—meaning stocks that switch from battleground to single-star stocks (e.g., from two star analysts to one). In the second subgroup we include stocks that remain battleground stocks even after the decrease in star-analyst coverage (e.g., from three star analysts to two). We repeat the tests for these two groups separately.[11] The results show that stocks that lose their battleground status drive almost the entire increase in forecast error. The average forecast error in these stocks increases by roughly one-third (0.10) and this increase is significant at the 1% level. In contrast, stocks that remain battleground stocks experience a small and insignificant increase of 0.007.

Results in the third column can be viewed as the first step in a difference-in-difference analysis. In order to complete the second step, we match each firm that experiences a change in star coverage with the most similar firm that experiences no change in star coverage (row 1 in the Table). This allows us to compare stocks that experience a shock to the competition among star analysts to similar stocks that experience no such shock. We match each stock sequentially, according to the year of the forecast, industry

[11] Notably, the forecast error of the second group (stocks that remain battleground ones) is lower than the first group one year before portfolio formation. This is to be expected, as stocks that lose star coverage and remain battleground stocks are larger than stocks that lose battleground status.

(F&F 12 industries), and size. Results of this matching analysis are presented in the last three columns.

Focusing on our main treatment group (last three rows), the results of the matching analysis are similar to the ones in the third column. For the entire portfolio of stocks that experience a decrease in star coverage, the difference-in-difference in forecast error is positive (0.066) and significant at the 5% level. Again, stocks that lose their battleground status as a result of a decrease in star coverage drive the results. For these stocks, the difference-in-difference in forecast error is 0.11 and significant at the 1% level. The next column similarly examines difference-in-differences in forecast error but only for stocks that are larger than the median NYSE size in the year of portfolio formation. We largely control for heterogeneity in size by comparing the forecast error of each stock to the forecast error in the previous year. However, it may be that the increase in forecast error is limited to relatively small firms whereas large, heavily covered firms are hardly affected. Results do not support this conjecture, as the difference-in-differences in forecast error among large firms decreases only slightly (0.08) and remains significant at the 10% level.

We note that a stock can switch from battleground to single-star sort not only because a star analyst covering it loses her star status in the I/I rankings. It is also possible that a star analyst covering the stock either decides to drop its coverage or is no longer included in the I/B/E/S database (e.g., the analyst has transitioned to become a corporate executive). The last column presents the results for stocks in which the recently demoted star analyst continues to cover the firm. The motivation behind this test is twofold. First, although our previous results (cf. Table 1) show that stars rarely drop coverage, we still need to ensure that the change in forecast error is independent of any decision made by the analyst. Second, we want to test whether the change in forecast error is driven by information rather than by competition. A plausible explanation for an increase in forecast error among stocks that experience a decrease in star coverage is that the loss of a star reduces the information about a firm and thus leads to an increase in forecast error. We mitigate both concerns by requiring that the ex-star analyst continue to cover the firm. Results in the last column are consistent with our previous findings by showing that stocks that switch from battleground to single-star experience a large increase in forecast error.

In order to ensure the robustness of our results, we examine alternative matching criteria that add (in conjunction with forecast year, industry, and size) either the number of analysts, profitability, or forecast error in the previous year.[12] In all of these matching specifications, the difference in the differences in forecast error over time between the treatment and control group is positive and statistically significant. Given the small number of observations in the control group, we use only three criteria (forecast year, industry, and size) in our main analysis to restrict the bias introduced by matching discrepancies. Finally, we note that among stocks that experience an increase in star coverage, the difference-in-differences in forecast error is negative and in some cases significant. While this result is consistent with our competition argument, we note that it is the control group which drives it. Further, this result is sensitive to the matching criteria used. Thus, we take this result with a grain of salt.

According to the self-selection argument, star-analysts are better than ordinary analysts in identifying stocks with good information environment, or, more fundamentally,

[12] We also match by industry and number of analysts; industry and earnings; and size and number of analysts. In all these specifications, the difference-in-differences in forecast error is positive and statistically significant.

they display a higher tendency to select such stocks than ordinary analysts.[13] Such selection ability may be rewarded by a higher likelihood of being selected as a star, leading to the observed higher accuracy in battleground stocks. Our next set of tests aims to explore the self-selection explanation using a regression analysis. However, before devising such a test, we ask a preliminary question: assuming that the self-selection argument is correct, is the superior selection ability a characteristic of star analysts throughout their career or does this ability improve with experience? Specifically, we ask whether star analysts are endowed with superior selection ability from the onset of their career, that is, before becoming stars.

Accordingly, we focus our attention on stocks in which a star analyst initiates coverage in the early stages of her career.[14] If selection ability is a characteristic of analysts throughout their careers, then star analyst accuracy should not depend on whether the star analyst is currently reigning or not. Correspondingly, the higher accuracy in battleground stocks should hold among stocks that are selected by star analysts in the early stages of their career. Conversely, if stock-picking ability improves over time then the battleground effect should not exist among these stocks. We formally test this question by excluding from the sample all stocks whose coverage is initiated by the analyst after becoming a star.

(Insert Table 4 about here.)

The results presented in Model 1 show that the coefficient of *battleground* hardly changes and remains negative (-0.071) and highly significant in this subsample. We can also report that further limiting the sample to stocks that are selected by a star analyst in the first four years of her career does not materially change our results. Hence, if the alternative

[13] Throughout the rest of the this discussion, we do not differentiate between ability and tendency, which are used interchangeably.

[14] Analysts hardly initiate coverage after being demoted from star status.

self-selection argument is the main driving force behind our results, then star analysts have the ability to identify firms with better information environments even before they obtain star status.

The result in Model 1 confirms that the alleged stock-selection ability is not correlated with the current ranking of the analyst. An important implication of this finding is that if star analysts indeed tend to cover firms with a better information environment, then the battleground effect documented in this paper is part of a larger phenomenon. When two (or more) analysts—who are chosen as stars at some point in their career—cover the same stock, their forecast error should be relatively low regardless of whether they are currently reigning or not. That is, star status can be used to identify analysts who possess superior selection ability. The above conjecture allows us to separate between our competition-driven argument and the alternative self-selection argument. As noted, according to the self-selection argument, forecast accuracy should mostly depend on the number of analysts who are selected as stars at some point in their career (henceforth career-star analysts). The larger the number of career-star analysts that cover the firm, the lower the forecast error should be. More importantly, whether these career-star analysts are reigning or not should not matter. Hence, the binary variable *battleground* should not have a material effect on forecast error. In Model 2, we test this implication by adding the number of career-star analysts that cover the firm as a control variable. The results are inconsistent with the self-selection argument, as the coefficient of *battleground* remains large (-0.056) and significant at the 1% level even after we control for the number of career-star analysts.

We note that the portfolio of single-star stocks in Model 2 includes stocks that are covered by a reigning star analyst and no other career-star analyst(s). We can report that these stocks are relatively small and are covered by fewer analysts. Therefore, while we control for size and analyst coverage, residual cross-sectional differences may still explain our results. In Model 3 we decrease the cross-sectional variation between single-star and battleground stocks by excluding from the sample all stocks that are covered by less than two career-star analysts. The resulting subsample now includes only two types of stocks: those that are covered by two or more reigning star analysts (battleground stocks as originally defined) and single-star stocks covered by (at least) one additional career-star analyst. If the self-selection argument is the main driving force behind our result, no material difference should then exist between star analyst accuracy while competing with another reigning star and her accuracy while competing with a career-star analyst. Take, for example, a star analyst that is competing against another star in one stock and against a future star in another. The self-selection argument suggests that the forecast error in the battleground stock should be similar to that in the second stock, as both stocks are likely to have good information environment. Our competition argument, however, suggests that the forecast error in the battleground stock should be lower than that in the second stock, as the competition with another reigning star analyst is likely to induce more effort. Results in this subsample are presented in Model 3. The coefficient of *battleground* is negative (-0.04) and remains significant at the 10% level. That is, when we focus on the competition between reigning stars and analysts that experience star status at some point in their careers, the accuracy of reigning stars is higher when their competitors are currently reigning as well.

Notably, most forecasts by career-star analysts are made before they become stars. In our sample, a career-star analyst spends on average over seven years before obtaining star status, roughly four years as a reigning star, and disappears from the I/B/E/S files less than two years after being demoted. As such, most career-star analysts are analysts that will be selected as stars in the future or reigning stars rather than former stars who have been demoted. Our tests in Models 2 and 3 largely compare the accuracy of a star analyst when competing with another star analyst(s) to her accuracy when competing with an analyst that will become a star later in her career.[15] Recall that in Table 3, on the other hand, we compared the accuracy of a star analyst when competing with another star analyst(s) to her accuracy when competing with recently demoted star analyst(s). Taken together, our results indicate that a reigning star is more accurate when competing with another reigning star(s) than when competing with a former or future star(s). The latter result cannot be explained by the coverage choice even if stars are gifted with superior stock-picking ability.

The coefficient of the number of career-star analysts is negative and significant in both Model 2 and Model 3. One possible explanation is that star analysts may be able to identify the aspiring analysts with whom they are likely to compete for star status in the future. Hence, star analysts may put more effort into single-star stocks covered by career-star analyst(s) before the potential entrants become stars. According to this argument, the number of career-star analysts should have a stronger effect on single-star stocks than on battleground stocks. This is because the competition between reigning stars is likely to induce more effort regardless of the number of up-and-coming stars that also cover the stock. Indeed, our unreported results show that the coefficient of the number of career-star analysts decreases by half (-0.006) and loses its statistical significance when we limit the sample to only include battleground stocks.

[15] If star analysts are able to identify up-and-coming stars, they are likely to put more effort into stocks that are covered by future star analysts. Such foresight ability would bias against finding any difference in forecast accuracy between battleground stocks and stocks in which a star analyst competes with future star analyst(s).

We perform two additional robustness tests using subsamples that are likely to reduce both cross-sectional and cross-time variation in information environment. In the first exercise, we limit the sample to include only stocks that changed from battleground to single-star sort or vice versa at least once during our sample period. By using the same set for both battleground and single-star stocks, this test is meant to ensure that our results are not driven by any cross-sectional differences between the two types. In the second exercise, we limit the sample to include only firms in the highest NYSE-size decile. These are very large firms, with a market value of over $10 billion, which enjoy widespread analyst coverage. More than 99% of these stocks are covered by 10 analysts or more and two-thirds are covered by 20 analysts or more. Furthermore, there are hardly any firms in the highest size decile that experience negative earnings. Hence, these stocks are likely to have minimal variation in their information environment over time. Our unreported results show that the coefficient of *battleground* in both tests remains negative and significant. That is, battleground stocks display higher accuracy even in subsamples that are designed to have a similar and stable information environment. This result is inconsistent with the notion that the information environment drives higher accuracy in battleground stocks.

While our tests in Tables 3 and 4 attribute the higher accuracy in battleground stocks to the strategic behavior of star analysts, one may argue that it is brokerage houses that assign analysts to stocks. In particular, it may be that institutional investors are more interested in firms with certain characteristics. As a consequence, different brokerage houses will assign their best analysts to cover the same set of stocks. Since the best analysts are more likely to be both accurate and selected as stars, this brokerage house-driven argument is indistinguishable from self-selection by the analysts themselves. Overall, our results are inconsistent with both types of selection whether stemming from the star analysts or from their brokerage house. First, we show that when a stock switches from battleground to single-star, the forecast error of the remaining star markedly increases. Second, when we consider only stocks that switch from battleground to single-star or vice versa during our sample period, the accuracy of star analysts remains higher in battleground stocks. Another brokerage house-driven explanation may be that star status is important to the brokerage house, and therefore brokerage houses allocate more resources and assign more support to star analysts to preserve their star status. We note, however, that this explanation cannot account for the irrelevance of the number of star analysts within battleground stocks. We find that the drop in forecast error in adding a second star to a single-star stock does not extend to the third star and so on. In the next section, we examine whether existing star analysts have an incentive to strategically devote more effort to battleground stocks.

4 Implicit Incentives in the Competition Among Star Analysts

Our results so far highlight the importance of star-analyst coverage to a firm's information environment. Specifically, we find a large decrease in the forecast error of star analysts when two or more star analysts cover the firm. In this section, we try to identify the mechanism that induces star analysts to perform better in battleground stocks. Bringing forward a clear incentive to perform better in battleground stocks will further support our effort-driven argument and whether it tells the whole story.

Previous literature has found that star status is associated with higher analyst pay as well as higher deal flow to the brokerage house. In particular, Groysberg, Healy, and Maber (2011) find that analysts selected to the I/I All-American Team earn much higher salaries than other analysts. In addition, they show a large increase in analyst compensation—of roughly 25%—when they become stars. Clarke, Khorana, Patel, and Rau (2007) find that when the stars switch brokerage houses, the deal flow of the new (old) brokerage house increases (decreases). Arguably, the most important challenge a star analyst faces is to maintain star status. While star status is sticky, roughly 25% of all stars fail to retain their star status in the consecutive year (e.g., Emery and Li (2009) and our own findings). Maintaining star status becomes even more difficult with age, as the I/I survey respondents seem to prefer younger blood (as evident from the negative relation between experience and star status).

Most of the literature compares stars with non-stars while overlooking the ranking itself. Both Clarke, Khorana, Patel, and Rau (2007) and Groysberg, Healy, and Maber (2011) do not distinguish between different rankings. Arguably, the compensation for a star analyst and her ability to attract new deals are likely to improve with the rankings. Most importantly, a higher ranking substantially decreases the probability that the analyst will lose star status—i.e., will no longer be ranked in any of the top three places. Table 5 illustrates this point using a simple transition matrix. The rows represent the ranking of the analyst in year *t* and the columns represent the ranking at year *t + 1*. Table 5 shows that during our sample period, the probability of an analyst ranked in first place being demoted out of the first three places is close to 12%. The probability of demotion more than doubles for an analyst ranked in second place, and an analyst ranked third faces a probability of more than 40% of not being selected into the top three places in the subsequent year. Results of Table 5 demonstrate that current ranking is crucial in maintaining star status and the benefits that come with it.

(Insert Table 5 about here.)

Taking into account the importance of the I/I rankings, we ask whether performing well in battleground stocks is rewarded with a better chance to remain a star. The I/I rankings are based on a questionnaire sent to thousands of professionals in hundreds of institutions on an annual basis. Importantly, the survey respondents do not receive any type of compensation and thus it seems reasonable to assume that they use “rules of thumb,” which allow them to respond to the survey in a limited amount of time while providing adequate answers. We suggest that success in battleground stocks can serve as one such “rule of thumb” as it allows the I/I respondents to directly compare the performance of star analysts without the need to take into account the heterogeneity in information environment across firms. Since three-quarters of stars analysts retain their star status, it seems that the I/I rankings are mainly affected by this exclusive tournament between star analysts.

Several papers examine whether star analysts have better predictive ability, both before and after they become stars, and typically report a positive relation between accuracy and star status. For example, Stickel (1992) reports that star analysts are more accurate than non-star analysts. Leone and Wu (2007) find a positive relation between pre-selection accuracy and star status. Emery and Li (2009) use a logistic regression to examine which variables affect the probability of being a star. They report that overall accuracy (in all stocks in the analyst’s portfolio) is not a significant determinant of becoming an I/I star and only plays a modest role compared with that of other determinants for I/I stars trying to repeat. Our tests are distinct from the previous literature in several important regards. First, we differentiate between battleground and non-battleground stocks, which allows us to evaluate star analyst accuracy relative to other star analysts and not just relative to the entire analyst community. We show that the performance of star analysts is not equally important across all of the stocks they cover. Second, we are only interested in the determinants of ranking improvements of *existing* star analysts. Since existing star analysts are already highly recognized, variables related to recognition are likely to play a minor role. Third, our sample period begins after Regulation Fair Disclosure (FD) was introduced. Earlier papers using pre-FD data document that analysts' accuracy is not only influenced by their intellectual ability but also by their relationship with the management of the firm. For example, Cohen, Frazzini, and Malloy (2010) find that prior to Regulation FD, equity analysts outperform on their stock recommendations when they have educational ties with senior officers of firms that they cover. This school-tie premium disappears after the introduction of Regulation FD, which mandates that all publicly traded companies must disclose material information to all investors at the same time.

4.1 Success in battleground stocks and ranking improvements

Table 6 tests the relationship between the accuracy of star analysts in battleground stocks and their promotion in the I/I rankings. The dependent variable is binary and we assign it the value of 1 if the star analyst improves her ranking. A rank improvement takes place when an analyst ranked in the second or third place moves up or when an analyst ranked in the highest position remains in the highest position in the subsequent year.[16] Our sample includes 1,184 analyst-years, of which 35% experience a ranking improvement in the

[16] Our notion of improvement includes analysts ranked in the highest position who manage to remain in the top place, which is consistent with the incentive to maximize the probability of retaining star status. Alternatively, we use a more restrictive definition of actual improvement by dropping analysts ranked first in year *t* since they technically cannot improve their ranking. After dropping all analysts ranked first, our sample decreases by roughly one-third, and the proportion of ranking improvement decreases to 21.6%. The results remain qualitatively the same as in Table 6 although with lower significance.

subsequent year. Given the annual frequency of I/I rankings, we aggregate all forecasts made by each analyst in each year by using a simple mean.

(Insert Table 6 about here.)

In Model 1, the main independent variable is mean relative accuracy, which we define as follows:

$$Relative\ accuracy_{i,j,t} = 1 - \frac{Error_{i,j,t} - MIN\left(Error\right)_{j,t}}{MAX\left(Error\right)_{j,t} - MIN\left(Error\right)_{j,t}},$$

where *i* is the analyst, *j* is the firm, and *t* is the year. We then calculate the mean (simple average) across all stocks the analyst covers in each year. Note that the accuracy is normalized relative to all analysts covering the firm (whether stars or non-stars) and thus it inherently controls for firm-specific differences. In particular, relative forecast accuracy controls for variations in the information environment across companies and time. The results of Model 1 show that the coefficient of mean relative accuracy is positive (0.89) and significant at the 5% level. Due to the loss of information in aggregation, the insignificant results for most of our control variables are to be expected. The only control variable that is significant is firm experience. The negative coefficient suggests that there is a tendency to promote relatively young analysts. This finding is consistent with Emery and Li (2009), who suggest that the assessment of older analysts is less likely to change. Surprisingly, there is a negative, albeit insignificant, relation between brokerage size and the probability of promotion. A possible explanation of this finding is that star analysts are already recognized, thus making recognition variables such as the brokerage house less important. Model 2 adds the number of battleground stocks that the analyst covers during the year to the regression. The coefficient of this variable is positive (0.06) and significant at the 1% level. This suggests that the higher the number of battleground stocks an analyst covers, the more likely she is to be promoted in the I/I rankings. The coefficient of mean relative accuracy hardly changes and remains positive and significant.

The previous tests, based on the variable *relative accuracy*, demonstrate that relative performance affects the likelihood of ranking improvements. To further explore this result, we study whether being the most accurate star analyst in a battleground stock particularly affects the likelihood of ranking improvements. For this purpose, we create a binary variable *win*, to which we assign the value of 1 if the star analyst is closer to the actual earnings than all other star analysts—that is, her forecast error is the smallest among all star analysts covering the stock. We then count the total number of wins that an analyst has accumulated in a given year, which we refer to as *No. of wins*. Adding this variable to the regression significantly changes the results. The coefficient of *No. of wins* is positive (0.10) and highly significant. The coefficient of *No. battleground* is reduced by more than half (0.02) and becomes statistically insignificant. Similarly, the coefficient of mean relative accuracy is also reduced by roughly one-half and becomes statistically insignificant. Therefore, our results suggest that wins in battleground stocks are pivotal to one's chance to be promoted in the I/I rankings.

In Model 4, we examine the importance of the number of wins in comparison to that of relative accuracy. We do so by normalizing the value of *No. of wins* relative to all *star* analysts covering the firm, so that

$$relative\ wins = \frac{wins_{it} - MIN(wins)_t}{MAX(wins)_t - MIN(wins)_t},$$

where *wins* is the number of wins of analyst *i* in year *t*, and *MAX (MIN) wins* is the maximum (minimum) number of wins of all star analysts in the same year. Since both *relative wins* and *mean relative accuracy* are normalized—as are all of the other variables—between 0 and 1, the magnitude of the coefficient indicates their relative importance. Our results show that the coefficient of *relative wins* is almost four times greater than that of *mean relative accuracy* (0.15 and significant, compared with 0.04 and insignificant).

In Models 5 and 6, we explore the possibility that the I/I respondents use more complex rules than simply ranking existing stars by their total number of wins in battleground stocks. In Model 5, we add to the regression an interaction variable that measures the relative accuracy in battleground stocks. Our results show that the coefficient of this interaction variable is small and statistically insignificant. In contrast, the coefficient of *No. of wins* is hardly affected. We next note that our binary variable *win* only compares accuracy across star analysts. However, it is possible that being the most accurate among all analysts, whether stars or non-stars, also has an effect on ranking improvement. Specifically, we try to determine whether wins that are accompanied by supreme overall accuracy relative to all analysts in the I/B/E/S database carry more weight than wins associated with relatively poor overall accuracy. To do so, we create a binary variable *Win plus ranked in the top 2*, to which we assign the value of 1 if, in at least one of the wins of the star analyst, the analyst's accuracy is also ranked in the top two places relative to the entire I/B/E/S universe.[17] The results in Model 6 show that the coefficient of this interaction variable is slightly negative and very close to 0. This suggests that the performance of star analysts relative to non-star analysts in battleground stocks does not play a substantial role in the I/I magazine rankings.

4.2 Success in battleground vs. single-star stocks

We have shown that accuracy among star analysts in battleground stocks is highly correlated with an improvement in I/I rankings. However, we have yet to examine the importance of a win in battleground stocks compared with performing well in single-star stocks. To address this issue, we create another binary variable, *ibes win*, to which we assign the value of 1 if the analyst is the most accurate in the entire I/B/E/S universe, including both stars and non-stars. We then count the total number of I/B/E/S wins that an analyst has accumulated in a given year, which we refer to as *No. of top1*. Our main goal is to compare the importance of performing well in battleground stocks (*No. of wins*) to that of performing well in single-star stocks (*No. of top1*).

(Insert Table 7 about here.)

Table 7 shows the relation between the accuracy of star analysts in both battleground and single-star stocks and their promotion in the I/I rankings. As in Table 6, the dependent variable indicates whether the star analyst improves the ranking or remains in

[17] We use the top two places rather than the first place alone in order to increase the power of our test. We can report that when we use first place alone relative to all analysts, the coefficient is negative (-0.08) and insignificant.

the highest position. In Model 1, we estimate the effect of the total number of I/B/E/S wins that an analyst has accumulated in a particular year on the probability of ranking improvement and our results show that the coefficient of *No. of top1* is positive (0.25) and highly significant. In Model 2, we add back to the regression the variable *No. of wins* (the number of battleground stocks in which the analyst is the most accurate relative to other stars) and we find that the coefficient of *No. of top1* drops by almost half and is significant only at the 10% level. In comparison, the coefficient of *No. of wins* is significant at the 1% level. Interestingly, both coefficients seem to be of the same magnitude; however, while the unconditional probability of a star analyst being the most accurate in the entire I/B/E/S universe is less than 10%, the probability of a star analyst being the most accurate relative to other stars is 35%. This suggests that the weight of a win relative to other stars is much greater than the weight of an I/B/E/S win relative to all other analysts. In order to further examine the relative importance of both variables, we normalize the variable *No. of top1* to between 0 and 1 using the same method employed to compute *relative wins*. In Model 3, we include the two normalized variables in order to learn about their relative importance in I/I rankings. Consistent with our previous results, Model 3 shows that the coefficient of *relative wins* is roughly two-and-a-half times larger than that of *Relative top1* (1.35 compared with 0.58, respectively).

The variable *No. of top1* pools together I/B/E/S wins in both battleground and single-star stocks and thus its weakness may be driven by the insignificance of *ibes* wins in battleground stocks. Indeed, our previous findings (cf. Model 6 in Table 6) suggest that the performance of star analysts in battleground stocks relative to non-star analysts does not play a key role in the I/I magazine rankings. To better distinguish between the importance of battleground and single-star stocks, we use an alternative definition of *No. of top1* that includes I/B/E/S wins only in single-star stocks. That is, we count the total number of *ibes wins* in single-star stocks in each year.

Models 4–6 re-estimate Models 1–3 while replacing the pooled *No. of top1* variable with the unblended one.[18] Our results show that the coefficient of *No. of top1* increases materially from 0.25 in Model 1 to 0.34 in Model 4. Furthermore, when we estimate it together with *No. of wins,* the coefficient of *No. of top1* is almost twice as large in Model 5 as in Model 2, which confirms that being the most accurate overall is much more important in single-star stocks than in battleground stocks. The literature typically assumes that the success of star analysts is measured against the entire I/B/E/S universe. The results in Model 5 suggest that this holds only in single-star stocks. Success in battleground stocks is predominantly measured against other star analysts. In Model 6, we again normalize the unblended variable *No. of top1* (I/B/E/S wins in single-star stocks) so that we can compare its magnitude to that of *relative win*. Consistent with our main argument—that star analysts are being evaluated primarily on the basis of their performance in battleground stocks—we find that the coefficient of *relative wins* is 1.8 times larger than the coefficient of the normalized variable *Relative top1.*

A potential concern with our findings is that the special weight given to performing well in battleground stocks is driven by the fact that battleground stocks represent larger firms. It may be that performing well in large stocks is the real underlying driver of ranking promotions. Indeed, our univariate analysis (cf. Table 1) shows that battleground stocks are larger than single-star stocks. To distinguish between the two explanations, we examine the effect of performing well in extremely large stocks. We count the number of wins in

[18] Using an interaction variable between *battleground* and *Top1* leads to similar results.

battleground stocks (*No. of wins*) and the number of I/B/E/S wins (*No. of top1*) in single-star stocks, but this time only in stocks that are in the highest NYSE-size quintile. That is, we re-estimate the same three regressions as in Models 4–6 in Table 7 while only collecting wins in the largest firms. Our unreported results show that the coefficient of *No. of top1* remains insignificant whereas the coefficient of *No. of wins* remains large and significant. Our findings confirm that even among large firms, doing well relative to other star analysts carries more weight in the I/I rankings than doing well relative to ordinary analysts.

To ensure the robustness of our results, we estimate multiple alternative specifications for *No. of wins* and *No. of top1*. We can report that using the NYSE median as the size threshold (that is, counting both the number of wins in battleground stocks and the number of I/B/E/S wins in single-star stocks in stocks larger than the NYSE median) barely changes our results. Our results also hold when we drop firms that are in the highest size decile, ensuring that a few distinguished stocks do not drive the higher importance of battleground stocks. Finally, our results are not sensitive to whether we define good performance in single-star stocks (*No. of top1*) as the 20% most accurate analysts in the I/B/E/S universe rather than the single most accurate one. In all of these specifications, the magnitude of *relative wins* is at least 1.6 times higher than that of the number of I/B/E/S wins in single-star stocks. Hence, our findings suggest that I/I respondents focus on the performance of star analysts in battleground stocks.

5 Conclusions

A large body of literature examines the strategic behavior of analysts. One of the main reasons why analysts may choose to bias their forecasts is related to career concerns. Strategic behavior driven by career concerns is typically associated with the behavior of ordinary, lower-tier analysts. Ordinary analysts tend to "herd" in order to avoid negative consequences (turnaround) in case their private information turns out to be wrong or they opt to overstate their private signals to stand out from the crowd. In this paper, we examine the career concerns of a group of analysts at the top of their profession—star analysts—who are already prominent and enjoy a high level of job security and thus unlikely to face the same considerations as ordinary analysts. Star analysts have an incentive to retain star status and we argue that this incentive influences the financial forecasts they release to the public.

The most influential rankings of analysts are provided by *Institutional Investor* (I/I) magazine, which annually sends out thousands of questionnaires to money managers and, based on their responses, ranks the top three analysts in each sector. Since the respondents are not compensated for their participation in the survey, it is likely that they look for ways to minimize their effort while still providing reasonable answers. A simple rule of thumb would be to compare star analysts who cover the same stock. This one-on-one comparison allows respondents to determine that the more accurate analyst is "better," while avoiding the time-consuming process of comparing across a larger set of stocks and taking into account factors such as earnings surprises, information environment, and earnings management.

The findings in this paper are supportive of the previous argument. We show that the performance of star analysts is not equally important across all of the stocks they cover. The performance of a star analyst in a stock that is covered by one or more other star analysts (i.e., a battleground stock) carries more weight than performance in stocks that are not covered by other star analysts. Our results show that existing star analysts are rewarded for winning—i.e., being the most accurate among all star analysts that cover a particular stock. Specifically, winning in a battleground stock materially improves the probability of being re-selected as a star in the following year. I/I survey respondents seem to favor analysts who managed to accumulate more wins in battleground stocks during the past year. This implicit incentive induces star analysts to strategically devote more effort to battleground stocks. Our findings indeed suggest that star analysts are more accurate in forecasting earnings in battleground stocks than in single-star stocks and this finding is consistent with the notion that competition among star analysts affects the information environment of the firms they cover.

By highlighting the importance of competition among star analysts, this paper makes two seminal contributions to the literature. First, it provides evidence on economic factors behind the selection process of analyst rankings. Stickel (1992) reports that star analysts are more accurate than non-star analysts. Leone and Wu (2007) find a positive relation between pre-selection accuracy and star status. Emery and Lee (2009) find that both the accuracy of earnings forecasts and the profitability of investment recommendations play a minor role in the selection of star analysts and deem the I/I rankings to be nothing but a beauty contest. Taking into account the large effect that star analysts have on financial markets, their findings suggest that investors, managers, and other analysts place their trust in a bunch of gifted salesmen. While understanding the methodology used in analyst rankings is outside the scope of this paper, our emphasis on the importance of competition among existing star analysts can serve as a springboard to further research.

Second, this paper identifies a novel strategic consideration that may bias forecasts issued by financial analysts. A large body of literature argues that analysts bias the information they release in order to accommodate their brokerage house interests. The evidence on whether this bias extends to star analysts is mixed. Star analysts have been shown to herd less, to be less optimistic during hot equity periods, and not to revise their recommendations when they switch brokerage houses (Hong, Kubik, and Solomon (2000); Clarke, Khorana, Patel, and Rau (2007); and Fang and Yasuda (2009)). These findings are consistent with the argument that reputational concerns prevent star analysts from engaging in such opportunistic behavior. In contrast, both Mola and Guidolin (2009) and Brown et al. (2013) show that stars bias their recommendations to accommodate affiliated mutual funds and hedge funds. Our results also show that star analysts tailor their forecasts in response to their own incentives. However, unlike the first-moment effects documented in the literature, the outcome documented in this paper relates to the second moment—the forecast error. Specifically, we show that the forecast error depends on whether a star analyst faces competition with other star analysts.

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Table 1: Summary Statistics

We divide all sample stocks into three groups: (1) stocks not covered by any star analyst (No star analyst), (2) stocks covered by a single star analyst (Single-star analyst), and (3) stocks covered by more than one star analyst (Battleground stocks). We use *Institutional Investor* (I/I) rankings to determine star status. All analysts ranked in the first three places in the previous year are considered to be stars. *Size* is the natural logarithm of the market value at the end of the month before the first forecast of the fiscal year. *Large firms* are larger than the median NYSE size. *Proportion small* is the proportion of stocks in the lowest size quintile (NYSE cutoff points). *Average EPS* is the simple average of EPS among all stocks in the portfolio. *Proportion negative EPS* is the proportion of firms with positive EPS. *No. Analyst* is the number of analysts that cover that firm in a given fiscal year. *Δanalysts* is the change in the number of analysts compared with the previous year. Finally, *Abs error* is the average absolute error of the analyst, calculated as the difference between the analyst's forecast and the realized earnings.

Panel A: Firm-years

		No Star Analyst	Single-Star Analyst	Battleground Stocks
1	**No. of firms**	12,831	3,690	3,639
2	**Large firms**	1,008	1,187	2,569
3	**Size**	12.92	14.09	15.48
4	**Proportion small**	0.56	0.21	0.03
5	**Average EPS**	0.34	0.65	0.84
6	**Proportion negative EPS**	0.28	0.15	0.03
7	**No. Analysts**	6.88	11.45	18.51
8	**Δanalysts**	0.37	0.66	1.05
9	**Absolute error**	0.55	0.41	0.31

Panel B: Analyst-years

		No Star Analyst	Single-Star Analyst	Battleground Stocks
10	**No. of firms covered by star**	---	5.22	7.10
11	**No. of initiations per year (stars)**	---	0.67	1.15
12	**No. of withdrawals per year (stars)**	---	0.27	0.32

Table 2: Forecast Error of Star Analysts

The table presents the accuracy of star analysts. We define a star analyst as an analyst ranked in the first three places in the I/I rankings. We measure analyst forecast error in a stock as the absolute difference between the analyst's EPS forecast and the realized EPS scaled by the realized EPS. Throughout, we use only the earliest forecast each year for each stock. *Battleground* is a binary variable to which we assign the value of 1 if two or more star analysts cover the firm. Control variables are normalized to be between 0 and 1. *No. analyst* is the total number of analysts that cover the stock. *Days elapsed* is the number of days between the analyst's last and current forecasts. *Forecast horizon* is the number of days until the end of the fiscal year. *Order* is the order in which the analyst announces. *Broker size* is the number of analysts employed by the brokerage house. *General experience* is the number of years the analyst is in I/B/E/S files, whereas *Firm experience* is the number of years the analyst has been covering a specific firm. In Model 6, we include only the first announcement by any star analyst for each stock. We exclude from the analysis firms that are in the lowest size quintile. All standard errors are clustered by firm. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: All firms

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Battleground	-0.0550***	-0.0629***	-0.0431**	-0.0520***	-0.0514**	-0.061**	
	(0.0147)	(0.0157)	(0.0202)	(0.0152)	(0.0207)	(0.0269)	
No. of analysts		-0.125**	0.137	-0.285***	0.146	0.250*	0.0866
		(0.0495)	(0.101)	(0.0588)	(0.0976)	(0.138)	(0.114)
Days elapsed		0.0235	0.00274	0.00864	-0.000938	0.00557	-0.00407
		(0.0193)	(0.0176)	(0.0186)	(0.0178)	(0.0314)	(0.0168)
Forecast horizon		0.371***	0.157***	0.271***	0.167***	0.172***	0.178***
		(0.0350)	(0.0324)	(0.0334)	(0.0338)	(0.0589)	(0.0385)
Order		0.228***	0.0266	0.122***	0.0266	0.0210	0.0530
		(0.0370)	(0.0339)	(0.0341)	(0.0350)	(0.0664)	(0.0386)
Broker size		0.0310*	-0.00308	-0.0469	-0.0495	-0.0808	0.00911
		(0.0164)	(0.0156)	(0.0312)	(0.0313)	(0.0562)	(0.0143)
General experience		-0.0738***	-0.0139	-0.261	-0.178	-0.0143	-0.0207
		(0.0244)	(0.0237)	(0.283)	(0.297)	(0.498)	(0.0251)
Firm experience		-0.0133	0.0309	-0.0326	0.0179	-0.0488	0.0255
		(0.0367)	(0.0317)	(0.0336)	(0.0345)	(0.0775)	(0.0321)
No. of stars in battleground							-0.00899
							(0.00956)
Constant	0.363***	0.0778	0.185***	0.285	0.210	0.0171	0.293***
	(0.0233)	(0.0495)	(0.0563)	(0.257)	(0.313)	(0.623)	(0.0697)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ranking fixed effect	No	Yes	Yes	No	No	No	No
Firm fixed effect	No	No	Yes	No	Yes	Yes	Yes
Analyst fixed effect	No	No	No	Yes	Yes	Yes	Yes
N	11691	10787	10787	10787	10787	5410	8221
Adj. R-sq	0.013	0.035	0.318	0.117	0.330	0.289	0.364

Panel B: Large firms

This panel replicates the analysis in Panel A while focusing only on firms larger than the median NYSE size. All the variables are defined as in Panel A.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Battleground	-0.024**	-0.045***	-0.065***	-0.037***	-0.073***	-0.09***	
	(0.0115)	(0.0163)	(0.0207)	(0.0131)	(0.0207)	(0.0269)	
No. of analysts		0.0112	0.211**	-0.117***	0.233**	0.323**	0.147
		(0.0502)	(0.105)	(0.0397)	(0.104)	(0.152)	(0.114)
Days elapsed		0.0132	-0.00332	0.00462	-0.000621	0.0454	-0.0226
		(0.0199)	(0.0177)	(0.0190)	(0.0184)	(0.0344)	(0.0164)
Forecast horizon		0.329***	0.156***	0.247***	0.162***	0.232***	0.163***
		(0.0356)	(0.0334)	(0.0298)	(0.0357)	(0.0737)	(0.0374)
Order		0.183***	0.0372	0.0995***	0.0321	0.0701	0.0483
		(0.0370)	(0.0337)	(0.0307)	(0.0348)	(0.0754)	(0.0368)
Broker size		0.0201	-0.00432	-0.0585*	-0.0371	-0.0920	-0.00228
		(0.0161)	(0.0139)	(0.0330)	(0.0316)	(0.0605)	(0.0124)
General experience		-0.0593**	-0.0217	-0.150	-0.130	-0.0476	-0.011
		(0.0246)	(0.0206)	(0.266)	(0.310)	(0.575)	(0.0198)
Firm experience		-0.00348	0.0482	-0.0109	0.0717**	0.114	0.0328
		(0.0362)	(0.0295)	(0.0287)	(0.0316)	(0.0757)	(0.0288)
No. of stars in battleground							-0.0053
							(0.00791)
Constant	0.276***	0.0120	-0.131*	0.142	0.300	0.221	0.0372
	(0.0173)	(0.0490)	(0.0672)	(0.255)	(0.293)	(0.656)	(0.0463)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ranking fixed effect	No	Yes	Yes	No	No	No	No
Firm fixed effect	No	No	Yes	No	Yes	Yes	Yes
Analyst fixed effect	No	No	No	Yes	Yes	Yes	Yes
N	9102	8505	8505	8505	8505	3841	7064
Adj. R-sq	0.008	0.030	0.300	0.113	0.319	0.281	0.329

Table 3: Changes in Star Coverage and Forecast Error

The table presents the relationship between the forecast error of star analysts and the change in the number of star analysts covering the firm. We start by calculating the average forecast error of all star analysts that cover a firm in both the year of portfolio formation and the prior year. We then divide all stocks that are covered by star analysts into three groups: (1) stocks that experienced a decrease in the number of star coverage, (2) stocks that experienced no change in star coverage, and (3) stocks that experienced an increase in star coverage relative to the previous year. The third group (stocks that experienced a decrease in star coverage) is further divided into two subgroups: stocks that switch from battleground to single star and stocks that remain battleground stocks. Note that we include only stocks that are covered by at least one star analyst in the year of portfolio formation and in the previous year. The first column presents the mean forecast error one year prior to portfolio formation. The second column presents the mean forecast error in the year of portfolio formation. The third column presents the difference in forecast error between the year of portfolio formation and the previous year. The next three columns present the difference-in-difference analysis. Each firm in our treatment group (firms that experience a change in star coverage) is matched with a similar firm from the subsample in which star coverage remains unchanged. Our matching criteria are industry (Fama & French 12 industries) and size. The fourth column presents the difference-in-difference analysis for the entire sample. The fifth column presents a similar analysis but only in stocks that are larger than the median NYSE size at the year of portfolio formation. Finally, the last column presents the difference-in-difference analysis when we only include cases in which the demoted star analyst continues to cover the firm.

	Error Year t-1	**Error year t**	**Diff**	**Diff-in-diffs analysis**		
				All firms	**Large firms**	**Ex-star remains**
Stable star coverage (n=2174)	0.292	0.293	0.000			
			(0.024)			
Increase in star-analyst coverage (n=1106)	0.264	0.270	-0.006	-0.043*	-0.064**	-0.035
			(0.356)	(1.836)	(2.448)	(1.592)
Decrease in star-analyst coverage (all) (n=915)	0.262	0.316	0.054**	0.066**	0.015	0.552
			(2.535)	(2.401)	(0.626)	(1.629)
Switch to single-star (n=455)	0.307	0.423	0.116***	0.139***	0.079*	0.124**
			(3.138)	(2.993)	(1.790)	(2.117)
Remain battleground (n=460)	0.220	0.227	0.007	-0.003	-0.028	-0.012
			(0.365)	(0.098)	(0.962)	(0.346)

Table 4: Reverse Causality

This table examines whether the smaller error in battleground stocks can be the result of analysts seeking to cover stocks in a better information environment. Control variables include all controls in Table 2, normalized to be between 0 and 1, and also year and firm fixed effects. We call career-star those analysts that at some point in their careers are selected as stars (top three places in the I/I ranking). Model 1 drops all stocks that are chosen by the star analyst after becoming a star. In Model 2, we add to the regression the variable No. of career-stars that cover the firm. In Model 3, we exclude from the sample all firms that are covered by less than two career-star analysts. As with all our tests, the dependent variable is the accuracy of reigning stars. Throughout, we include only stocks that are larger than the NYSE size median. All standard errors are clustered by firm. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Model 1	Model 2	Model 3
Battleground	-0.076***	-0.056***	-0.041*
	(0.0198)	(0.0207)	(0.022)
No. of career-star		-0.015**	-0.012*
		(0.0069)	(0.0069)
No. of analysts	0.343***	0.273***	0.227**
	(0.0817)	(0.1040)	(0.103)
Days elapsed	0.007	-0.001	-0.006
	(0.0235)	(0.0183)	(0.0175)
Forecast horizon	0.171***	0.166***	0.176***
	(0.0391)	(0.0347)	(0.0360)
Order	0.0637*	0.034	0.045
	(0.0378)	(0.0347)	(0.0347)
Broker size	-0.0732*	-0.044	-0.027
	(0.0426)	(0.0319)	(0.0320)
General experience	-0.143	-0.122	-0.034
	(0.3481)	(0.3082)	(0.3101)
Firm experience	0.034	0.067**	0.066**
	(0.0576)	(0.0315)	(0.0321)
Constant	-0.657	0.333	0.092
	(0.779)	(0.2951)	(0.3260)
Year fixed effects	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes
Analyst fixed effect	Yes	Yes	Yes
N	5600	8505	8042
Adj. R-sq	0.3	0.320	0.318

Table 5: Transition Matrix

The table presents the frequency of changes in I/I rankings during our sample period. The rows represent the ranking of the analyst in year t, whereas the columns represent the ranking at year t+1. Rankings 1, 2, and 3 correspond to the first, second, and third place on the I/I All-American Research Team. Ranking 4 represents runner-ups, and Ranking 5 represents analysts that are not included in the I/I rankings.

	Ranking (t+1)					
Ranking(t)	**1**	**2**	**3**	**4**	**5**	**Total**
1	418	86	32	20	52	**608**
	(68.75)	(14.14)	(5.26)	(3.29)	(8.55)	**(100)**
2	100	236	98	59	90	**583**
	(17.15)	(40.48)	(16.81)	(10.12)	(15.44)	**(100)**
3	45	106	178	145	97	**571**
	(7.88)	(18.56)	(31.17)	(25.39)	(16.99)	**(100)**
4	22	99	155	418	391	**1,085**
	(2.03)	(9.12)	(14.29)	(38.53)	(36.04)	**(100)**
Total	**585**	**527**	**463**	**642**	**630**	**2847**
	(20.55)	**(18.51)**	**(16.26)**	**(22.55)**	**(22.13)**	**(100)**

Table 6: Success in Battleground Stocks and Ranking Improvement

The table presents the relation between analyst accuracy in battleground stocks and the probability of promotion in the I/I rankings. The dependent variable is binary and we assign it the value of 1 if the star analyst (ranked in the first three places) improves her ranking or remains in first place. Given that the basic measure is analyst-years rather than individual forecasts, we aggregate all the independent variables across all stocks in a certain year. The variable *No. battleground stocks* counts the number of stocks covered by more than one star analyst. The variable *No. of wins* counts the number of wins in battleground stocks. A win is defined as a stock in which the star analyst is closer to the actual earnings than all the other star analysts covering the stock. All other control variables are normalized to take a value between 0 and 1. There are 1,184 analyst-years in our sample, of which 35% are promoted. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Mean relative accuracy	0.895**	0.896**	0.552	0.425	0.440	0.433
	(0.420)	(0.434)	(0.453)	(0.440)	(0.443)	(0.448)
No. of battleground stocks		0.065***	0.028			
		(0.013)	(0.020)			
No. of wins			0.109***		0.153***	0.154***
			(0.042)		(0.039)	(0.042)
Relative wins				1.562***		
				(0.295)		
Mean relative accuracy (BG)					-0.024	
					(0.095)	
Win plus ranked in the top 2						-0.028
						(0.047)
Mean no. analyst	0.137	0.514	0.592	0.512	0.571	0.545
	(0.570)	(0.585)	(0.586)	(0.589)	(0.593)	(0.584)
Mean days elapsed	-0.418	-0.487	-0.450	-0.442	-0.413	-0.421
	(0.522)	(0.541)	(0.542)	(0.539)	(0.540)	(0.538)
Mean forecast horizon	0.223	-0.137	-0.104	-0.024	-0.015	-0.017
	(0.728)	(0.751)	(0.754)	(0.748)	(0.746)	(0.748)
Mean order	-0.707	-1.059	-1.091	-1.026	-1.028	-1.029
	(0.741)	(0.765)	(0.767)	(0.761)	(0.763)	(0.761)
Mean brokerage size	-0.326	-0.398	-0.440*	-0.434	-0.413	-0.413
	(0.261)	(0.263)	(0.264)	(0.264)	(0.264)	(0.264)
Mean general experience	0.505	0.399	0.388	0.416	0.404	0.441
	(0.375)	(0.381)	(0.384)	(0.393)	(0.381)	(0.381)
Mean firm experience	-2.348***	-2.507***	-2.500***	-2.499***	-2.464***	-2.464***
	(0.788)	(0.815)	(0.819)	(0.814)	(0.817)	(0.814)
Constant	0.142	0.215	0.023	-0.065	-0.177	-0.494
N	1184	1184	1184	1184	1184	1184

Table 7: Success in Battleground and Single-Star Stocks and Ranking Improvement

The table presents the relation between analyst accuracy in battleground and single-star stocks and the probability of promotion in I/I rankings. The dependant variable is binary and we assign it the value of 1 if the star analyst (ranked in the first three places) improves ranking or remains in first place. Given that the basic measure is analyst-years rather than individual forecasts, we aggregate all the independent variables across all stocks in a certain year. The variable *No. battleground stocks* counts the number of stocks covered by more than one star analyst. The variables *No. of wins* and *No. of top1* count the number of wins in battleground stocks and the number of I/B/E/S wins in single-star stocks, respectively. In Models 4–6, the *No. of top1* counts only I/B/E/S wins in single-star stocks. All other control variables are normalized to take a value between 0 and 1. There are 1,184 analyst-years in our sample, of which 35% are promoted. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Top 1: All stocks			**Top 1: Single-star stocks**		
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Mean relative accuracy	0.567	0.314	0.307	0.726*	0.297	0.300
	(0.433)	(0.446)	(0.446)	(0.426)	(0.445)	(0.445)
No. of top1	0.253***	0.130*		0.344***	0.304***	
	(0.072)	(0.078)		(0.101)	(0.103)	
No. of wins		0.133***			0.145**	
		(0.031)			(0.029)	
Relative top1			0.580*			0.832**
			(0.305)			(0.302)
Relative wins			1.353***		0.153***	1.509***
			(0.315)		(0.039)	(0.297)
Mean no. analyst	0.642	0.752	0.743	0.509	0.851	0.793
	(0.589)	(0.597)	(0.597)	(0.582)	(0.594)	(0.594)
Mean days elapsed	-0.446	-0.438	-0.471	-0.426	-0.435	-0.454
	(0.529)	(0.540)	(0.542)	(0.528)	(0.543)	(0.561)
Mean forecast horizon	0.330	0.072	0.024	0.299	0.064	0.036
	(0.736)	(0.752)	(0.752)	(0.733)	(0.754)	(0.753)
Mean order	-0.712	-0.997	-1.075	-0.686	-0.998	-1.013
	(0.746)	(0.763)	(0.763)	(0.745)	(0.770)	(0.765)
Mean brokerage size	-0.305	-0.435	-0.458	-0.411	-0.511*	-0.499*
	(0.260)	(0.265)	(0.265)	(0.263)	(0.267)	(0.266)
Mean general experience	0.477	0.404	0.403	0.406	0.307	0.376
	(0.377)	(0.383)	(0.384)	(0.373)	(0.386)	(0.384)
Mean firm experience	-2.407***	-2.482***	-2.516***	-2.341***	-2.449***	-2.476***
	(0.797)	(0.816)	(0.818)	(0.796)	(0.820)	(0.820)
Constant	-0.846	-0.572	-0.521	-0.065	-0.177	-0.494
N	1184	1184	1184	1184	1184	1184