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THE RELATION BETWEEN ACCOUNTING QUALITY AND SECURITY ANALYSTS' TARGET PRICE FORECAST PERFORMANCE

Using a sample of the US security analysts' target price forecasts issued over the period 2000–2010, we examine whether accounting quality affects security analysts' target price forecast performance. We find that analysts' 12-month-ahead target price forecasts for the firms with higher accounting quality are more accurate and have higher possibilities of being met at some time during or at the end of the forecast horizon. These results are consistent with the fact that accounting quality has significant impact on analysts' target price forecasts and that higher accounting quality results in more accurate target price forecasts.

Keywords: *analysts; target price; accounting quality.*
JEL Classification: M4, G17.

Жон-Сок Чо

ВЗАЄМОЗВ'ЯЗОК МІЖ ЯКІСТЮ БУХОБЛІКУ І ПРОГНОЗУВАННЯМ ЦІЛЬОВОЇ ЦІНИ

У статті на матеріалах вибірки прогнозів цільової ціни на американських фондових біржах за 2000–2010 рр. оцінено якість бухобліку і його вплив на прогнозування цільової ціни. Показано, що прогнози фахівців на річну перспективу для фірм із вищою якістю ведення бухобліку завжди точніші і збуваються з більшою ймовірністю під час або в кінці періоду прогнозування. Це підтверджує факт, що якість бухобліку значно впливає на прогнозування цільової ціни фахівцями і що вища якість бухобліку забезпечує точніші прогнози.

Ключові слова: *аналітики, цільова ціна, якість бухобліку.*
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Жон-Сок Чо

ВЗАИМОСВЯЗЬ МЕЖДУ КАЧЕСТВОМ БУХУЧЕТА И ПРОГНОЗИРОВАНИЕМ ЦЕЛЕВОЙ ЦЕНЫ

В статье на материалах выборки прогнозов целевой цены на американских фондовых биржах за 2000–2010 гг. оценено качество бухучета и его влияние на прогнозирование целевой цены. Показано, что прогнозы специалистов на годовую перспективу для фирм с более высоким качеством ведения бухучета всегда точнее и сбываются с большей вероятностью во время или в конце периода прогнозирования. Это подтверждает факт, что качество бухучета значительно влияет на прогнозирование целевой цены специалистами и что более высокое качество бухучета обеспечивает более точные прогнозы.

Ключевые слова: *аналитики, целевая цена, качество бухучета.*

Introduction. Schipper (1991) suggested more research into how security analysts actually use accounting information and their own earnings forecasts in decision-making. Brown (1993) also called for research to better understand the decision processes of analysts, the roles of analysts' earnings forecasts, and other information in formulating analysts' forecasts.

Research on individual analysts' forecasting abilities consistently emphasized the quality of firm reporting as an important factor in determining the usefulness of

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financial information (Williams, 1996; Healy et al., 1999). Previts et al. (1994) found that analysts place heavy weights on earnings-related information, and Lang and Lundholm (1996) showed that the dispersion in analysts' forecasts declines with higher quality annual report disclosures and better investor relations.

A number of studies find correlations between accounting variables and analysts' price forecasts and recommendations. Bandyopadhyay et al. (1995) documented that long-term earnings forecast revisions positively influence the variation in price forecast revisions. Block's (1999) survey study showed that analysts consider earnings and cash flow to be more important than dividends and book value in security valuation. It also shows that analysts rely more heavily on earnings multiples versus DCF in valuation, and growth potential and earnings quality are the crucial factors in evaluating P/E ratios. Demirakos et al. (2004) found that analysts overwhelmingly refer to simple accounting-based P/E multiples to support their stock recommendations.

Recently, security analysts have increasingly disclosed target prices along with their stock recommendations and earnings forecasts. Despite the most concise and explicit statement on the firm's expected value, research on target prices has remained largely unexplored. Brav and Lehavy (2003) reported that 2/3 of all analyst reports include target prices. They examine the informativeness of target price forecast revisions and document a significant market reaction to the information contained in analysts' target prices, unconditionally and conditional – on simultaneous recommendation and earnings forecast revisions. Asquith et al. (2005) showed that the addition of both target prices and analyst justifications is important in explaining the market's reaction to analyst reports. They report significant incremental reactions to target prices and provide evidence that target price forecasts are valuable to investors.

Overall, these extent studies suggest that accounting information affects security analysts' forecasts and their forecasting ability and show that analysts' forecasts are positively related to stock value-relevant fundamental such as earnings expectations.

In this study, we examine the relation between firms' accounting quality and analysts' target price forecasts. Specifically, we investigate whether accounting quality affects analysts' target price forecast performance. We focus on the quality of accounting information (hereafter, AQ) since financial statements are an important source of information for analysts in formulating their' equity reports including target prices. Following Bharath et al. (2008), we construct accrual-based metrics as firms' AQ measure. In constructing the AQ measure, Bharath et al. use the magnitude of operating accruals to proxy for the influence of discretionary accounting choices. The AQ measure is defined as the first principal component from 3 standard abnormal operating accrual metrics that have been used in accounting research. Unexpected (abnormal) accruals reveal unforeseen deviations between earnings and operating cash flows and as a result, it makes difficult for analysts to reliably interpret and incorporate accounting information into their forecasts. The relevance and reliability of accounting information in formatting analysts' opinion may be influenced by their perception of accounting information.

Using a database of the US security analysts' target price forecasts over the period 2000–2010, we document that accounting quality has a significant impact on analysts' target price performance. The 3 target price performance measures based on Bradshaw et al. (2012) show that target price forecasts for firms with higher account-

ing quality are more accurate and have higher possibilities of being met or beat at some time during or at the end of the forecast horizon. These results are consistent with that accounting quality has a positive impact on analysts' target price forecasts and that higher accounting quality results in more accurate target price forecasts.

Sample and methodology. The initial sample of target price forecasts is drawn from the publicly traded US firms in the I/B/E/S database, 2000–2010. We obtain stock price and return data from CRSP and firm-related information from COMPUSTAT database, respectively. We retain 12-month-ahead target prices issued by identifiable analysts within the 45-day period immediately after the release of previous year's earnings announcement[2]. For these target prices, we require the closing share price prior to the target price forecast announcement month and the actual share price as of the end of the forecast horizon. To mitigate the effects of extreme observations, we truncate observations with (target price/closing share price) ratio at the 1st and 99th percentiles. Our final sample consists of 11,728 firm-years from 2000–2010.

Table 1. **Distribution of number of firms**

Year	# of Firms	%
2000	697	5.94
2001	602	5.13
2002	930	7.93
2003	903	7.70
2004	1,088	9.28
2005	1,066	9.09
2006	1,161	9.90
2007	1,252	10.68
2008	1,353	11.54
2009	1,385	11.81
2010	1,291	11.01
Total	11,728	100.00

In order to measure accounting quality we construct Bharath et al.'s (2008) accrual-based metrics. Following their procedure, we derive the absolute abnormal level of accruals for each firm from the 3 industry-level cross-sectional models of accruals: (i) Dechow and Dichev (2002), (ii) Teoh et al. (1998), and (iii) Jones (1991) as modified by Dechow, Sloan, and Sweeny (1995). After computing the normal level of accruals for the 48 Fama and French (1997) industry groups under each of 3 models, we define abnormal accruals as the difference between the actual level and the normal level of accruals. After the derivation of abnormal accruals, we construct the AQ measure as the first principal component from 3 abnormal accruals measures. We calculate the AQ measure for the fiscal year t prior to the analysts' forecast announcements.

First, we define the total accruals variable as the following:

$$TA_{i,t} = EARN_{i,t} - CFO_{i,t}, \quad (1)$$

where $TA_{i,t}$ – total accruals for firm i in year t; $EARN_{i,t}$ – earnings before extraordinary items and discontinued operations for firm i in year t; $CFO_{i,t}$ – cash flows from operations for firm i in year t.

[2] We also tested the 30-day period and the results are identical.

Then, we calculate the total current accruals using the statement of cash flow:

$$TCA_{i,t} = \Delta AR_{i,t} + \Delta INV_{i,t} + \Delta OCA_{i,t} - \Delta AP_{i,t} - \Delta TXP_{i,t} - \Delta OCL_{i,t}, \quad (2)$$

where $TCA_{i,t}$ – total current accruals firm i in year t; $\Delta AR_{i,t}$ – accounts receivable at year t less accounts receivable at year t-1 for firm i; $\Delta INV_{i,t}$ – inventory at year t less inventory at year t-1 for firm i; $\Delta OCA_{i,t}$ – other current assets at year t less other current assets at end year t-1 for firm i; $\Delta AP_{i,t}$ – accounts payable at year t less accounts payable at year t-1 for firm i; $\Delta TXP_{i,t}$ – tax payable at end year t less tax payable at year t-1 for firm i; $\Delta OCL_{i,t}$ – other current liabilities at end year t less other current liabilities at year t-1 for firm i.

For the Dechow and Dichev model, the following model is run to calculate the fitted (normal) value for each firm:

$$\frac{TCA_{i,t}}{AvgAssets_{i,t}} = \alpha_0 + \alpha_1 \frac{CFO_{i,t-1}}{AvgAssets_{i,t}} + \alpha_2 \frac{CFO_{i,t}}{AvgAssets_{i,t}} + \alpha_3 \frac{CFO_{i,t+1}}{AvgAssets_{i,t}} + \varepsilon_{i,t}, \quad (3)$$

where $AvgAssets_{i,t}$ is the average total assets in the current year t. The first measure of abnormal accruals, $AADD$, is the absolute value of the residuals.

As the second measure, we run the following Teoh et al. model:

$$\frac{TCA_{i,t}}{TA_{i,t-1}} = \beta_1 \frac{1}{TA_{i,t-1}} + \beta_2 \frac{\Delta REV_{i,t}}{TA_{i,t-1}} + \varepsilon_{i,t}. \quad (4)$$

The coefficients estimated from equation (4) are used to compute the fitted value, the normal current accruals ($NCA_{i,t}$):

$$NCA_{i,t} = \hat{\beta}_1 \frac{1}{TA_{i,t-1}} + \hat{\beta}_2 \frac{(\Delta REV_{i,t} - \Delta AR_{i,t})}{TA_{i,t-1}}, \quad (5)$$

where $\Delta Rev_{i,t}$ is revenue at year t less revenue at year t-1 for firm i. Then, we compute $(TCA_{i,t} / Asset_{i,t-1}) - NCA_{i,t}$ as the abnormal current accruals. The second measure of abnormal accruals, AAT, is the absolute value of this abnormal current accruals.

For the third measure of abnormal accruals, we run the modified Jones model. The following cross-sectional regression equation is estimated for each industry and each year.

$$\frac{TA_{i,t}}{TA_{i,t-1}} = \gamma_1 \frac{1}{TA_{i,t-1}} + \gamma_2 \frac{\Delta REV_{i,t}}{TA_{i,t-1}} + \gamma_3 \frac{PPE_{i,t}}{TA_{i,t-1}} + \zeta_{i,t}. \quad (6)$$

The estimated coefficients from equation (6) are used to calculate the normal accruals for each firm:

$$NA_{i,t} = \hat{\gamma}_1 \frac{1}{TA_{i,t-1}} + \hat{\gamma}_2 \frac{(\Delta REV_{i,t} - \Delta AR_{i,t})}{TA_{i,t-1}} + \hat{\gamma}_3 \frac{PPE_{i,t}}{TA_{i,t-1}}. \quad (7)$$

As the fitted value is assumed to represent nondiscretionary component of accruals, the difference between this estimation and the actual accruals is deemed to be the total discretionary accruals. The third measure of abnormal accruals, $AAMJ$, is estimated as the absolute value of $(TA_{i,t} / Asset_{i,t-1}) - NA_{i,t}$.

After estimating 3 measures of abnormal accruals, we use principal components analysis (PCA) to construct a parsimonious accounting quality measure. By deducting the mean value from and divide them by the standard deviation, we cross-sectionally standardize the 3 measures. Then we apply the PCA methodology to constructs the AQ

measure as the first principal component. We multiply the first principal component with -1 to construct a measure for increases in accounting quality. Following these steps, we estimate the AQ measure for each firm in the sample:

$$AQ_{it} = - [0.5370AADD_{i,t} + 0.6441\ AADD_{i,t} + 0.5448AAMJ_{i,t}].$$

Table 2 presents the correlations between the 3 abnormal accruals measures and the AQ measure. Their correlations are very high and statistically significant.

Table 2. **Correlations between accounting quality measures (n = 11,728)**

	AQ	AADD	AAT	AAMJ
AQ	1.000			
AADD	-0.277***	1.000		
AAT	-0.323***	0.189***	1.000	
AAMJ	-0.977***	0.094***	0.194***	1.000

*, **, and *** indicate statistical significance at the 10, 5, and 1% levels, respectively.
Variable definitions: AQ – accounting quality measured as the first principal component of AADD, AAT, and AAMJ multiplied by -1; AADD – absolute value of abnormal accruals computed using the Dechow and Dichev model; AAT – absolute value of abnormal accruals computed using the Teoh et al. model; AAMJ – absolute value of abnormal accruals computed using the modified Jones model.

Following Bradshaw et al. (2012), we adopt 3 measures to capture analysts' target price performance (hereafter, TPP): (i) *ADiff*, (ii) *Hpass*, and (iii) *Epass*. *ADiff* is calculated as the absolute value of (AP12-MTP)/CP, where AP12 is the actual stock price 12-months following the target price release date, MTP is the mean value of 12-month-ahead target prices, and CP is the closing price prior to the target price release month. *ADiff* measures the degree of the accuracy of analysts' 12-month-ahead target price compared to the actual stock price. The second and third TPP, *Hpass* and *Epass* are the indicator variables. If the mean value of target prices is met at any time during the 12-month forecast horizon, *Hpass* equals to 1. At the token, if the mean value of target prices beats the actual stock price as of the end of the 12-month forecast horizon, *Epass* equals to 1. These 2 indicator TPP measures show whether analysts' 12-month-ahead target price forecasts actually beat the actual stock price during or at the end of the forecast horizon[3].

Empirical results. Table 3 provides the descriptive statistics. The mean (median) number of target prices issued per firm is 4.385 (3.000). On average, the 12-month-ahead target price is 24.7% higher than the current market price (MTP / CP = 1.247). 67.5% of firm-year observations meet or beat target price forecasts at some time during the forecast horizon (*Hpass* = 0.675) and 35.4 % of them as of the end of the 12-month forecast horizon (*Epass* = 0.354).

Table 4 reports the correlation structure of the variables of interest. There is a significant correlation between the accounting quality measure and the target price performance measure. The correlation between AQ and *ADiff* is negative and the one between AQ and *Hpass* (*Epass*) is positive[4]. The correlations between accounting quality measure and other variables of interest are consistent with the results reported in the extant literature.

[3] We use target price forecasts and actual stock prices converted to the same split-adjusted basis.
[4] The negative correlation between *ADiff* and AQ is because AQ is multiplied by -1. The higher the level of AQ, the better is a firm's accounting quality.

Table 3. **Descriptive statistics of firm characteristics (n = 11,728)**

Variable	Mean	Std. dev	Q1	Q2	Q3
# of TPs issued	4.385	2.839	2.000	3.000	5.000
MTP/CP	1.247	0.260	1.099	1.187	1.318
AQ	-0.186	0.444	-0.174	-0.081	-0.041
Hpass	0.675	0.468	0.000	1.000	1.000
Epass	0.354	0.478	0.000	0.000	1.000
ADiff	0.427	0.459	0.135	0.308	0.589
PreRet	0.061	0.415	-0.162	0.040	0.227
MarketRet	0.040	0.231	-0.120	0.098	0.221
PrcStd	5.324	6.351	2.190	3.571	6.020
SIZE	14.362	1.577	13.238	14.211	15.345

Variable definitions: TP – target price; MTP – mean value of 12-month-ahead target prices; CP – closing price prior to the target price release month; AQ – accounting quality measured as the first principal component of AADD, AAT, and AAMJ multiplied by -1; ADiff – absolute value of (AP12-MTP)/CP, where AP12 is the actual stock price 12-months following the target price release date; Hpass = 1 if the mean value of target prices is met at any time during the 12-month forecast horizon; Hpass = 0 if the mean value of target prices is not met at any time during the 12-month forecast horizon; Epass = 1 if the mean value of target prices beats the actual closing price as of the end of the 12-month forecast horizon; Epass = 0 if the mean value of target prices cannot beat the actual closing price as of the end of the 12-month forecast horizon; PreRet – six-month buy-and-hold raw return prior to the target price release month; PrcStd – standard deviation of closing prices over the one-year period ending prior to the target price release month; MarketRet – 12-month buy-and-hold value-weighted market return following the target price release; SIZE – natural logarithm of price per share multiplied by shares outstanding prior to the target price release date.

Table 4. **Correlations of firm characteristics (n = 11,728)**

	AQ	Hpass	Epass	ADiff	PreRet	MarketRet	PrcStd	SIZE
AQ	1.000							
Hpass	0.047***	1.000						
Epass	0.039***	0.513***	1.000					
ADiff	-0.095***	-0.187***	-0.059***	1.000				
PreRet	0.066***	-0.055***	-0.096***	-0.131***	1.000			
MarketRet	0.051***	0.141***	0.432***	-0.161***	-0.078***	1.000		
PrcStd	-0.001	-0.037***	-0.032***	0.141***	-0.031***	-0.041***	1.000	
SIZE	0.047***	-0.072***	-0.035***	-0.197***	0.064***	-0.086***	0.235***	1.000

*, **, and *** indicate the statistical significance at the 10, 5, and 1% levels, respectively.
All variables are defined in Table 3.

We run the following OLS (logistic) regressions to investigate the relation between accounting quality and analysts' target price performance.

$$TPP_{i,t} = \delta_0 + \delta_1 AQ_{i,t} + \delta_2 PreRet_{i,t} + \delta_3 \Delta PrcStd_{i,t} + \\ + \delta_4 \Delta MktRet_t + \delta_5 LogMV_{i,t} + \sum Year + \tau_{i,t}. \quad (8)$$

TPP, our measure of analysts' target price performance, is the dependent variable in our regression analyses. It is measured as either a continuous variable, *ADiff*, or an indicator variable, *Hpass* and *Epass*.

Following the previous research, we include these variables to control for possible biases. Jegadeesh et al. (2004) show that analysts' recommendation is associated with past momentum. We include price momentum (*PreRet*), measured as the six-month buy-and-hold raw return prior to the target price release month. Volatile stock prices make price forecasts more unpredictable. We, therefore, include as the second control variable stock price volatility (*PrcStd*), which is the standard deviation of closing prices over the one-year period ending prior to the target price release month.

The third control variable, the *ex post* market return (*MarketRet*) is measured as the 12-month buy-and-hold value-weighted market return following the target price release. To proxy for any omitted variables associated with firm size, we include size (*SIZE*), calculated as the natural logarithm of price per share multiplied by shares outstanding prior to the target price release date. Finally, we include *Year Dummies* to control for time-period specific effects[5].

Table 5 reports the results of our regression analyses. The first regression results show the relation between AQ and *ADiff*. As shown in model 1, the coefficient of AQ is negative and significant. The AQ coefficient is -0.056 and significant at the 1% level, consistent with our univariate results showing that accounting quality positively affects the analysts' target price performance. These results indicate that analysts' 12-month-ahead target price forecasts for firms with higher accounting quality are much closer to the actual stock price 12-months following the target price release. In other words, higher accounting quality results in more accurate target price forecasts.

Table 5. **Regression analysis (n = 11,728)**

	Model 1		Model 2		Model 3	
Dependent	ADiff		Hpass		Epass	
	Coefficient	t-stat	Coefficient	Chi-Square	Coefficient	Chi-Square
Intercept	1.503	37.74***	2.014	88.74***	-0.891	15.33***
AQ	-0.056	-6.38***	0.252	26.22**	0.337	21.22***
PreRet	-0.068	-6.60***	-0.078	2.15	-0.373	33.85***
PrcStd	0.010	15.80***	-0.003	0.58	-0.013	10.55***
MarketRet	-0.116	-2.06**	1.408	20.33***	3.963	142.01***
SIZE	-0.066	-25.60***	-0.070	27.43***	0.027	3.49*
Year Dummies	Yes		Yes		Yes	
Adj. or Pseudo R^2	0.167		0.101		0.283	

*, **, and *** indicate statistical significance at the 10, 5, and 1% levels, respectively.
All the variables are defined in Table 3.

For models 2 and 3, where *Hpass* and *Epass* are dependent variables, the coefficient of AQ is positive and significant at the 1% level. These results show that when analysts forecast 12-month-ahead target prices for firms with higher accounting quality, they have higher possibilities for meeting or beating their forecasts during or by the end of their forecast period. These results verify the finding from model 1, whose dependent variable is a continuous one. The results for the control variables are similar to those in previous research.

Combined, our results indicate that target firms' accounting quality positively affects security analysts' target price performance. We find that higher accounting quality results in more accurate target price forecasts.

Conclusion. We study the relation between firms' accounting quality and security analysts' target price forecast performance. Recently, security analysts have increasingly disclosed target prices along with their stock recommendations and earnings forecasts. Despite the most concise and explicit statement on the firm's expected value and popularity, the research on target prices has remained scarce.

Using a sample of the US security analysts' target price forecasts issued over the period 2000–2010, we adopt the accrual-based metrics advocated in Bharath et al.

[5] The inclusion of year or industry classification dummies did not affect our results.

(2008) as firms' accounting quality and construct 3 measures to capture target price forecasting performance based on Bradshaw et al. (2012). Since financial statements are an important source of information for analysts in formulating their' equity reports including target prices, we focus on the effect of the quality of accounting information, using a parsimonious accounting quality measure (AQ), on analysts' target price forecast performance.

Our study shows that analysts' target price forecasts for firms with higher accounting quality are more accurate and have higher possibilities for being met at some time during or at the end of the forecast horizon. These results are consistent with that accounting quality has a significant impact on analysts' target price performance and that higher accounting quality results in more accurate target price forecasts.

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