경영학석사학위논문

Institutional Investors' Investment Horizon and Analysts' Target Price Accuracy

2016년 2월

서울 대학교 대학원
경영학과 회계학전공
김 은 지

Institutional Investors' Investment Horizon and Analysts' Target Price Accuracy

Eunjee Kim

College of Business Administration

Seoul National University

Abstracts: This paper investigates whether the investment horizon of institutional investors influences sell-side analysts' target price (TP) accuracy. Especially, I examine whether a sell-side analyst compromises TP accuracy on a stock if the stock is held by short-term institutional investors since those investors are sensitive to near-term price impact from TP issuances and, therefore, are more likely to exert pressures on analysts to keep the stock price high. Using a database of analysts' TPs issued from 1999 to 2013, I find that TP error increases as transient institutional investors' ownership increases, but not with the holdings of long-term institutional investors. The market partly appreciates the optimistic biases in the analysts' TP revisions, reacting less favorably to a revision if the revision is preceded by the purchase of short-term institutional investors. However, the market overreacts in general and corrects itself in subsequent months. Overall, empirical results indicate that sell-side analysts and the market identify the heterogeneity of institutional investors and react selectively according to institutional investors' investment horizons.

Keywords: Institutional investors, Analyst target prices

Student number: 2014-20488

Table of Contents

Ⅰ. INTRODUCTION

Ⅱ. RELATED STUDIES AND HYPOTHESES

1. Institutional investors' investment horizons
2. Sell-side analysts' responses to the heterogeneity of institutional investors
3. Sell-side analysts' target prices

Ⅲ. VARIABLE DESCRIPTIONS

1. TP accuracy
2. Institutional investors' investment horizons
3. Control Variables

Ⅳ. DATA AND SAMPLE

Ⅴ. EMPIRICAL RESULTS

1. Heterogeneous Institutional Investors and Sell-side Analysts' Target Price Errors
2. Reverse Causality
3. Postevent Market Reactions Associated with Sell-side Analyst Target Price Revisions

Ⅵ. CONCLUSIONS

REFERENCES

Figure 1: Sequence of events

Table 1: Variable Definitions

Table 2: Descriptive Statistics for Main Variables

Table 3: Pearson/Spearman Correlation Matrix for Main Variables

Table 4: The Effect of Heterogeneous Institutional Investors' Ownership on Analysts' TP Error

Table 5: Controlling for Reverse Causality

Table 6: Short-term and Long-term Cumulative Abnormal Returns upon the Sell-side Analyst TP Revisions

Table 7: Calendar Time Regressions

Ⅰ. INTRODUCTION

Numerous studies have shown that the investment horizon of institutional investors plays a crucial role in corporate monitoring by influencing management's decisions about disclosures, M&A, and CEO contracting. It is reasonable that the heterogeneity of institutional investors influences not only corporate management but also sell-side analysts because the analysts have incentives to cater to the different requests from each type of institutional investor. However, studies on sell-side analysts' behaviors depending on different investment horizons of institutional investors are relatively rare. I hypothesize that sell-side analysts issue more optimistic opinions on stocks held by short-term institutional investors due to the following two reasons. First, short-term institutional investors should care about their near-term exit prices of their investment, and thus, are more likely to exert pressures on sell-side analysts to keep the stock price high ("fee pressure"). Second, ceteris paribus, short-term investors with high portfolio turnover generate greater brokerage commissions, compared to long-term investors. Thus, sell-side analysts may compromise the accuracy of their opinions if they can generate higher commission revenue from transient institutional investors ("trade generation") (Gu, Li, and Yang, 2013)[1]. Similar to Gu et al. (2013) and Firth, Lin, Liu and Xuan (2013), this paper focuses more on the fee pressure hypothesis than on the trade generation hypothesis because I examine a sequence of events starting with the existing holdings of institutional investors and subsequent analysts' target prices (TPs) issuances/revisions.[2]

My prediction that sell-side TP error increases with short-term institutional ownership

[1] Gu, Li, and Yang (2013) explicitly distinguished between "fee pressure hypothesis" and "trade generation hypothesis". Not mutually exclusive, they are distinct because the trade generation hypothesis views analyst optimism as a cause of intensified trading while the fee pressure hypothesis views analyst optimism as a consequence of the pressure exerted through trade allocations by large investors.

[2] Also, sell-side analysts should be less motivated to be optimistically biased on the stock if the stock is already held by institutional investors and, therefore, a potential for additional buying trade is limited.

is not obvious because an analyst also faces countervailing incentives to issue unbiased TPs, with the purpose of building up the reputation of high-quality research with accurate forecasts (Hong and Kubik, 2003; Jackson, 2005; Cowen, Groysberg, and Healy 2006; Ljungqvist, Starks, Wei, and Yan, 2007). Accordingly, if the rewards from accurate research outweigh the pressures to reach optimistic opinions, analysts will choose to provide unbiased TPs, and if not, they will forgo forecasting accuracy by giving optimistic calls – in other words, analysts will react selectively according to institutional investors' investment horizons, based on their own cost-benefit assessments. Also, investment horizons of institutional investors are expected to differently influence two competing roles of institutional investors on sell-side analysts' forecasting accuracy – monitor role vs. predator role (Gu et al., 2013). Once short-term institutional investors have purchased a stock, they would prefer optimistic analysts to unbiased one, since they want the stock price to remain high in order to exit from their investment shortly. On the other hand, long-term investors do not have those incentives and would more appreciate value-added, unbiased research for accurate follow-ups on current positions. Hence, I predict that buy-side pressure on sell-side analysts for an optimistic opinion will be more pronounced under the influence of short-term institutional investors.

Specifically, I examine (1) whether short-term institutional investors increase sell-side analysts' TP errors and (2) whether the market perceives the errors (optimism) within analysts' TPs driven by the pressure from short-term institutional investors. My tests confirm that the sell-side analysts' TP errors are positively associated with the short-term institutional investors' ownership and the market partly recognizes the bias in the analysts' TPs and react less positively to the favorable TPs if short-term institutional investors recently purchased the stock prior to the TP issuances.

Using detail I/B/E/S price targets for 2,710 U.S. firms and the Thomson Financial Institutional Holdings (13F) database over the period of 1999-2013, I study the associations between institutional investors' investment horizons and sell-side analysts' target price accuracy. I use TP instead of recommendations or earnings forecasts as a proxy of sell-side analysts' opinions because of the advantage of its continuous nature and direct valuation implications (Bradshaw, Brown, and Huang, 2013). My TP accuracy measure is the difference between the TP and the stock price at the subsequent TP revision date scaled by the stock price at the TP issue date, *TPE_rev* (Bilinski, Lyssimachou, and Walker, 2013).

The first part of my empirical analysis investigates whether sell-side TP error has positive relationship with the holdings of short-term institutional investors (levels analysis) and whether sell-side analyst's TP error increases following a rise in those investors' ownership (changes analysis). I find that TP error increases as transient institutional investors' ownership increases in both levels and changes analysis, but cannot find a similar result from the relationship between TP errors and the ownership of long-term institutional investors. These results indicate that sell-side analysts distinguish different types of institutional investors and an investment horizon of those investors indeed has a meaningful influence on the sell-side TP's optimism.

However, previous tests are subject to selection bias since short-term institutional investors can proactively choose stocks of which sell-side analysts are likely to issue optimistic opinions. To establish the direction of causality, I examined the effect of the decimalization in 2001 to transient institutional investors' ownership on sell-side TP error. Decimalization enhanced both trading activities and ownership of transient institutional investors by improving stock liquidity of actively traded stocks (Fang, Tian, and Tice, 2014). Therefore, I use the increase in transient institutional investors' ownership caused by decimalization as an instrument to document that the change in short-term institutional investors' ownership caused analysts' TP error, not vice versa.

As the second set of empirical analyses, I examine short-term and long-term market reactions to the TP revisions preceded by the purchase of short-term institutional investors. These tests are conducted to find whether the market appreciates the optimism in sell-side TPs originated from the buy-side pressures. On the three-day window of TP revision dates, the market seems to recognize the optimism in analysts' upward TP revisions, reacting less favorably to a revision if the revision is made after the short-term institutional investors' purchase of the stock. However, the market still overreacts in general and corrects itself in subsequent months and therefore, short-term institutional investors can benefit from exerting influence on sell-side analysts to issue positive opinions on their investments. On the other hand, sell-side analysts' upward revisions associated with preceding long-term institutional investors' purchases do not accompany any market corrections at the revision date or further post-event period.

My paper contributes to the literature in several ways. First, my analyses add to the stream of literature that investigates the effects of shareholder heterogeneity on sell-side analysts' behavior by providing evidence that sell-side analysts differentiate each type of institutional investor according to the investment horizon and react selectively based on the investors' demands. Second, evidence of this paper supports and fine-tunes previous results on the post-event abnormal returns of TP revisions (Brav and Lehavy, 2003) and extends them to the question of whether the ex-post abnormal returns of TP announcements show different patterns when TP revision types (i.e., upward revision, downward revision, and reiteration) are further conditioned on short-term institutional investors' preceding trading directions. Third, I also extend the literature on the roles of institutional investors on sell-side analysts' forecasting accuracy[3] by better separating two competing roles in influencing analysts' behavior –

[3] See Hayes (1998), Irvine (2001), Francis (2004), Jackson (2005), Cowen, et al. (2006), Mehran and Stulz (2007), and Agrawal and Chen (2008), for example.

moderating analysts' biases as monitors vs. twisting analysts' opinions as predators (Gu et al., 2013). Extant literature has provided evidence for both roles, but it is difficult to disentangle the two roles since the detailed brokerage commission dataset is not publicly available.[4] Despite the absence of direct trading commission data, this paper was able to indirectly disentangle the two competing roles of institutional investors by dividing institutional investors into subgroups according to their investment horizons. The institutional investors' predator role dominates the monitor role when the investment horizon is short, whereas the monitor role stands out when they commit to an investing for long run. Fourth, my findings have regulatory implications by showing that not all institutional investors act as predators of sell-side analysts. Therefore, it is sensible for regulators to focus their efforts on the relationship between short-term institutional investors and sell-side brokerage firms.

This study also has a limitation that can be addressed by future research. Short-term institutional investors' ownership is only a proxy for buy-side fee pressure and the proxy can be related to other economic sources such as firm characteristics or trading activities. Therefore, despite my attempt to address observable and unobservable confounding factors, I admit that the association between TP error and each institutional type could be not solely driven by the fee pressure hypothesis.

The remainder of the paper is organized as follows. Section Ⅱ discusses prior studies and introduces my research questions. Section Ⅲ describes main variables and Section Ⅳ

---

[4] Firth et al. (2013) and Gu et al. (2013) are notable exceptions. They utilized unique dataset from China because the China Securities Regulatory Commission mandatorily requires each mutual fund to publicly report its stockholdings and trading commission payment details, including the total amount and distribution of commission s among brokerage firms (Firth et al., 2013). However, my paper differs from their studies in the following important ways. First, institutional investors' investment horizon and the investors' business relation with brokerage firm are disparate classification. For example, even though an institutional investor is a client of sell-side analysts' brokerage, if the investor has long investment horizon, they would prefer unbiased research from the related sell-side analysts. Second, my paper examined accuracy (optimism) of TPs instead of that of recommendations. Third, I used overall institutional investors' ownership data for the U.S. market whereas above two previous papers used trading commission data from the Chinese mutual funds.

outlines the data and sample. Section Ⅴ reports the results of empirical analyses. Finally, I conclude in Section Ⅵ.

Ⅱ. RELATED STUDIES AND HYPOTHESES

1. Institutional investors' investment horizons

Institutional investors are not homogeneous and literatures have examined that investment horizon of institutional investors influences corporate decisions and information intermediaries' opinions. With regard to corporate decisions, early theoretical works[5] have highlighted that each institutional investor respectively chooses its priority between monitoring and simple trading based on its cost-benefit framework and, thus, as shown in rich empirical studies[6], only long-term institutional investors exerts an influence on firms' decisions on M&As, R&D investments, and CEO contracts (Chen, Harford and Li, 2007).

Regarding the influences of heterogeneous institutional investors on sell-side analysts, studies have examined institutional investors have two countervailing roles for sell-side analysts. First, previous studies have found that institutional investors demand value-added (unbiased) research from sell-side analysts (Cowen et al., 2006; Ljungqvist et al., 2007). On the other hand, other studies provided evidence that institutional investors put pressure on the sell-side analysts to issue positive research and to refrain from offering negative opinions on the securities that they hold (Firth et al. 2012; and Gu et al. 2013). Given the existence of these two contradicting roles of institutional investors, this study tries to examine whether institutional investors choose their role between monitoring and simple trading based on their investment horizon, accordingly influencing analysts' choice between optimism and accuracy.

2. Sell-side analysts' responses to the heterogeneity of institutional investors

---

[5] See Shleifer and Vishny (1986), Maug (1998), and Kahn and Winton (1998), for example.

[6] See Brickley, Lease, and Smith (1988), Agrawal and Mandelker (1990), Bushee (1998), Hartzell and Starks (2003), Almazan, Hartzell, and Starks (2005), Gasper, Massa and Matos (2005), and Borokhovich, Brunarski, Harman, and Parrino, (2006), for example.

Previous studies have found that sell-side analysts distinguish and respond differently to a specific type of institutional investors. One stream of this research examined the relations between institutional investors and brokerage firms by categorizing the institutional investors into affiliated group and independent unaffiliated one. Mola and Guidolin (2009) found that sell-side analysts are likely to assign more frequent and favorable recommendations to a stock after the analysts' affiliated mutual funds invest in that stock because the family affiliation provides analysts with a further incentive to promptly issue reports with positive prospects on stocks held by affiliated mutual funds and to reluctantly release those with negative prospects. On the other hand, Irvine, Simko, and Nathan (2004) showed that affiliated analysts' earnings forecasts are more accurate than the other analysts' forecasts since affiliated mutual funds provide additional information for the affiliated analysts and demand high-quality research from them. I conjecture that this mixed evidence from the previous research might results from the lack of consideration of investment horizon of affiliated mutual funds.

Another stream of research classified institutional investors into client and non-client group for a brokerage and investigated whether a certain type of institutional investors gives a pressure on sell-side analysts to bias their opinions. Thanks to the direct trade commission data from China, recent literatures could test the respective reactions of sell-side analysts according to their client relationship. Firth et al. (2012) and Gu et al. (2013) found that sell-side analysts are more optimistic on their stock recommendations when the stock is held by their clients. Therefore, sell-side analysts perceive different types of institutional investors and react selectively to each of them. In this study, I explore another dimension of investor heterogeneity, institutional investors' investment horizon and expect the study to fill the void in previous research.

3. Sell-side analysts' target prices

In this section, I first review previous literature on the informativeness of analysts' TPs and then summarize studies on the sell-side TP accuracy.

Bradshaw (2002) found that sell-side analysts use TP as a rationale for their recommendations in over two-thirds of the 103 sample sell-side reports, and showed higher TPs are associated with more favorable stock recommendations. Although Bradshaw (2002) focused on the role of TPs as a justification tool for analysts' recommendations, subsequent studies further discovered independent informativeness of TPs beyond that of recommendations or earnings forecasts. Using analysts' target prices issued over period 1997-1999, Brav and Lehavy (2003) examined short-term market reaction to TP revisions and long-term comovement of TP and stock prices and found analysts' TPs are informative both unconditionally and conditional on contemporaneously issued stock recommendation and earnings forecasts revisions. Asquith, Mikhail, and Au (2005) used a database constructed from analyst reports issued by *Institutional Investor* All-American team members during 1997-1999, and they also found that TP revisions provide independent information to the capital market and incorporating them dramatically increases the fit of the regression results over that obtained from earnings forecast revisions and discrete recommendations alone. Bradshaw et al. (2013) confirmed the previous findings, providing evidence of significant market reactions to analysts' TP revisions after controlling for revisions in their earnings forecasts and stock recommendations over the 10 years from 1999 through 2009.

Prior studies have employed diverse measures of TP accuracy. Asquith et al. (2005) examined a 'TP attainability' to measure the accuracy of TPs, considering TPs to be accurate if the firm's stock price equals the 12-month projected price at any time during the year following the release of a report, and they found approximately 54% of analysts' TPs are achieved. Bradshaw et al. (2013) investigated analysts' TP performance of 12-month-ahead target price forecasts by utilizing several TP accuracy measures: within-analyst rank correlation, TP forecast error, and TP attainability. They have provided statistically significant but economically weak evidence of persistent differential abilities by sell-side analysts to forecast TPs. Gleason, Johnson, and Li (2013) investigated the influence of *inferred* valuation model use on the investment performance of sell-side analysts' TPs and documented that substantial improvements in TP quality occur when analysts appear to be using a residual-income valuation technique rather than a PEG valuation heuristic. In their empirical analyses with 750,000 TPs issued from 1997 through 2003, they depart from earlier emphasis on price target attainability and instead use a 12-month ex-post buy-and-hold return as TP accuracy measure. Finally, Bilinski et al. (2013) provided the evidence of TP accuracy in an international setting. Using an international sample of 16 countries, this paper examined analyst- and country-specific determinants of TP forecast errors, and found that significant variation in average TP accuracy across countries is due to differences in accounting disclosure quality, the origin of the legal system, cultural traits, and IFRS regulation.

Ⅲ. VARIABLE DESCRIPTIONS

1. TP accuracy

I use TP instead of recommendation or earnings forecast as a proxy of sell-side analysts' opinion, because (1) incorporating gradations in the analysts' TPs can overcome many of the disadvantages of limited, discrete recommendation categories (Asquith et al. 2005); (2) contrary to earnings forecasts which only covers short-term limited period, TPs reflect permanent nature of company's earnings (Bradshaw et al., 2013); and (3) TPs are often computed as the product of forecasted earnings and a financial ratio, providing incremental information beyond earnings forecasts (Asquith et al., 2002; and Brav and Lehavy, 2003).

Following Bilinski, Lyssimachou, and Walker (2013), I measure TP accuracy by the magnitude of TP error, *TPE_rev*, which is the difference between the TP and the stock price at the TP revision date, P_{rev}, scaled by the stock price at the TP issue date, P_s. Although Bilinski et al. (2013) used absolute difference, this paper adopted signed difference to get implications of optimism as well as accuracy of TP.[7]

$$TPE\_rev = \frac{TP - P_{rev}}{P_s}$$

In addition to absolute *TPE_rev*, Bilinski et al. (2013) used another TP error measure, *TPE*, the absolute difference between the target price and the actual stock price at the end of 12-month forecast horizon scaled by the stock price at the TP issue date since the forecast horizon of most TPs is 12 months. However, I used only *TPE_rev* as a main TP error measure, because (1) a revision in target price made before the end of 12-month forecast horizon means that the

[7] My TP accuracy measure, TPE_rev, indicates analysts' *ex-post* optimism because the variable compares stock price at TP revision date (P_{rev}) with previous TP, looking backward. Untabulated findings reveals that inferences based on estimating my baseline model (both level and change analyses) using *ex-ante* optimism measure (TP/P_s) are largely the same as those based on my main dependent variable, TPE_rev.

preceding TP becomes obsolete (Bilinski et al. 2013) and (2) for my sample, median interval for target price forecast revision is 91 days, much shorter than stated forecast horizon of 12 months.[8] Therefore, I believe 12-month horizon *TPE* used in Bilinski et al (2013) is not an appropriate measure of TP accuracy at least for this paper's empirical tests.

2. Institutional investors' investment horizons

Main explanatory variable of my empirical analyses is institutional investors' investment horizon and I adopted Bushee's (1998, 2001) methodology of institutional investor classification. He developed an algorithm to decompose institutional investors into three groups by diversification of investment position and trading frequency for an institution: (1) the transient investors with high turnover and highly diversified positions; (2) the dedicated investor with low turnover and high concentration of their holdings; and (3) quasi-indexing investors with low turnover and high diversification. Therefore, according to Bushee's classification, transient investors hold their investments for short horizon whereas dedicated investors and quasi-indexers maintain their positions for longer periods. Hence, I use three types of institutional investor as the proxy for institutional investors' investment horizon. Institutional investors' ownership data at the end of quarter *q-1* are matched to subsequent TPs issued during quarter *q* as shown in Figure 1.

3. Control variables

I include a series of control variables in my model to capture previously documented determinants of TP accuracy. I mainly followed Bilinski et al. (2013) and Bradshaw et al. (2013) in selecting control variables[9]: covered firm characteristics, analyst/broker characteristics, and

---

[8] This sample descriptive is consistent with Bradshow, Huang, and Tan (2012). Due to this shorter-than-expected observed revision frequency, they also chose six-month as primary TP horizon.

[9] Bilinski et al. (2013) also included TP/P ratio and EPS forecast error (*aEPS*) to control for a firm's high expected

others. The covered firm characteristics include firm market capitalization (*MV*) and the number of analysts following a firm (*F_#Ana*) as measures for information environment of a firm. Bilinski et al. (2013) showed that both variables have negative associations with TP error because analysts produce more accurate forecasts for firms with abundant information environment and high competition among analysts. Price momentum (*MOM*) controls for predictable price patterns. Jegadeesh, Kim, Krische, and Lee (2004) found that analyst's recommendation profitability is positively associated with past momentum, and Bilinski et al. (2013) and Bradshaw et al. (2013) also showed that past price momentum decreases sell-side TP errors. Stock price volatility (*VOL*) is included to capture the level of difficulty to predict a firm's future price, and I expect the sign of the coefficient of *VOL* to be positive. I also included stock turnover (*TURN*), average daily stock turnover for 3 months prior to the TP issue date, to control for the general trade generation incentive of sell-side analysts. Since numerous previous studies have shown significantly positive relations between trading commission and analysts' optimism, *TURN* variable is predicted to be positively related to the TP errors (O'Brien and Bhushan, 1990; McNichols and O'Brien, 1997; Jackson, 2005; and Agrawal and Chen, 2008). Note that a significant association between TP error and the each institutional investor's ownership after controlling for stock turnover indicates a sell-side analyst distinguishes each institutional investor' investment horizon and reacts selectively, a behavior distinct from chasing actively-traded stocks for trade generation. Additionally, I included a firm's past financial performance measures since analysts use past information to develop their TPs. I control for past firm characteristics for quarter *q-1*, including profitability (*ROA*), loss dummy (*LOSS*),

---

earnings growth and analysts' differential ability to issue accurate target price beyond the ability to forecast accurate earnings, respectively. However, I do not use these variables since their inclusion would distract from my research objectives. First of all, including TP/P ratio might distort the test since it is mechanically associated with dependent variable, *TPE_rev*, by definition of the variable. Instead of TP/P, I additionally include market-to-book ratio in the regression model to capture expected earnings growth of a firm. Secondly, in this paper, *aEPS* should not be included in the model because I use TP error as an aggregate measure of analyst's opinion, not incremental information beyond earnings forecast.

leverage (*LEV*), and market-to-book ratio (*MTB*).

The analyst and broker characteristics I control for include an analyst's firm-specific experience (*A_exp*), number of firms that an analyst is following (*A_cover*), and the number of analysts at a brokerage house (*B_#Ana*). Previous studies have shown that experienced analysts predict covered firms' future price (TP) as well as EPS more accurately (Mikhail, Walther, and Willis, 1997; Clement 1999; Jacob, Lys, and Neale 1999; and Bilinski et al. 2013). However, the influence on TP error of the number of an analyst's coverage firms is somewhat mixed. Although Clement (1999) and Jacob et al. (1999) found that effort constraints and diffusion of focus cause analysts to increase forecast errors, it is also possible that an analyst can obtain additional information by covering more companies and produce more accurate forecasts as shown in Bollinger (2004). Therefore, I have no expectation for the sign of the coefficient of *A_cover*. Finally, the number of analysts at a brokerage house (*B_#Ana*) captures the size of research resource that an analyst can utilize, and Clement (1999) and Jacob et al. (1999) found the positive association between the brokerage size and forecast accuracy of the analysts in the brokerage.

In addition, I include dummy variable for financial crisis period (*Fin_cris*) because drastic share price change around the period distorts my dependent variable, *TPE_rev*. To control for time and industry effects, I also include a set of annual dummies (*Year dummies*) for the TP issue year and ten industry dummies (*Industry dummies*) based on the sector code from the GICS classification in all regression models. Table 1 provides detailed variable definitions.

Ⅳ. DATA AND SAMPLE

The data used in this study are mainly obtained from four sources: Thomson Reuters's I/B/E/S, CRSP, Compustat, and Thomson Financial Institutional Holdings (13F) database. My sample period is from the first quarter of 1999 to the fourth quarter of 2013. I collect the each analyst's target prices and EPS estimates for firms listed on NYSE, AMEX and Nasdaq from the I/B/E/S detail U.S files and daily stock prices, returns, traded volume, and the number of shares outstanding from CRSP. I delete firms whose stock price is missing or less than 5 dollars. I obtained quarterly financial data of covered firms from Compustat database. Following Bushee's (1998, 2001) classification, I break down institutional holdings from 13F into three groups. Each TP issued in quarter *q* (firm-analyst observations) is merged with the firm's financial and ownership data at the end of quarter *q-1*. To minimize the effect of outliers, I delete all continuous variables at the top and bottom 1% of each variable's distribution. My final sample includes 206,285 TPs for 2,710 firms issued by 6,417 analysts, and each unit of observation is a single analyst TP.

Table 2 presents the descriptive statistics for the dependent and explanatory variables. As previous studies have founded, sell-side analysts are generally optimistic – mean TP error (*TPE_rev*) is 14%. The summary statistics for analyst characteristics are mostly similar with Bilinski et al. (2013), confirming our sample is not special. The average firm-specific forecasting experience is 3.18 years and an analyst covers average 16.42 firms at the same time. Approximately 61 analysts are employed at one brokerage house on average during my sample period.

Table 3 presents Pearson and Spearman rank correlations between our main baseline variables. The ownership of transient institutional investors, *TII*, has a significantly positive Pearson (Spearman) correlation with turnover measure, consistent with Bushee's identification of transient investors. The number of analysts following, *F_#Ann* also has a significant positive Pearson (Spearman) correlation with *TURN*, suggesting that actively-traded stocks attract more sell-side analysts or sell-side analyst following generates more turnovers for covered stocks.

Ⅴ. EMPIRICAL RESULTS

I first investigate whether analyst's TP error increases with transient institutional investor's ownership and whether the same relation exits for the ownership of dedicated and quasi-indexing institutional investors. To address reverse causality of my first analyses, I exploit external shock of liquidity at decimalization and establish causal effect of institutional investors' investment horizon on sell-side analysts' TP accuracy. As a second set of analysis, I examine the ex-post market reactions to the sell-side TP revisions, in order to find whether the market appreciates the optimistic bias associated with institutional investor's investment horizon.

1. Heterogeneous Institutional Investors and Sell-side Analysts' Target Price Errors

The baseline models of my first empirical analyses are:

$$\begin{aligned} TPE\_rev_{ij} = {} & \beta_0 + \beta_1 TII_{ij} + \beta_2 DED_{ij} + \beta_3 QUS_{ij} + \beta_4 lnMV_{ij} + \beta_5 lnF\_\#Ana_{ij} + \beta_6 MOM_{ij} \\ & + \beta_7 VOL_{ij} + \beta_8 TURN_{ij} + \beta_9 ROA_{ij} + \beta_{10} LOSS_{ij} + \beta_{11} LEV_{ij} + \beta_{12} MTB_{ij} \\ & + \beta_{13} lnA\_exp_{ij} + \beta_{14} lnA\_cover_{ij} + \beta_{15} lnB\_\#Ana_{ij} + \beta_{16} Fin\_cris_{ij} \\ & + \sum_{k=0}^{10} \beta_{17+k}\, Industry\ dummies_{ij} + \sum_{k=0}^{12} \beta_{28+k}\, Year\ dummies_{ij} + \varepsilon_{ij} \qquad (1) \end{aligned}$$

$$\begin{aligned} \Delta TPE\_rev_{ij} = {} & \beta_0 + \beta_1 \Delta TII_{ij} + \beta_2 \Delta DED_{ij} + \beta_3 \Delta QUS_{ij} + \beta_4 \Delta lnMV_{ij} + \beta_5 \Delta lnF\_\#Ana_{ij} \\ & + \beta_6 \Delta MOM_{ij} + \beta_7 \Delta VOL_{ij} + \beta_8 \Delta TURN_{ij} + \beta_9 \Delta ROA_{ij} + \beta_{10} \Delta LEV_{ij} \\ & + \beta_{11} \Delta MTB_{ij} + \beta_{12} \Delta lnA\_exp_{ij} + \beta_{13} \Delta lnA\_cover_{ij} + \beta_{14} \Delta lnB\_\#Ana_{ij} \\ & + \sum_{k=0}^{10} \beta_{15+k} Industry\ dummies + \sum_{k=0}^{12} \beta_{26+k} Year\ dummies + \varepsilon_{ij} \qquad (2) \end{aligned}$$

where the *ln* denotes logarithmic transformation of the variable.[10] The variables are measured

[10] For *A_exp* I use log 1+ corresponding variable to account for zero values.

for firm i and analyst j. Our empirical tests use robust standard errors clustered by firm and analyst (Peterson 2009).

Table 4 presents how the investment horizon of institutional investors influences analysts' target price accuracy. Column (1) and (2) are results from the estimation of regression model (1) where the analysts' target price errors are regressed on the levels of each type of institutional ownership at the end of *q-1*. Column (3) and (4) are based on the regression model (2). Here, I test whether a quarter-on-quarter increase in transient institutional investors' ownership causes a sell-side analyst to produce a more inaccurate (optimistic) TP, compared to their previous one for the same covered stock. Since sell-side analysts are likely to face greater pressures from short-term institutional investors to maintain optimistic view on the investors' investment, I expect β_1 to be significantly positive in both level and change regression models. On the other hand, long-term institutional investors, compared to short-term institutional investors, will more appreciate unbiased high-quality research; therefore, sell-side analysts should have less incentive to please long-term investors with optimistic opinion. Accordingly, I predict the magnitude of β_2 and β_3 to be significantly less than β_1 but whether long-term investors' monitor role overwhelms their predator role or not is an empirical question. Hence, I do not predict specific signs for the coefficient estimates of dedicated and quasi-indexing investors' ownership.

Column (2) is my baseline OLS regression model clustered by firm and analyst (Peterson, 2009). Consistent with my prediction, the coefficient of *TII*, β_1, is positive and significant after controlling for other determinants of analysts' TP error, indicating that the sell-side analysts' TP error increases with the ownership of transient institutional investors' ownership. The result is economically significant since one standard deviation increase of transient investors' ownership would increase sell-side analysts' TP error by 2.2%pt. On the other hand, the coefficient of DED (β_2) is insignificant and that of QUS (β_3) is significantly negative, implying that competing roles of dedicated institutional investors offset themselves and in case of quasi-indexers, monitor role dominates predator role of the institutional investors. Though there is some difference in the magnitude, both coefficient estimates (β_2 and β_3) are significantly less than β_1, confirming my prediction.

Coefficients of control variables mostly fall in line with my predictions or findings from previous studies. The number of analysts covering a firm (*F_#Ana*) is negatively related to analysts' TP error, suggesting that for firms with rich information environment analysts produce more accurate TPs. The size measure, *lnMV*, shows the opposite sign to my prediction, but economic significance of the coefficient is negligible. Similar to the findings from Bilinski et al. (2013) and Bradshow et al. (2014), a reversal of price momentum (*MOM*) decreases TP errors and more volatile stocks (*VOL*) are associated with larger TP errors. Regarding to the proxies of analysts/broker characteristics, the coefficient of *B_#Ana* shows that analysts produce more accurate TPs when they have superior research resources. Insignificant coefficient of the number of an analysts' coverage firms (*A_cover*) seems to reflect the mixed evidence from previous research (Clement, 1999; Jacob et al., 1999; Bollinger, 2004). However, I cannot find the explanation for the significantly positive association between analysts' experience (*A_exp*) and TP error.

To test the robustness of findings from level analysis of regression model (1), I tested my baseline model using change variables, controlling for time-invariant unobservable omitted variables. Dependent variable of change analysis is the change in TP errors (Δ*TPE_rev*) of the same analyst for the same covered stock. The number of sample observations used for this change analysis is 165,384. Results are qualitatively similar to the level analysis, and explanatory power of the change model is even higher than previous level model. Results in column (4) show that an increase in transient investor's ownership leads to larger TP error (more optimistic TP). The coefficient estimate of Δ*TII* means that 1% ownership increase of transient institutional investors are associated with subsequent 3.12%pt increase in sell-side analysts' TP error. However, the increase in long-term institutional investors does not increase analysts' TP error, suggesting that sell-side analysts selectively react to the ownership changes of heterogeneous institutional investors. The sign and significance of coefficients of control variables in the change analysis are mostly similar to those in the level analysis. To sum, results from level and change analyses support my hypothesis that sell-side analysts distinguish institutional investors with different investment horizon and that investment horizon indeed exerts a significant influence on the analysts' optimism.

2. Reverse Causality

Although the prior empirical analyses support my hypothesis that stock holdings of short-term institutional investors make sell-side analysts compromise their TP accuracy to cater for those investors. However, the findings are also subject to alternative explanation that short-term institutional investors may selectively choose the stocks that sell-side analysts are likely to issue inaccurate (optimistic) TPs – i.e. stocks with poor information and high return volatility. To address this reverse causality, I use the change of liquidity caused by the exogenous shock of decimalization to identify causal effect of transient institutional investors' ownership on sell-side analysts' opinion.

Bushee (2004) argued that transient institutions prefer greater liquidity because it allows them to move in and out of stocks without having their trading profits eroded by round-trip transaction costs. Since decimalization significantly increase liquidity of the market, especially actively traded stocks (Bessembinder, 2003; Furfine, 2003), it is reasonably expected that decimalization positively influences the activities of transient institutional investors. In fact, Fang et al. (2014) directly examined this impact of liquidity change on institutional investors. Using difference-in-difference test for three-year window before and after the decimalization in

2001, they found that an exogenous increase in stock liquidity increases the holdings by non-dedicated institutional investors. Therefore, I use the change of liquidity caused by decimalization as an instrument because the decimalization increases the transient investors' ownership but do not directly affect analyst's TP accuracies.

Decimalization has been often used as an exogenous shock to liquidity by previous scholars. Chordia, Roll, and Subrahmanyam (2008) used the decimalization to show that increases of liquidity improve market efficiency and Fang, Noe, and Tice (2009) studied decimalization to establish a causal effect of liquidity on firm performance. Also, Fang et al. (2014) showed that an increase in liquidity from decimalization causes a reduction in future innovation. Here, I followed Fang et al. (2009)'s approach to identify casual relations between transient investor's ownership and sell-side analysts' TP accuracy.[11]

The NYSE and Amex began trading all listed stocks in decimals on January 29, 2001 and Nasdaq did over the interval of March 12, 2001 to April 9, 2001. Therefore, I regress the change in TP error surrounding decimalization on the change in transient institutional investors' ownership from the second half of 2000 to the second half of 2001. To be included in the sample, the same analyst should issue TPs on the same covered stock before and after the decimalization and I winsorized top and bottom 1% of each continuous variables. Finally, 319 observations are used to this analysis. The regression model is:

[11] Fang et al. (2009) used the change in variables from the fiscal year prior to decimalization (t-1) to the fiscal year after decimalization (t+1). However, I use shorter test window, from second-half of 2000 to first-half of 2001, in order to better control changes of omitted firm fundamental variables.

$$\Delta TPE\_rev_{ij,t-1,t+1}$$
$$= \gamma_0 + \gamma_1 \Delta TII_{ij,t-1,t+1} + \gamma_2 \Delta DED_{ij,t-1,t+1} + \gamma_3 \Delta QUS_{ij,t-1,t+1} + \gamma_4 \Delta lnMV_{ij,t-1,t+1}$$
$$+ \gamma_5 \Delta lnF\_\#Ana_{ij,t-1,t+1} + \gamma_6 \Delta MOM_{ij,t-1,t+1} + \gamma_7 \Delta VOL_{ij,t-1,t+1} + \gamma_8 \Delta TURN_{ij,t-1,t+1}$$
$$+ \gamma_9 \Delta ROA_{ij,t-1,t+1} + \gamma_{10} \Delta LEV_{ij,t-1,t+1} + \gamma_{11} \Delta MTB_{ij,t-1,t+1} + \gamma_{12} \Delta lnA\_exp_{ij,t-1,t+1}$$
$$+ \gamma_{13} \Delta lnA\_cover_{ij,t-1,t+1} + \gamma_{14} \Delta lnB\_\#Ana_{ij,t-1,t+1}$$
$$+ \sum_{k=0}^{10} \gamma_{15+k} Industry\ dummies_{ij,t-1,t+1} + \sum_{k=0}^{12} \gamma_{26+k} Year\ dummies_{ij,t-1,t+1}$$
$$+ \varepsilon_{i,t-1,t+1} \qquad (3)$$

where t is the a calendar year from January 1, 2001 to June 31, 2001 which decimalization occurred. The variables are measured for firm i and analyst j. Regression (3) is estimated using OLS procedures and the test uses robust standard errors clustered by firm and analyst (Peterson, 2009). The coefficient of ΔTII, γ_1, is the interested variable and I expect the variable to be significantly positive because the increase of transient institutional investors' ownership driven by decimalization should lead to more optimistic TPs from sell-side analysts.

The results are presented in Table 5. The increased transient institutional investors' ownership around decimalization resulted in larger sell-side analyst's optimism. Consistent with the results of Fang et al. (2014), holdings of both transient and quasi-indexing institutional investors significantly increased after decimalization in my sample[12], but it is notable that the change of quasi-indexer's ownership does not have an association with the change of analysts' TP accuracy. Therefore, this quasi-experimental analysis addresses reverse causality issue of previous analyses, strengthening my main hypothesis that sell-side analysts dynamically react to the ownership changes of different type of institutional investors.

[12] Untabulated due to space constraints

3. Postevent Market Reactions Associated with Sell-side Analyst Target Price Revisions

In this section, I investigate value implications of analyst TP revisions, differentiating TP revisions made following transient investor ownership changes. From the previous tests, I presented that analyst TPs are optimistically biased due to the pressure from short-term investors, but whether the market properly adjusts for such bias is another question. I first analyze short-term market reactions upon the TP revision date and then examine long-term stock returns after the revisions.

Brav and Lehavy (2003) presented that TP revisions are incrementally informative, both unconditionally and conditional on stock recommendation and earnings forecast revisions. Following Brav and Lehavy (2003), I computed cumulative abnormal returns (CARs) as the difference between a firms' buy-and-hold return and the buy-and-hold return on the NYSE/AMEX/Nasdaq value-weighted market index over the period of -1 to +1 days around TP revision date. Then, I used the CARs into the following regression model modified from Gu et al. (2013) and Lin and McNichols (1998):

$$\begin{aligned} CAR_{ij} = {} & \delta_0 + \delta_1 UP_{ij,t} + \delta_2 REIT_{ij,t} + \delta_3 DOWN_{ij,t} + \delta_4 UP_{ij,t} \cdot \Delta TII_{i,t-2,t-1} + \delta_5 REIT_{ij,t} \\ & \cdot \Delta TII_{i,t-2,t-1} + \delta_6 DOWN_{ij,t} \cdot \Delta TII_{i,t-2,t-1} + \delta_7 UP_{ij,t} \cdot \Delta DED_{i,t-2,t-1} \\ & + \delta_8 REIT_{ij,t} \cdot \Delta DED_{i,t-2,t-1} + \delta_9 DOWN_{ij,t} \cdot \Delta DED_{i,t-2,t-1} + \delta_{10} UP_{ij,t} \\ & \cdot \Delta QUS_{i,t-2,t-1} + \delta_{11} REIT_{ij,t} \cdot \Delta QUS_{i,t-2,t-1} + \delta_{12} DOWN_{ij,t} \cdot \Delta QUS_{i,t-2,t-1} \\ & + \sum_{k=0}^{10} \delta_{13+k} Industry\ dummies + \sum_{k=0}^{12} \delta_{23+k} Year\ dummies + \varepsilon_{ij} \end{aligned} \quad (4)$$

where *CAR* is the cumulative market-adjusted returns around the date of the TP revision (day 0) over trading-day window (-1, +1). When testing long-term ex-post buy-and-hold abnormal returns, I used (0, +60) and (0, +90) trading windows. *UP*, *REIT*, and *DOWN* refer to indicator variables of upward revisions, reiteration, and downward revisions. Note that ownership changes of each institutional investor (ΔTII, ΔDED, ΔQUS) precede analysts' TP revision. The variables are measured for firm *i* and analyst *j*.

Short-term stock returns upon analyst TP revision

I am mainly interested in the coefficient estimates of interactions of upward revision (*UP*) and transient ownership change (ΔTII), δ_4. If the market appreciates the optimism in sell-side analysts' TPs driven by the preceding purchase of transient institutional investors, the sign of δ_4 should be significantly negative. If the market completely adjusts for the bias, then analysts will not have the incentive for the optimistic bias and there is no need for transient institutional investor to pressure analysts with regard to TPs. Since sell-side analysts' TPs are not positively biased by the ownership change of long-term institutional investors, I do not expect the signs of δ_7 or δ_{10} to be significantly negative.

Predicting signs for interaction terms with downward revision (δ_6) is not straightforward since countervailing forces exist with regard to downward revisions. Negative sell-side opinion despite transient institutional ownership may deliver more negative signals to the market and create damaging price effects upon revision date, suggesting negative signs for δ_6. On the other hand, the explicit extent of downward TP revision can be smaller when transient institutional investors have increased their ownership on the stock because sell-side analysts would not want to displease those investors. For example, sell-side analysts might reduce downward magnitude from original 10% to 5% if the covered stock is newly purchased by institutional investors. If this is the case, the signs for δ_6 will be positive. Therefore, I have no prediction for the signs of δ_6.

Columns (1) of Table 6 show OLS regression results using average three-day CARs at TP revision date as a dependent variable. Results are mostly consistent with my prediction. The coefficients on *UP*, *REIT*, and *DOWN* show that sell-side analysts' TP revisions have a significant impact on stock returns. The interactions of upward revision (*UP*) and the change of transient ownership (Δ*TII*) is significantly negative, suggesting that the market discounts favorable TPs of sell-side analysts if the opinion is followed by the increase of transient holdings. It is interesting that the interaction of *UP* and Δ*QUS* (δ_{10}) is significantly positive, meaning that the investment of quasi-indexing institutional investors gives more credibility to the analysts' upward TP revisions. Finally, the interactions of downward revision (*DOWN*) and the change of transient ownership (Δ*TII*) is significant and positive, and I conjecture the result is driven by less negative extent of TP revisions from sell-side analysts under the existence of transient institutional investors.

Long-term stock returns following analyst TP revision

I also study the stock performance subsequent to the TP revision date, measured by market-adjusted CAR over the three months and six months as shown in column (2) and (3). I do not examine stock returns for longer horizon since almost three fourth of my sample observations is revised within 6 months after TP issuance date.

The long-term returns of the covered stocks following the analyst TP revisions are qualitatively similar to the short-term market reactions on the TP revision date. The coefficient of on *UP**Δ*TII* (δ_4) is significantly negative in both column (2) and (3), again supporting that optimism in sell-side analysts' upward TP revisions following short-term institutional investors' purchases are partly corrected for postevent period. This is consistent with Brav and Lehavy (2003)'s finding of postevent drifts following TP revisions and also analogous to the results from Gu et al. (2013) which have shown that favorable recommendations of affiliated analysts are followed by worse subsequent stock performance compared to the recommendation of unaffiliated analyst. Similar to the result in column (1), previous ownership changes of long-term institutional investors do not present significant variation of long-term stock returns of the covered stocks.

Although the evidence reported in Table 6 suggests that it takes a while for the market to reflect the bias in sell-side TPs into the stock prices, I run calendar-time portfolio analysis (Fama, 1998) to directly examine long-term postevent cumulative abnormal returns. I followed the approach applied by Brav and Lehavy (2003)[13] which shows how the information regarding future abnormal returns that TP contains varies across previous ownership change of transient institutional investors. The test is performed by constructing portfolio that includes all TP revisions that are announced within *previous six months* and each TP revision is matched with the transient institutional investors' ownership change in previous quarter. I first classified the sample into three groups: TP upward revisions, reiterations, and downward revisions, and then sorted each group in decile (tercile)[14] by the magnitude of the ownership changes from transient institutional investors. The equal-weighted portfolio returns in excess of risk-free rate are examined by Carhart (1997) four-factor model and I present estimated alphas and factor loadings. The regression model is given by

$$r_{p,t} - r_{f,t} = \alpha + \beta_1 \cdot RMRF_t + \beta_2 \cdot SMB_t + \beta_3 \cdot HML_t + \beta_4 \cdot UMD_t + \varepsilon_t \qquad (5)$$

and I focus on the inference of the magnitude and significance of the intercept, α. This analysis fine-tunes Brav and Lehavy (2003)'s result on postevent abnormal returns of TP revisions and extends it to the question of whether the ex-post abnormal returns of TP announcement show different patterns when TP revision types are further conditioned on preceding short-term institutional investors' trading direction.

---

[13] Brav and Lehavy (2003) performed this additional test to address methodological concerns raised by Fama (1998) and Barber and Lyon (1997).

[14] For the reiteration category, I report estimates for the highest and lowest tercile portfolios, since the number of observations in this case is less than the portfolios in upward and downward revision categories.

Table 7 presents regression results for monthly portfolios dependently sorted on TP revisions types and preceding transient ownership changes. The result on unconditioned TP revision categories confirms the findings of Brav and Lehavy (2003), providing evidence that only upward TP revision portfolio has a significant portfolio intercept of 0.241 percent. Interestingly, when conditioned on transient investors' ownership changes within a TP upward revision category, the alpha for the highest decile portfolio loses its significance whereas the lowest decile portfolio maintains its economically and statistically large portfolio intercept, 0.559 percent. This result implies that the sell-side TP upward revision varies considerably in the information it contains regarding ex-post abnormal returns according to the preceding trading patterns of short-term institutional investors. When decile portfolios are differently constructed by preceding long-term institutional ownership changes, any meaningful difference in postevent abnormal returns between the highest and lowest decile is not founded (in untabulated results).

Overall, the results in Table 6 and Table 7 indicate that, when the analysts' TPs are issued, the market recognizes and discounts the optimistic bias associated with the pressure from short-term institutional investors. However, the market still overreacts in general and corrects itself in subsequent months. Therefore, short-term institutional investors can benefit from forcing sell-side analysts to issue positive opinion on their investments.

Ⅵ. CONCLUSIONS

The empirical analyses so far support that there are dynamic interactions between sell-side analysts and heterogeneous institutional investors' investment horizon and the sell-side analysts try to provide customized service to meet the specific demands from each type of institutional investor. First, this study documents that TP error increases as transient institutional investors' ownership increases. Second, my test established causal relations between analyst's TP errors and institutional investors' investment. Third, I also find that even though the market discount sell-side TP's optimism at its issuance, it still overreact to the favorable opinion, showing negative price drift.

My findings highlight the importance of recognizing investment horizon of institutional investors as a dimension of institutional investors' heterogeneity, and understanding various analysts' behaviors according to this dimension can give implications for regulators and investors. First, not all institutions are the same and not all of them act as a predator for sell-side analysts. Therefore, it might be efficient for regulators to focus on the relations between short-term institutional investors and sell-side brokerage firms when they try to identify and mitigate conflicts of interests of sell-side analysts. Second, investors need to be more careful when interpreting favorable sell-side analysts' opinion if it is preceded the ownership change of short-term institutional investors.

REFERENCES

Agrawal, Anup, and Mark A. Chen. "Do analyst conflicts matter? Evidence from stock recommendations." *Journal of Law and Economics* 51.3 (2008): 503-537.

Agrawal, Anup, and Gershon N. Mandelker. "Large shareholders and the monitoring of managers: The case of antitakeover charter amendments." Journal of Financial and Quantitative analysis 25.02 (1990): 143-161.

Agrawal, Anup, and Mark A. Chen. "Do analyst conflicts matter? Evidence from stock recommendations." Journal of Law and Economics 51.3 (2008): 503-537.

Almazan, Andres, Jay C. Hartzell, and Laura T. Starks. "Active institutional shareholders and costs of monitoring: Evidence from executive compensation." Financial Management 34.4 (2005): 5-34.

Asquith, Paul, Michael B. Mikhail, and Andrea S. Au. "Information content of equity analyst reports." Journal of financial economics 75.2 (2005): 245-282.

Bessembinder, Hendrik. "Trade execution costs and market quality after decimalization." Journal of Financial and Quantitative Analysis 38.04 (2003): 747-777.

Bilinski, Pawel, Danielle Lyssimachou, and Martin Walker. "Target price accuracy: International evidence." *The accounting review* 88.3 (2012): 825-851.

Bolliger, Guido. "The characteristics of individual analysts' forecasts in Europe." Journal of Banking & Finance 28.9 (2004): 2283-2309.

Borokhovich, Kenneth A., et al. "Variation in the Monitoring Incentives of Outside Stockholders*." Journal of Law and Economics 49.2 (2006): 651-680.

Bradshaw, Mark, Alan G. Huang, and Hongping Tan. Analyst Target Prices and Forecast Accuracy around the World. Working Paper (Boston College), 2012.

Bradshaw, Mark T., Lawrence D. Brown, and Kelly Huang. "Do sell-side analysts exhibit differential target price forecasting ability?." *Review of Accounting Studies* 18.4 (2013): 930-955.

Brav, Alon, and Reuven Lehavy. An empirical analysis of analysts' target prices: Short term informativeness and long term dynamics. *The Journal of Finance*, 58, 1933–1967.

Brickley, James A., Ronald C. Lease, and Clifford W. Smith. "Ownership structure and voting on antitakeover amendments." Journal of financial economics 20 (1988): 267-291.

Bushee, Brian J. "The influence of institutional investors on myopic R&D investment behavior." Accounting review (1998): 305-333.

Bushee, Brian J. "Do Institutional Investors Prefer Near-Term Earnings over Long-Run Value?*." Contemporary Accounting Research 18.2 (2001): 207-246.

Bushee, Brian. "Identifying and attracting the “right” investors: Evidence on the behavior of institutional investors." Journal of Applied Corporate Finance 16.4 (2004): 28-35.

Chen, Xia, Jarrad Harford, and Kai Li. "Monitoring: Which institutions matter?." Journal of Financial Economics 86.2 (2007): 279-305.

Chordia, Tarun, Richard Roll, and Avanidhar Subrahmanyam. "Liquidity and market efficiency." Journal of Financial Economics 87.2 (2008): 249-268.

Clement, Michael B. "Analyst forecast accuracy: Do ability, resources, and portfolio complexity matter?." Journal of Accounting and Economics 27.3 (1999): 285-303.

Cowen, Amanda, Boris Groysberg, and Paul Healy. "Which types of analyst firms are more optimistic?." *Journal of Accounting and Economics* 41.1 (2006): 119-146.

Fang, Vivian W., Thomas H. Noe, and Sheri Tice. "Stock market liquidity and firm value." Journal of financial Economics 94.1 (2009): 150-169.

Fang, Vivian W., Xuan Tian, and Sheri Tice. "Does stock liquidity enhance or impede firm innovation?." *The Journal of Finance* 69.5 (2014): 2085-2125.

Furfine, Craig. "Decimalization and market liquidity." Economic Perspectives 27.4 (2003): 2.

Firth, Michael, et al. "The client is king: do mutual fund relationships bias analyst recommendations?." *Journal of Accounting Research* 51.1 (2013): 165-200.

Francis, Jennifer, and Donna Philbrick. "Analysts' decisions as products of a multi-task environment." *Journal of Accounting Research* (1993): 216-230.

Gaspar, José-Miguel, Massimo Massa, and Pedro Matos. "Shareholder investment horizons and the market for corporate control." Journal of Financial Economics 76.1 (2005): 135-165.

Gleason, Cristi A., W. Bruce Johnson, and Haidan Li. "Valuation Model Use and the Price Target Performance of Sell-Side Equity Analysts*." Contemporary Accounting Research 30.1 (2013): 80-115.

Gu, Zhaoyang, Zengquan Li, and Yong George Yang. "Monitors or predators: The influence of institutional investors on sell-side analysts." *The Accounting Review* 88.1 (2012): 137-169.

Hartzell, Jay C., and Laura T. Starks. "Institutional investors and executive compensation." Journal of Finance (2003): 2351-2374.

Hayes, Rachel M. "The impact of trading commission incentives on analysts' stock coverage decisions and earnings forecasts." *Journal of Accounting Research* (1998): 299-320.

Hong, Harrison, and Jeffrey D. Kubik. "Analyzing the analysts: Career concerns and biased earnings forecasts." *Journal of Finance* (2003): 313-351.

Irvine, Paul JA. "Do analysts generate trade for their firms? Evidence from the Toronto stock exchange." *Journal of Accounting and Economics* 30.2 (2000): 209-226.

Irvine, Paul, Paul J. Simko, and Siva Nathan. "Asset management and affiliated analysts' forecasts." Financial Analysts Journal 60.3 (2004): 67-78.

Jackson, Andrew R. "Trade generation, reputation, and sell-side analysts." *The Journal of Finance* 60.2 (2005): 673-717.

Jacob, John, Thomas Z. Lys, and Margaret A. Neale. "Expertise in forecasting performance of security analysts." Journal of Accounting and Economics 28.1 (1999): 51-82.

Jegadeesh, Narasimhan, et al. "Analyzing the analysts: When do recommendations add value?." The journal of finance 59.3 (2004): 1083-1124.

Kahn, Charles, and Andrew Winton. "Ownership structure, speculation, and shareholder intervention." The Journal of Finance 53.1 (1998): 99-129.

Lin, Hsiou-wei, and Maureen F. McNichols. "Underwriting relationships, analysts' earnings forecasts and investment recommendations." Journal of Accounting and Economics 25.1 (1998): 101-127.

Ljungqvist, Alexander, et al. "Conflicts of interest in sell-side research and the moderating role of institutional investors." *Journal of Financial Economics* 85.2 (2007): 420-456.

Maug, Ernst. "Large shareholders as monitors: is there a trade-off between liquidity and control?." The Journal of Finance 53.1 (1998): 65-98.

Mehran, Hamid, and René M. Stulz. "The economics of conflicts of interest in financial institutions." *Journal of Financial Economics* 85.2 (2007): 267-296.

Mikhail, Michael B., Beverly R. Walther, and Richard H. Willis. "Do security analysts improve their performance with experience?." Journal of Accounting Research (1997): 131-157.

O'Brien, Patricia C., and Ravi Bhushan. "Analyst following and institutional ownership." Journal of Accounting Research (1990): 55-76.

Petersen, Mitchell A. "Estimating standard errors in finance panel data sets: Comparing approaches." Review of financial studies 22.1 (2009): 435-480.

McNichols, Maureen, and Patricia C. O'Brien. "Self-selection and analyst coverage." Journal of Accounting Research (1997): 167-199.

Mola, Simona, and Massimo Guidolin. "Affiliated mutual funds and analyst optimism." Journal of Financial Economics 93.1 (2009): 108-137.

Shleifer, Andrei, and Robert W. Vishny. "Large shareholders and corporate control." The Journal of Political Economy (1986): 461-488.

Figure 1. Sequence of events

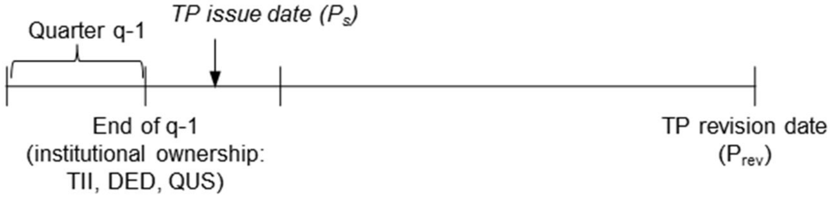

Table 1. Variable Definitions

Variable	Definition
Dependent variable: TP Accuracy Measure	
TPE_rev	The difference between the target price, TP, and the stock price on the subsequent TP revision date, P_{rev}, scaled by the stock price at the TP issue date, P_s.
Independent variable: Institutional Investors' Investment Horizon Measure	
TII	The ownership percentage of transient institutional investors on firm i measured at the end of quarter q-1.
DED	The ownership percentage of dedicated institutional investors on firm i measured at the end of quarter q-1.
QUS	The ownership percentage of quasi-indexing institutional investors on firm i measured at the end of quarter q-1.
Independent variable: Covered Firm Characteristics	
MV	Firm market capitalization measured at the TP issue date and expressed in USD millions.
F_#Ana	The number of analysts issuing at least one EPS forecast for the firm over the previous 12 months.
MOM	Buy-and-hold stock returns for 3 months prior to the TP issue date.
VOL	Stock return standard deviation over 3 months prior to the TP issue date.
TURN	Average daily stock turnover (trading volume divided by outstanding number of shares) 3 months prior to the TP issue date.
ROA	Net income of quarter q-1 divided by total assets at the end of the quarter
Loss	An indicator variable that equals 1 if net income of quarter q-1 is negative, and 0 otherwise.
LEV	Total liability divided by total assets, measured at the end of quarter q-1.
MTB	Market value of equity divided by book value of equity, measure at the end of quarter q-1.
Independent variable: Analyst and Broker Characteristics	
A_exp	The number of years that an analyst j has issued at least one EPS forecast for a given firm.
A_cover	The number of companies for which an analyst j issued at least one EPS forecast over the previous 12 months.
B_#Ana	The number of analysts at the brokerage house that issued at least one EPS forecasts in the previous 6 months.
Independent variable: Other controls	
Fin_cris	An indicator variable that equals 1 if the forecast is issued after September 1, 2007, and 0 otherwise.

The table presents the definitions of the main variables used in the study. I divided the variables into five categories: (1) TP accuracy measure, (2) institutional investors' investment horizon measure, (3) covered firm characteristics, (4) analyst and broker characteristics, and (5) other control variables.

Table 2. Descriptive Statistics for Main Variables

	n	Mean	Median	Q1	Q3	Std Dev
TPE_rev	206,285	0.14	0.10	-0.04	0.29	0.30
TII (%)	206,285	0.17	0.16	0.11	0.23	0.08
DED (%)	206,285	0.08	0.07	0.03	0.12	0.06
QUS (%)	206,285	0.47	0.49	0.40	0.57	0.14
MV (USDm)	206,285	11,090	3,970	1,395	12,431	19,111
F_#Ana	206,285	13.28	12.00	7.00	18.00	7.71
MOM	206,285	0.05	0.05	-0.09	0.18	0.22
VOL	206,285	0.03	0.02	0.02	0.03	0.01
TURN	206,285	12.03	9.88	6.37	15.36	8.17
ROA	206,285	0.14	0.14	0.07	0.22	0.21
LEV	206,285	3.25	2.11	1.57	3.15	3.17
MTB	206,285	3.14	2.39	1.53	3.80	2.65
A_exp (year)	206,285	3.18	2.27	0.78	4.84	2.98
A_cover	206,285	16.42	16.00	12.00	21.00	7.39
B_#Ana	206,285	60.84	46.00	22.00	96.00	48.07

Table 1 reports descriptive statistics for main variables. The definitions of variables are summarized in Table 1.

Table 3. Pearson/Spearman Correlation Matrix for Main Variables

	TPE_rev	TII	DED	QUS	lnMV	lnF_#Ana	MOM	VOL	TURN	ROA	LEV	MTB	A_exp	A_cover	B_#Ana
TPE_rev		0.049***	0.01***	-0.045***	0.023***	-0.011***	-0.207***	0.159***	0.07***	-0.05***	-0.038***	-0.029***	-0.023***	-0.013***	-0.046***
TII	0.041***		0.05***	0.132***	-0.23***	0.031***	0.083***	0.124***	0.372***	-0.008***	-0.174***	0.114***	-0.035***	0.017***	-0.041***
DED	0.007***	0.072***		0.05***	-0.002	0.072***	0.034***	0.02***	0.078***	-0.032***	-0.08***	0.097***	-0.021***	-0.002	0.009***
QUS	-0.033***	0.093***	0.027***		0.022***	0.135***	-0.042***	-0.096***	0.014***	0.027***	-0.057***	-0.038***	0.153***	0.1***	0.008***
lnMV	-0.001	-0.221***	0.104***	0.115***		0.426***	0.01***	-0.177***	-0.102***	0.135***	0.066***	0.151***	0.102***	-0.015***	0.064***
lnF_#Ana	-0.003	0.048***	0.114***	0.129***	0.637***		-0.021***	-0.074***	0.3***	0.057***	-0.018***	0.067***	0.163***	0.029***	0.036***
MOM	-0.202***	0.088***	0.043***	-0.031***	0.04***	-0.013***		-0.173***	-0.048***	0.038***	-0.039***	0.183***	-0.015***	-0.006***	-0.027***
VOL	0.147***	0.176***	0.026***	-0.097***	-0.336***	-0.079***	-0.164***		0.456***	-0.182***	-0.056***	-0.053***	-0.091***	-0.031***	-0.061***
TURN	0.078***	0.444***	0.09***	0.093***	-0.012***	0.353***	-0.063***	0.504***		-0.062***	-0.127***	0.018***	0.009***	-0.032***	-0.003
ROA	-0.041***	-0.008***	-0.004*	0.018***	0.277***	0.087***	0.065***	-0.202***	-0.053***		0.003	0.334***	0.04***	-0.008***	0.045***
LEV	-0.041***	-0.161***	-0.059***	-0.037***	0.139***	-0.033***	-0.022***	-0.199***	-0.197***	0.048***		-0.067***	0.021***	0.083***	0.009***
MTB	-0.04***	0.119***	0.143***	-0.028***	0.232***	0.094***	0.229***	-0.104***	0.001	0.487***	-0.155***		-0.049***	-0.037***	0.006***
A_exp	-0.013***	-0.029***	-0.002	0.146***	0.173***	0.171***	-0.012***	-0.096***	0.035***	0.045***	0.054***	-0.041***		0.189***	0.064***
A_cover	-0.013***	0.026***	-0.005**	0.092***	0.003	0.027***	-0.007***	-0.037***	-0.009***	-0.005**	0.097***	-0.035***	0.233***		0.096***
B_#Ana	-0.054***	-0.04***	0.018***	0.03***	0.18***	0.059***	-0.029***	-0.074***	-0.006***	0.067***	0.095***	0.01***	0.075***	0.139***	

Table 3 shows Pearson and Spearman rank correlations between the main variables. Definitions of variables are in Table 1. Numbers of observations used in the correlation matrix is 158,473. Pearson correlations are reported above the main diagonal and Spearman correlations are reported below the diagonal. *** (**) (*) indicates significance ate 1% (5%) (10%) two-tailed level.

Table 4. The Effect of Heterogeneous Institutional Investors' Ownership on Analysts' TP Error

Dependent variable		**Level Analyses (TPE_rev)**				**Change Analyses (ΔTPE_rev)**	
		(1)	(2)			(3)	(4)
TII	β_1	0.198***	0.275***	Δ TII	β_1	0.273***	0.317***
		(4.97)	(6.85)			(6.50)	(7.75)
DED	β_2	0.044	-0.029	Δ DED	β_2	-0.109**	0.048
		(0.80)	(-0.60)			(-2.04)	(0.92)
QUS	β_3	-0.055**	-0.074***	Δ QUS	β_3	0.038	0.015
		(-2.54)	(-3.35)			(1.10)	(0.43)
*ln*MV	β_4	0.000***	0.000***	Δ *ln*MV	β_4	0.652***	0.693***
		(5.76)	(4.47)			(63.34)	(65.38)
*ln*F_#Ana	β_5	-0.016***	-0.009	Δ *ln*F_#Ana	β_5	-0.011*	-0.007
		(-2.68)	(-1.54)			(-1.96)	(-1.21)
MOM	β_6	-0.241***	-0.195***	Δ MOM	β_6	-0.106***	-0.097***
		(-28.45)	(-22.32)			(-15.87)	(-13.64)
VOL	β_7	4.317***	1.563***	Δ VOL	β_7	0.993***	-0.632**
		(15.17)	(5.47)			(6.43)	(-2.25)
TURN	β_8	-0.000	0.000	Δ TURN	β_8	0.014***	0.006
		(-0.32)	(0.26)			(2.88)	(1.00)
ROA	β_9	-0.015	-0.034**	Δ ROA	β_9	0.021**	0.022**
		(-1.02)	(-2.54)			(2.05)	(2.24)
LOSS	β_{10}	0.025***	0.025***	Δ LEV	β_{10}	0.000	0.000
		(3.31)	(3.77)			(0.17)	(0.24)
LEV	β_{11}	-0.003***	0.000	Δ MTB	β_{11}	-0.001*	-0.001**
		(-3.14)	(0.39)			(-1.94)	(-2.12)
MTB	β_{12}	-0.002	-0.001	Δ *ln*A_exp	β_{12}	0.029***	0.010
		(-1.14)	(-0.97)			(2.96)	(0.96)
*ln*A_exp	β_{13}	0.001	0.005**	Δ *ln*A_cover	β_{13}	0.005	0.009*
		(0.31)	(2.00)			(0.96)	(1.78)
*ln*A_cover	β_{14}	0.001	-0.005	Δ *ln*B_#Ana	β_{14}	-0.000	0.000
		(0.12)	(-0.64)			(-0.02)	(0.02)
*ln*B_#Ana	β_{15}	-0.016***	-0.018***	Constant	β_0	-0.016***	-0.080***
		(-6.94)	(-9.05)			(-11.72)	(-4.03)
Fin_cris	β_{16}	-0.186***	-0.097***				
		(-24.72)	(-12.61)				
Constant	β_0	0.139***	0.374***				
		(5.11)	(9.57)				
Observations		206,285	206,285			165,384	165,384
Adj. R-squared		0.097	0.148			0.205	0.245
Industry FE		no	yes			no	yes
Year FE		no	yes			no	yes

The table reports the OLS regression results on the effect of the investment horizon of institutional investors on the TP accuracy of sell-side analysts. Column (1) and (2) presents coefficient estimates from the analyst TP accuracy regression in equation (1), and column (3) and (4) shows the coefficient estimates from the regression in equation (2). P-values based on robust standard error clustered by covered stock are reported in brackets (Peterson, 2009). Significance at 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Table 5. Controlling for Reverse Causality

Dependent variable		**Δ TPE_rev**
Δ TII	γ_1	1.673***
		(3.67)
Δ DED	γ_2	0.670
		(0.97)
Δ QUS	γ_3	-0.361
		(-0.71)
Δ *ln*MV	γ_4	0.000*
		(1.66)
Δ *ln*F_#Ana	γ_5	0.078
		(1.26)
Δ MOM	γ_6	0.001
		(0.02)
Δ VOL	γ_7	-5.326
		(-1.56)
Δ TURN	γ_8	0.010
		(1.36)
Δ ROA	γ_9	0.081
		(0.51)
Δ LEV	γ_{10}	0.005
		(0.24)
Δ MTB	γ_{11}	0.009
		(0.52)
Δ *ln*A_exp	γ_{12}	-0.197
		(-1.33)
Δ *ln*A_cover	γ_{13}	0.109
		(1.14)
Δ *ln*B_#Ana	γ_{14}	-0.040
		(-0.35)
Constant	γ_0	0.049
		(0.74)
Observations		319
Adjusted R-squared		0.168
Industry FE		yes
Year FE		yes

The table shows the coefficient estimates from the analyst TP accuracy regressions in equation (3). P-values based on robust standard error clustered by covered stock are reported in brackets (Peterson, 2009). Significance at 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Table 6. Short-term and Long-term Cumulative Abnormal Returns upon the Sell-side Analyst TP Revisions

		(1)	(2)	(3)
		3-day abnormal return	**3-month BHAR**	**6-month BHAR**
UP	δ_1	0.030***	0.030***	0.096***
		(18.64)	(7.34)	(16.48)
REIT	δ_2	0.009***	0.013***	0.076***
		(4.83)	(2.75)	(11.50)
DOWN	δ_3	-0.005***	0.006	0.074***
		(-3.20)	(1.54)	(12.90)
UP*ΔTII	δ_4	-0.042***	-0.171***	-0.176***
		(-5.89)	(-9.60)	(-7.01)
REIT*ΔTII	δ_5	-0.037	-0.013	-0.182*
		(-1.26)	(-0.18)	(-1.76)
DOWN*ΔTII	δ_6	0.028***	-0.048***	-0.078***
		(4.66)	(-3.16)	(-3.65)
UP*ΔDED	δ_7	-0.017	0.008	0.059
		(-1.60)	(0.30)	(1.59)
REIT*ΔDED	δ_8	0.101**	-0.084	-0.074
		(2.53)	(-0.84)	(-0.52)
DOWN*ΔDED	δ_9	0.025***	-0.008	-0.075**
		(2.93)	(-0.37)	(-2.49)
UP*ΔQUS	δ_{10}	0.030***	0.084***	-0.007
		(5.02)	(5.58)	(-0.32)
REIT*ΔQUS	δ_{11}	-0.008	-0.087	-0.040
		(-0.31)	(-1.42)	(-0.45)
DOWN*ΔQUS	δ_{12}	-0.024***	-0.018*	-0.005
		(-5.70)	(-1.66)	(-0.31)
Observations		197,977	197,977	197,977
Adj. R-squared		0.063	0.023	0.030
Industry FE		yes	yes	yes
Year FE		yes	yes	yes

The table shows the coefficient estimates from the analyst TP accuracy regressions in regression model (4). Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Table 7. Calendar Time Regressions

	Intercept	RMRF	SMB	HML	UMD	Adj. R^2
TP upward revisions						
All TP upward revisions	0.241	1.080	0.288	0.292	0.064	86.6%
	(4.697)	(86.503)	(17.221)	(18.387)	(6.810)	
Most largest TII % increases (high)	-0.012	1.229	0.419	0.159	0.056	88.9%
	(-0.067)	(29.420)	(7.698)	(2.976)	(1.766)	
Most largest TII % decreases (low)	0.559	1.123	0.425	0.260	0.021	83.3%
	(2.756)	(22.803)	(6.617)	(4.115)	(0.567)	
TP reiterations						
All TP reiterations	0.088	1.020	0.325	0.295	-0.067	88.0%
	(0.940)	(42.428)	(8.911)	(8.993)	(-3.618)	
Most largest TII % increases (high)	0.140	1.006	0.460	0.264	0.001	87.1%
	(0.823)	(22.730)	(6.226)	(4.302)	(0.032)	
Most largest TII % decreases (low)	0.107	1.056	0.337	0.183	-0.143	90.4%
	(0.707)	(25.184)	(4.943)	(3.040)	(-4.525)	
TP downward revisions						
All TP downward revisions	0.136	1.091	0.278	0.271	-0.238	86.0%
	(2.199)	(71.018)	(13.845)	(13.449)	(-19.991)	
Most largest TII % increase (high)	-0.006	1.182	0.439	0.312	-0.353	86.1%
	(-0.027)	(19.919)	(5.779)	(4.069)	(-7.897)	
Most largest TII % decrease (low)	0.091	1.245	0.417	0.078	-0.272	88.3%
	(0.392)	(20.722)	(5.532)	(0.985)	(-5.585)	

Portfolios are formed by including all TP issuances/revisions that were announced within the previous six months. The portfolios' equally weighted monthly returns, in excess of the risk-free rate, are regressed on the following four factors: RMRF, the excess return on the value-weighted market portfolio; SMB, the return on a zero investment portfolio formed by subtracting the return on a large firm portfolio from the return on a small firm portfolio; HML, the return on a portfolio of high book-to-market stocks less the return on a portfolio of low book-to-market stocks; and UMD, formed by taking the return on high momentum stocks minus the return on low momentum stocks. I report regression results from portfolios classified by TP upward revisions, reiterations, and downward revisions. I form decile (tercile) portfolios for TP upward/downward revisions (reiterations) based on the magnitude of the previous ownership changes of transient institutional investors on the covered stock, which then I regress on the four factors. For example, conditional on TP upward revisions, I construct a portfolio that includes firms whose target price issuance/revision occurred within the previous six months and was in the top and bottom decile of recent transient institutional ownership changes at the time of TP was announced.

국문초록

본 연구는 미국 주식시장에서 기관투자자들의 투자기간이 애널리스트 목표주가의 정확성에 영향을 미치는지 여부를 분석하였다. 특히, 애널리스트가 단기 기관투자자가 보유한 주식에 대하여 목표주가 정확성을 포기하는 가를 분석하였는데, 이는 단기 기관투자자일수록 단기 주가에 민감하고 따라서 현 주가를 높게 유지하기 위해 애널리스트에게 압력을 행사할 것으로 예상하기 때문이다. 1999년부터 2013년 동안 뮤추얼 펀드의 주식보유현황과 애널리스트 목표주가 자료를 이용하여 연구한 결과, 애널리스트의 목표주가 오차는 단기 기관투자자의 지분율이 증가함에 따라 증가하지만, 장기 기관투자자의 지분율과는 유의미한 관계가 없음을 발견하였다. 또한 시장은 단기 기관투자자의 매수 후에 발표된 애널리스트 목표주가 상향조정에 상대적으로 덜 반응함으로써, 애널리스트 목표주가의 편향을 주가에 일부 반영함을 발견하였다. 그럼에도 불구하고, 전반적으로 시장은 애널리스트의 목표주가 상향조정에 과잉반응을 보이고 차후 수 달에 걸쳐서 이 반응을 수정하였다. 따라서, 본 연구의 실증분석은 애널리스트가 투자기간에 따라 이질적인 기관 투자자 집단을 구별하고 이 집단에 따라 선별적으로 행동함을 시사한다.

주요어: 기관 투자자, 애널리스트 목표주가

학 번: 2014-20488