Why New Issues and High-Accrual Firms Underperform: The Role of Analysts' Credulity

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We find that analysts' forecast errors are predicted by past accounting accruals (adjustments to cash flows to obtain reported earnings) among both equity issuers and nonissuers. Analysts are more optimistic for the subsequent four years for issuers reporting higher issue-year accruals. The predictive power is greater for discretionary accruals than nondiscretionary accruals and is independent of the presence of an underwriting affiliation. Predicted forecast errors from accruals significantly explain the long-term underperformance of new issuers. The predictability of forecast errors among *non*issuers suggests that analysts' credulity about accruals management more generally contributes to market inefficiency.

In the ongoing debate over the efficiency of securities, one of the challenging issues is that predictability of returns can result from either mispricing or rational risk premia.[1] Where one side sees a mispricing, the other sees an improper specification of risk in the return benchmark. In a recent survey, Fama (1998) argues that market efficiency withstands the assault of recent evidence on long-run performance in event studies, whereas the book and surveys of Shleifer (2000), Hirshleifer (2001), and Daniel, Hirshleifer, and Teoh (2002) argue that the evidence supports irrational mispricing.

Consider the new issues puzzle documented by Ritter (1991), Loughran and Ritter (1995), and Spiess and Affleck-Graves (1995). These researchers report that in the three to five years after the issue of an initial public offering (IPO) or a seasoned equity offering (SEO), the stock returns of the new issuer underperform by as much as 6–7% per year relative to various benchmarks.

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[1] Some recent surveys of the evidence on mispricing versus risk premia include Fama (1998), Shleifer (2000), Hirshleifer (2001), and Daniel, Hirshleifer, and Teoh (2002).

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Following this discovery, researchers have considered alternative risk factor specifications and other methodological variations for new issues to examine the robustness of this finding.[2] Other researchers have examined whether the new issues puzzle results from investor overoptimism about rapidly growing firms or firms that boost earnings with accounting choices [see Ritter (1991), Loughran and Ritter (1995, 1997), Rajan and Servaes (1997), Rangan (1998), Teoh, Welch, and Wong (1998a, b), Teoh, Wong, and Rao (1998), and Michaely and Womack (1999)].

In this article we address market efficiency and the new issues puzzle in a way that partly avoids concerns about the appropriate expected returns benchmark. Our approach focuses on financial analysts, who are specialists in interpreting accounting and other information about firms on behalf of investors, and who form and disseminate forecasts of firms' future earnings prospects. We examine how efficiently financial analysts make use of accounting information in forming their expectations, and how any systematic errors in their forecasts affect stock market valuation. (Such systematic errors may arise from misperception or from agency problems.) If analysts' forecasts reflect information efficiently, then their forecast errors cannot be systematically predicted from past available accounting information. If so, there would be no reason to suspect that analysts' errors contribute to market inefficiency. However, if analysts systematically misuse the accounting earnings of firms, and if investors rely naively on analysts' forecasts, then systematic patterns of misvaluation and return predictability will result.

The earnings reported by firms in their financial statements include not just actual cash flows, but accruals. These are accounting adjustments to the firm's cash flows from operations consistent with financial reporting regulations. Because the timing of cash transactions can be mismatched with the timing of economic transactions, the stated regulatory purpose of accounting accruals is to make reported earnings more accurately reflect the economic performance of the firm.[3] Accruals contain important information for the future earnings of the firm, and so an observer who misinterprets these adjustments will have a distorted view of the firm's future prospects.

[2] Several studies have examined general statistical issues of power and bias in measures of long-run abnormal stock return performance; see also Barber and Lyon (1997), Kothari and Warner (1997), and Barber, Lyon, and Tsai (1999). Fama (1998) raises several methodological issues. Brav, Geczy, and Gompers (2000), Eckbo, Masulis, and Norli (2000), and Eckbo and Norli (2000) find that some factor specifications and cuts on the data weaken or eliminate the new issues puzzle. However, Loughran and Ritter (2000) argue that such specifications minimize the power to detect mispricing effects.

[3] See Appendix B of Teoh, Welch, and Wong (1998a) for a summary of the accrual adjustments permitted by generally accepted accounting principles (GAAP). Some of these include credit sales and purchases, estimates for uncollectibles (bad debts), estimates for write-offs of inventory and fixed assets, and depreciation policies. Accrual adjustments depend on the firm/business environment and management's assessment, subject to independent auditor approval, of the magnitude and timing of actual economic events.

Financial reporting rules allow firms some discretion to adjust accruals to reflect business conditions, subject to an external auditor's review.[4] Past research has shown that accounting accruals are affected by agency issues and asymmetric information, and therefore are subject to manipulation.[5] An important role for analysts is to help investors evaluate whether high reported net income resulting from large positive accruals is a result of good news about future firm performance, or merely reflects earnings management by the firm to improve investor perceptions.[6]

We test here the hypothesis that analysts systematically underestimate the extent of earnings management, and therefore are too ready to believe that high accruals reflect good news. If analysts are credulous in this fashion, then when accruals are high their forecasts of future earnings will be too optimistic.[7] Furthermore, investors who rely naively on such analysts will discount for accruals insufficiently and so will overvalue firms that take high accruals. Consequently, an understanding of whether analysts discount appropriately for accruals can help identify the source of investor mispricing of securities.

Thus we investigate whether analysts understand the implications of the information contained in past accruals for future earnings in settings where past research has indicated possible misvaluation by the stock market. We examine the ability of accruals to predict analyst forecast errors in two different samples of firms: equity issuers, and firms with large positive accruals. Rangan (1998), Teoh, Welch, and Wong (1998a, b), and Teoh, Wong, and Rao (1998) have documented that high issue-related discretionary accruals are associated with significantly negative long-run abnormal returns and earnings in the postissue period. Sloan (1996) has documented that firms with large accruals have subsequent abnormal returns. The efficient markets interpretation of these results is that there is a return benchmark specification error that is correlated with past accruals. We offer here an independent piece of evidence about whether the accruals/return relation and the new issues puzzle represent market inefficiencies by examining whether high accruals are related to biases in expectations, as reflected in analyst forecasts.

Our evidence indicates that high accruals in the issuing year significantly predict the extent to which subsequent earnings fall short of analyst forecasts (a negative forecast error) made in each of the four postissue years. In other

[4] For example, firms have discretion over the choice of accounting methods (e.g., accelerated or straightline depreciation), the estimates for applying these methods (e.g., the length of useful life to depreciate assets), and the period when these accruals have to be made (e.g., the timing of when asset write-downs are taken).

[5] Healy and Wahlen (1999) provide a comprehensive review of earnings management research.

[6] For example, a high earnings number may have resulted from high credit sales. If the demand for the firm's goods has truly increased, future cash collections are high. However, if the firm were pushing credit sales aggressively, future earnings may take a hit when bad debts exceed past estimates.

[7] By credulous we mean that an analyst views a high earnings number similarly and favorably without adequate regard for whether this arises because actual economic conditions are favorable or because managers choose an unduly high discretionary accrual.

words, analysts are more overoptimistic about firms with larger accruals. We separate total accruals into an expected and an unexpected (or excess) component relative to a cross-sectional industry benchmark. Excess accruals are presumed more likely to contain discretionary adjustments, and so are less likely to be understood correctly by analysts. We find that the predictive power is consistently significant for excess accruals but not for expected accruals. These results are robust with respect to a wide variety of control variables in the regression model and to alternative models for measuring excess accruals. We then examine whether investors recognize the full extent of the bias in analysts' forecasts. We find that the predicted forecast errors from accruals are significantly associated with the postissue stock returns' underperformance, suggesting that investors do not fully discount for the bias.

We also examine whether analysts employed by the underwriter of the new issuers understand accruals better than the analysts unaffiliated with the underwriter. Michaely and Womack (1999) report that recommendations by underwriter analysts show significant bias and that investors do not recognize the full extent of the bias. We examine here whether similar bias is present in the forecasts as well. Affiliated analysts are likely to be more informed about the issuer because of their greater access to the firm. However, they face greater incentives to be favorable to the firm to avoid jeopardizing underwriting fees, which are a major source of income for the brokerage firm.[8] We find that the predictive power of accruals for forecast errors is similar for analysts from underwriting firms as for analysts unaffiliated with the underwriting firm.

Finally, we establish that the negative relation between accruals and subsequent forecast errors is a general phenomenon. The predictive power of accruals for future forecast errors is similar for issuers as for the top quartile of nonissuers ranked by excess accruals. In other words, the results suggest that analysts make similar mistakes about accruals regardless of whether the incentive to boost accruals comes from an issuance event or from nonissuance-related circumstances. It is likely that firms in the more general sample face other incentives to manage earnings. To the extent that discretionary accruals predict forecast errors in nonissue settings as well, analysts' credulity about accruals helps explain investor misvaluation of firms more generally.

In summary, our evidence suggests the following explanation for the long-term postissue stock return underperformance. Firms manage accruals upward to report high earnings at the time of the issue. Perhaps, because of agency incentives to bias forecasts in favor of the firms, analysts do not discount adequately for the high level of discretionary accruals in their forecasts of subsequent earnings. Investors, relying on the overly optimistic analysts' forecasts

[8] See *Business Week* (October 5, 1998) article "Wall Street's Spin Games: Stock analysts often have a hidden agenda."

of earnings, overvalue new issue firms, and are surprised later when the reported earnings do not meet expectations. At that point, investors revise downward their valuation of the issuing firms. The accruals anomaly in the nonissue setting may be similarly explained. Analysts do not discount sufficiently for high accruals, leading to future earnings disappointment and subsequent downward revaluation of the stock.

These results, together with the findings of previous papers on accruals and returns, also have a bearing on the timing hypothesis explanation of the new issues puzzle emphasized by Loughran and Ritter (1997), and reflected in the psychology-based pricing model of Daniel, Hirshleifer, and Subrahmanyam (1998). According to the timing hypothesis, firms undertake new issues precisely when the firm is overvalued. The market fails to discount fully for this timing, and therefore in the short run continues to overvalue new issue firms (despite the negative stock price reaction associated with seasoned issues). This overvaluation is eventually corrected, leading to poor abnormal returns. Our article offers further support for the complementary hypothesis that firms manipulate market perceptions, and that it is this manipulation which causes the new issues puzzle. In principle, either timing or manipulation alone could explain the puzzle. In reality, it is likely that both effects are present, but this remains a topic for further investigation.

Section 1 discusses the sample selection and data for the new issues sample. Section 2 presents the test results for the relation between issue-year accruals and forecast errors of annual earnings in each of the five postissue years. Some diagnostic checks and further analyses using additional variables are also investigated. Section 3 evaluates the relevance of analysts' credulity about issue-year accruals for explaining the new issues puzzle. Section 4 compares the predictive power of accruals for affiliated versus unaffiliated analysts' forecast errors. Section 5 compares the predictive power of accruals between issuers and nonissuers. Section 6 concludes.

1. Sample Selection and Data

1.1 Sample selection

Our initial sample of new issue firms is drawn from firms with available analysts' forecasts of annual earnings per share from the Institutional Brokers Estimate Systems (IBES) 1994 database, and with available accounting data from Standard & Poor's COMPUSTAT. We require sufficient industry and firm accounting data to compute excess accounting accruals (see below) for inclusion in the sample. Banking and utility firms are excluded because disclosure requirements and accounting rules are significantly different for these industries. Data on IPOs and SEOs from 1975 to 1990 were obtained from the Securities Data Company. The new issuer must have at least one analyst forecast within the five-year period following the new issue. Only the earliest SEO is included if a firm has multiple new issues within a five-year period. The final new issues sample contains 1395 IPOs and 1260 SEOs. The general sample of nonissue firms used in the comparison test with issuing firms contains 18,648 observations. The number of observations decline as the lag increases between the earnings forecast year and the accruals year, but the sample remains large and comprehensive.

Table 1 reports fiscal year and industry distribution of the IPO and SEO samples. There is mild clustering of IPOs and SEOs in industries and in time

Table 1
Sample characteristics of firms conducting initial public offerings and seasoned equity offerings from 1975 to 1990

Panel A: Industry distribution

		IPO		SEO	
Industry	Codes	Frequency	Percent	Frequency	Percent
Oil & Gas	13, 29, 67	26	1.9	45	3.6
Food Products	20	24	1.7	25	2.0
Paper & Paper Products	24–27	46	3.3	59	4.7
Chemical Products	28	84	6.0	84	6.7
Manufacturing	30–34	57	4.1	92	7.3
Computer Equip. & Servs	35, 73	317	22.7	226	17.9
Electronic Equipment	36	109	7.8	125	9.9
Transportation	37, 39, 40–42, 44, 45	81	5.8	100	7.9
Scientific Instruments	38	99	7.1	103	8.2
Communications	48	37	2.7	29	2.3
Durable Goods	50	37	2.7	26	2.1
Retail	53, 54, 56, 57, 59	94	6.7	74	5.9
Eating & Drinking Est.	58	44	3.2	35	2.8
Financial Services	61, 62, 64, 65	62	4.4	45	3.6
Entertainment services	70, 78, 79	37	2.7	32	2.5
Health	80	46	3.3	24	1.9
All Others	—[a]	195	14.0	136	10.8
Total		1395	100	1260	100

Panel B: Time Distribution

	IPO		SEO	
Year	Frequency	Percent	Frequency	Percent
1975	3	0.2	29	2.3
1976	13	0.9	51	4.0
1977	7	0.5	26	2.1
1978	10	0.7	38	3.0
1979	23	1.6	42	3.3
1980	36	2.6	103	8.2
1981	100	7.2	95	7.5
1982	63	4.5	120	9.5
1983	254	18.2	267	21.2
1984	129	9.2	66	5.2
1985	129	9.2	122	9.7
1986	249	17.8	136	10.8
1987	206	14.8	93	7.4
1988	86	6.2	40	3.2
1989	74	5.3	31	2.5
1990	13	0.9	1	0.1
Total	1395	100	1260	100

This table illustrates the industry and time distribution of initial public offerings and seasoned equity offerings of the sample. Industry groupings are based on two-digit SIC codes. The new issues data is obtained from Securities Data Company.

[a] SIC Codes 1, 10, 12, 15, 16, 17, 22, 23, 47, 51, 52, 55, 60, 63, 67, 72, 75, 76, 82, 83, 87, 99.

periods corresponding to hot issue years in 1983, 1985, 1986, and 1987. New issues occur most often among high-technology industries (SICs = 35, 36, and 73) with approximately 30.5% and 27.8% of all IPOs and SEOs.

1.2 Analysts' forecast errors

IBES constructs a median consensus forecast for each firm for each month in the annual forecast horizon. We report our results using the median consensus forecasts in midyear (six months prior to the year end for the fiscal year for which the forecast is made).[9] We allow a minimum of a six-month lag between the forecast date and the fiscal year end of the accruals in question. This ensures that analysts have information about the lagged accruals, which are released in the annual report usually three to four months after the fiscal year end, when forecasting earnings. Individual (instead of consensus) analysts' forecasts are used in Section 4 when we examine the relevance of an affiliation between the analyst and the underwriter of the new issue. These individual analysts' forecasts are obtained from the IBES Analyst Estimate Detailed tape.

Following the tradition in the literature, the analysts' forecast error (AFE) is the actual earnings per share minus the forecast, scaled by price at the beginning of the forecast month. Thus a negative forecast error implies analyst optimism, whereas a positive error implies pessimism. We use the superscript n $(= 1, \ldots, 5)$ for AFE to denote the year lag between the fiscal year of the accruals and the fiscal year for which the annual earnings forecast is made.

Stock returns were obtained from Chicago's Center for Security Prices database, and are adjusted for stock splits and stock dividends. For consistency with the literature, the forecast errors are winsorized at $+/-10\%$ to prevent extreme observations from having an undue influence on the estimated regression coefficients.[10]

Table 2 reports the summary statistics for the median consensus AFEs for the IPO and SEO sample separately. The consistently negative sign for all mean and median postissue AFEs indicate that, on average, analysts are overoptimistic about the earnings prospects of issuers in each of the five years after the offering. These results are consistent with evidence of analyst overoptimism for SEOs in Ali (1996) and for IPOs in Rajan and Servaes (1997). The mean IPO AFE_1 of -0.026 implies that actual earnings per share one year after the offering fell short of analysts' forecast by 2.6 cents per dollar of investment in the stock. Thus if the average firm P/E is 20, then the forecast error is approximately 52 cents per share. The more negative forecast

[9] The results are qualitatively similar if year-end consensus forecasts are used, and so are not reported.

[10] The results are qualitatively similar (and sometimes slightly stronger) when forecast errors are not winsorized.

Table 2
Descriptive statistics of the offering year accounting accruals, size, postissue AFEs of annual earnings and number of analysts' following for IPO and SEO firms

Panel A: IPO sample

	TAC_0	$XTAC_0$	$ETAC_0$	MV_0	AFE^1	AFE^2	AFE^3	AFE^4	AFE^5
Mean	0.119	0.085	0.035	184	−0.026	−0.030	−0.029	−0.032	−0.029
Median	0.023	0.037	−0.010	75	−0.014	−0.020	−0.016	−0.019	−0.016
SD	0.478	0.310	0.314	359	0.039	0.042	0.045	0.045	0.045
No. offerings	1100	1100	1100	1100	535	954	1026	929	799

Number of analysts' forecasts per offering contributing to

	AFE^1	AFE^2	AFE^3	AFE^4	AFE^5
Mean	3.29	4.09	4.77	5.34	5.64
Median	2.00	3.00	3.00	3.00	3.00
SD	2.78	3.64	4.41	5.15	5.55

Panel B: SEO sample

	TAC_0	$XTAC_0$	$ETAC_0$	MV_0	AFE^1	AFE^2	AFE^3	AFE^4	AFE^5
Mean	0.038	0.046	−0.008	524	−0.023	−0.029	−0.029	−0.024	−0.026
Median	−0.012	0.021	−0.019	144	−0.013	−0.016	−0.017	−0.013	−0.015
SD	0.318	0.223	0.211	1421	0.038	0.041	0.042	0.043	0.043
No. offerings	1216	1216	1216	1216	871	979	976	901	812

Number of analysts' forecasts per offering contributing to

	AFE^1	AFE^2	AFE^3	AFE^4	AFE^5
Mean	6.68	7.17	7.58	7.91	8.20
Median	5.00	5.00	6.00	6.00	6.00
SD	5.85	6.21	6.61	6.94	7.20

TAC_0 is the asset-scaled total accruals in the fiscal year of the new issue and is measured as the bottomline net income (172) minus cash flows from operations (308); Compustat items given parenthetically. $XTAC_0$ and $ETAC_0$, the asset-scaled excess and expected total accruals in the issue year, are calculated using Equations (A.2) and (A.3) in the appendix. They are estimated using the cross-sectional regression of total accruals on change in sales revenue and property, plant, and equipment [equation (A.1) in the appendix]. The model is the cross-sectional variant of the modified Jones model as used for example, in Teoh, Welch, and Wong (1998a, b) and Teoh, Wong, and Rao (1998). MV_0 is the market value (in millions) of total common stock outstanding at the end of the new issue year. All forecasts are one-year ahead forecasts of annual primary earnings per share (EPS). Only one analyst forecast (the midyear consensus) is used per offering. AFE^n, $n = 1$ to 5 of postoffering year, is the actual EPS^n minus the analysts' consensus forecast of EPS^n in midyear of n, scaled by price at the beginning of the month the forecast was made. Consistent with past studies, AFE^n is winsorized at +/−10%. Analysts' forecasts are obtained from IBES, and actual EPS are available from Compustat PST, fullcoverage, and research files. The number of analysts contributing to the consensus forecast per offering is a measure of the intensity of analysts' following of new issue firms.

errors for IPO firms than SEO firms suggests even stronger optimism for IPO firms than SEO firms.[11]

1.3 Accruals calculation

Our key independent variable, total accruals, is measured as

$$\text{total accruals} = \text{net income (172)} - \text{cash flow from operations (308)}$$

(Compustat item numbers in parentheses). For comparison across firms, we scale accruals by total assets at the beginning of the year, following the accounting literature.

[11] The combined new issues sample mean and median AFEs for $n = 1, \ldots, 5$ are, respectively, mean = −0.023, −0.028, −0.029, −0.027, and −0.027; median = −0.012, −0.017, −0.016, −0.015, and −0.015.

If managers use discretion to influence market perceptions, we expect greater predictive effect to come from abnormal accruals. To separate total accruals into expected and abnormal (or excess) components, we use the model in Teoh, Wong, and Rao (1998) summarized in the appendix. Essentially, total accruals are regressed on the change in sales revenue and the level of property, plant, and equipment. The cross-sectional regression is performed for each fiscal year of the new issue using all nonissuers in the same two-digit SIC industry code as the issuer, and excluding the issuers. The estimated coefficients on change in sales and property, plant, and equipment are used to calculate the expected accruals for the issuer. The excess accruals variable is the residual after subtracting expected accruals from total accruals. We interpret excess accruals as a proxy for accruals manipulation. For consistency with the accounting literature, all observations with accrual variables (total, excess, and expected accruals) exceeding 100% in absolute values are deleted from the analyses in this article.

The measurement of accruals manipulation is inherently a difficult task. Accrual choices intended to deceive firm outsiders are likely to be difficult for analysts, investors, and regulators to detect, which may be one reason why errors are made in interpreting accruals. Although the Jones model has been widely used and is documented to be most powerful at detecting earnings management among currently available models, it is imperfect. The estimated discretionary accrual component may be contaminated by nondiscretionary components. Contamination, by itself, is not a major concern because it merely introduces noise and lowers the power of our predictive tests. A greater concern is if the contamination introduces a systematic bias in the regression coefficients. To address this issue, we include both excess and expected accruals in the regression to determine the potential relevance and/or importance of this contamination bias. A statistically significant coefficient for excess accruals and not expected accruals would suggest that the contamination bias is unimportant in our context. Therefore we include various control variables in our regressions of the forecast error on accruals to eliminate potential sources of spurious correlations between excess accruals and future AFEs.

We also check robustness of results using excess accruals estimated from alternative expected accruals models. New issue firms likely differ from nonissuers in their cash flow positions at the time of the offering, so we also consider an alternative model for expected accruals that includes cash flows from operations as a further explanatory variable.[12] In addition, the

[12] Teoh, Wong, and Rao (1998) report several further alternative models to estimate excess accruals. One model that specifically addresses the concern that new issue firms tend to be high growth, and that the Jones model may not account sufficiently for the influence of growth on expected accruals is their matched-pair model. Issuers are matched to same industry non-issuers with similar (or higher) earnings growth or sales growth as the issuer. Excess accruals is calculated as the difference between the issuer's residual accruals and the matched firm's residual accruals. In another alternative model, the cross-sectional regression of accruals

issue-year excess accruals may be affected by cash inflows raised from the new offering. Thus we also examine the predictability of excess accruals measured in the year *prior* to SEOs (accruals data for the year prior to an IPO have to be hand-collected and so are excluded because of the relative inaccessibility) using the cash flow-adjusted model for excess accruals. The results are highly robust with respect to alternative expected accruals model specifications and additional control variables, and are not reported.

Summary statistics for the three key variables, total accruals, excess accruals, and expected accruals, all scaled by beginning total assets, are reported in Table 2 separately for the IPO and SEO samples. Summary statistics for firm size, a control variable in our regressions, are also presented in Table 2. Total accruals (TAC) are larger for the IPO sample than the SEO sample. They vary from a mean 11.9% and median 2.3% for the IPO sample to a mean 3.8% and median −1.2% for the SEO sample. A large part of total accruals is excess accruals. The mean and median asset-scaled excess accruals, XTAC, are 8.5% and 3.7% for the IPO sample and 4.6% and 2.1% for the SEO sample. All four statistics are significantly positive at the 1% level based on the Student's t-test statistic for the mean and Wilcoxon test statistic for the median. These statistics confirm the finding of large positive discretionary accruals during the offering period reported in Teoh, Wong, and Rao (1998), and Teoh, Welch, and Wong (1998a, b). The mean and median asset-scaled expected accruals, ETAC, are much smaller than XTAC, again consistent with prior studies. With the exception of the mean expected accruals for IPOs, all other statistics for expected accruals are significantly negative.

IPO firms are generally much smaller in size than SEO firms. The mean and median market capitalization at the end of the first fiscal year of the offering for the IPO sample are $184 million and $75 million and for the SEO sample are $524 million and $144 million. Thus, controlling for size is probably necessary to establish the presence of an independent relation between excess accruals and analyst overoptimism.

2. Predicting Analysts' Forecast Errors of Annual Earnings with Lagged Accruals

Table 3 presents the Spearman rank correlations between the issue-year accrual variables and each of the five postissue AFEs in panel A for IPOs and in panel B for SEOs. Total accruals and excess accruals are highly significantly negatively correlated with each of the five postissue AFEs in both panels; the level of signficance is generally at the 0.0001 level. The negative correlations are somewhat stronger for IPOs than SEOs. There is little correlation between

on sales and fixed assets is restricted only to a subset of industry peers with the highest sales growth. Teoh, Wong, and Rao (1998) report that the negative relation between issue-related accruals and post-issue abnormal firm performance is robust to these alternative models for excess accruals.

Table 3
Spearman rank correlation between offering year accruals and postissue analysts' forecast errors of IPO and SEO firms

Panel A: IPO sample

	AFE^1	AFE^2	AFE^3	AFE^4	AFE^5
TAC	−0.142***	−0.129***	−0.1000***	−0.130***	−0.101***
XTAC	−0.164***	−0.097***	−0.094***	−0.143***	−0.135***
ETAC	−0.001	−0.056	0.008	−0.007	0.044
No. of offerings	532	804	825	733	624

Panel B: SEO sample

	AFE^1	AFE^2	AFE^3	AFE^4	AFE^5
TAC	−0.090***	−0.104***	−0.109***	−0.095***	−0.074**
XTAC	−0.146***	−0.128***	−0.134***	−0.123***	−0.082**
ETAC	0.028	0.001	−0.003	−0.024	−0.046
No. of offerings	863	959	948	871	780

This table presents Spearman rank correlations between total accruals, excess accruals, and expected accruals with analysts' forecast errors of annual earnings made in and for fiscal years 1 through 5 after a new issue. See Table 2 for all variable definitions. *** and ** denote significance at less than the 1% and 5% levels, two-tailed tests, respectively.

expected accruals and postissue AFEs as none of the correlations is statistically significant for either the IPO or SEO samples. These results hint that issue-year total accruals, especially excess accruals, predict postissue AFEs, suggesting that analysts do not efficiently utilize information contained in accruals when making forecasts of future earnings.

The simple correlation tests do not control for other potential predictors of AFEs. As a first step, we control for size and industry influences on forecast errors by matching each issuer with a nonissuer having the same two-digit SIC code and similar market value of equity.[13] AFEs of the issuers are adjusted by subtracting from the error those of the same-size same-industry nonissuing matches for each of the five postissue years. The mean and median adjusted forecast errors, though small (ranging from −0.6% to −0.1%), are all negative for each of the postissue years and highly significant at less than the 1% level for the first four years. This confirms that analysts are overoptimistic by more for issuers than for similar nonissuers.

Of greater interest, we find that the industry and size-adjusted forecast errors vary with the accruals. Four quartile subsamples are formed by grouping the AFEs by the size of the issuers' excess accruals (XTAC). The results are presented in Table 4. The mean and median adjusted errors for the two smallest accrual quartiles, though often negative, are all not statistically significant. In contrast, the adjusted errors for the two highest accrual quartiles are all negative and highly statistically significant for the first four years. These adjusted errors are also of a similar order of magnitude as the unadjusted errors, as previously reported in Table 2. Thus there is evidence suggesting a negative relation between forecast errors and accruals after matching for size and industry.

[13] Nonissuing matches were found using the two-digit SIC code for 99.5% of issuers. One-digit SIC codes were used to match in the remainder.

Table 4
Size and industry-adjusted analysts' forecast errors of IPO and SEO issuers by quartiles ranked on offering year accruals

	$AAFE^1$	$AAFE^2$	$AAFE^3$	$AAFE^4$	$AAFE^5$
Quartile 1 (*lowest accruals*)					
Mean	−0.001	−0.002	0.003	0.000	0.003
Median	−0.002	−0.006	0.001	0.000	0.000
No. of offerings	315	401	404	367	322
Quartile 2					
Mean	0.004	−0.003	−0.004	0.000	0.003
Median	0.001	−0.003	−0.003	0.000	0.000
No. of offerings	315	402	405	367	323
Quartile 3					
Mean	−0.005*	−0.007**	−0.008***	−0.007**	−0.002
Median	−0.006**	−0.005**	−0.005***	−0.005***	−0.001
No. of offerings	316	402	405	368	323
Quartile 4 (*highest accruals*)					
Mean	−0.012***	−0.012***	−0.016***	−0.011***	−0.009***
Median	−0.007***	−0.004***	−0.015***	−0.009***	−0.005***
No. of offerings	314	401	405	367	322

This table presents the mean and median statistics of size and industry-adjusted analysts' forecast errors (AAFE) of annual earnings in postissue years 1–5. The AAFE is the issuer's analysts' forecasts error (AFE) minus the AFE of a nonissuer matched by the same two-digit SIC code and beginning year market value of equity. Quartiles are formed based on the issuer's offering year excess accruals. ***, **, and * denote significance at less than the 1%, 5%, and 10% levels, two-tailed tests, respectively.

2.1 Main regression results

To test formally whether total accruals, and particularly excess accruals, may not be adequately discounted by analysts, we use multivariate OLS regression. For each of the five years following a new issue, we ran the cross-sectional regression using all IPO and SEO firms:

$$\mathrm{AFE}^n_{i,j,t} = \alpha^n_0 + \sum_t \alpha^n_{1,t}\mathrm{DY}_t + \sum_j \alpha^n_{2,j}\mathrm{DI}_j + \alpha^n_3 \log(\mathrm{MV}^{n-1}_i) + \alpha^n_4 \mathrm{TAC}_i + \epsilon^n_i, \quad (1)$$

where $\mathrm{AFE}^n_{i,j,t}$ are the price-scaled median midyear consensus AFEs in years $n = 1, \ldots, 5$ after the issue year for issuer i, in industry j, and calendar year t. Because the consensus forecast is used per offering, each offering firm enters only once into the regression, even when the firm is followed by multiple analysts. DY_t is a dummy variable that equals 1 if the forecast is for the earnings of a fiscal year that ends in calendar year t, and 0 otherwise, and t ranges from 1975 to 1990. DI_j is a dummy variable that equals 1 if the firm belongs to industry j, and 0 otherwise.[14] The two sets of intercept dummies allow for macro effects such as business cycle trends and market sentiments that may affect analysts' forecasts, and they are included to control for possible cross-sectional correlations in the forecast errors. $\log(\mathrm{MV}^{n-1}_i)$ is the natural log of market value of all common stock outstanding at the end of

[14] The 17 industry groupings are presented in Table 1, panel A.

year $n-1$ relative to the issuer year. Brown et al. (1996) suggest that AFEs vary with firm size, and Ali (1996) reports that postissue AFE is more negative among small issuers than large issuers. These findings underscore the need to control for firm size. The key variable of interest is total accruals in the issue year, TAC_i. Equation (1) is estimated separately for each of the five postissue years, $n = 1$ to 5. Thus the AFEs are lined up according to event time, not calendar time, in each regression. A further set of five cross-sectional regressions is run with excess accruals (XTAC) and expected accruals (ETAC) instead of total accruals:

$$\text{AFE}^n_{i,j,t} = \alpha^n_0 + \sum_t \alpha^n_{1,t}\text{DY}_t + \sum_j \alpha^n_{2,j}\text{DI}_j + \alpha^n_3 \log(\text{MV}^{n-1}_i) + \alpha^n_4\text{XTAC}_i + \alpha^n_5\text{ETAC}_i + \epsilon^n_i. \quad (2)$$

Table 5 presents the 10 sets of cross-sectional regressions for Equations (1) and (2). For brevity, we report only the regression coefficients on the intercept, $\log(\text{MV}^{n-1})$, TAC, XTAC, and ETAC. The cross-sectional regressions are generally well-specified, with all the F-statistics significant at the 0.1% level and $\overline{R}^2$ ranging from 6.97% to 9.42%.

AFEs are less negative for larger firms, as indicated by the positive and highly significant coefficient on $\log(\text{MV}^{n-1})$ in all five regressions. This result is consistent with Ali's (1996) evidence that analysts' overoptimism is smaller for larger issuers. Focusing on the key accrual variables, we find that analysts are indeed credulous about accruals for a long period after the new issue. The TAC coefficients are significantly negative at the 1% or 5% levels for years 1–4. The predictive power of total accruals disappears by year 5, which coincides with when the stock returns of new issue firms stop underperforming. Panel B shows that the predictive power of total accruals for future AFEs is derived primarily from exess accruals and not expected accruals. The coefficient for excess accruals is statistically significantly negative for years 1–4, and is not significant in year 5, while none of the coefficients for expected accruals is significant. A coefficient of −0.016 for XTAC in the AFE^1 regression indicates that one standard deviation of XTAC (0.23) explains about 10% of the standard deviation in AFE^1 (0.038) and contributes about seven cents to the error in the forecast of an issuer with a P/E of 20.

The qualitative results in Table 5 are robust with respect to numerous diagnostic checks: (1) AFE variables are not winsorized, and the sample is not trimmed for TAC, XTAC, and ETAC values exceeding 100% in absolute values. (2) AFE is measured using end-of-year consensus forecasts instead of midyear consensus forecasts. (3) Rank values for dependent and non-dummy independent variables are used. (4) Separate regressions for IPO and SEO samples are run (the statistical significance is weaker for smaller subsamples). (5) Excess and expected accruals are decomposed using the cash flow-adjusted model, and the regression is run with and without an additional issue-year net income growth variable. The additional growth variable

Table 5
Cross-sectional regression of postissue analysts' midyear consensus forecast error on issue-year total accruals, excess accruals, and expected eccruals

$$\mathrm{AFE}^n_{i,j,t} = \alpha^n_0 + \sum_t \alpha^n_{1,t}\mathrm{DY}_t + \sum_j \alpha^n_{2,j}\mathrm{DI}_j + \alpha^n_3 \log(\mathrm{MV}^{n-1}_i) + \alpha^n_4 \mathrm{TAC}_i + \epsilon^n_i$$

Year after new issue	Estimated coefficients of independent variables White T-statistics				
	Intercept	$\log(\mathrm{MV}^{n-1})$	TAC	N	$\overline{R}^2$
$n=1$	−0.049***	0.006***	−0.014**	1229	7.98%
	−7.386	6.063	−2.420		
$n=2$	−0.041***	0.006***	−0.015***	1565	6.97%
	−6.751	7.727	−2.953		
$n=3$	−0.035***	0.006***	−0.010**	1578	7.11%
	−5.365	6.320	−1.983		
$n=4$	−0.045***	0.006***	−0.017***	1429	8.93%
	−5.934	8.229	−3.205		
$n=5$	−0.050***	0.006***	−0.003	1260	7.44%
	−7.976	7.221	−0.513		

$$\mathrm{AFE}^n_{i,j,t} = \alpha^n_0 + \sum_t \alpha^n_{1,t}\mathrm{DY}_t + \sum_j \alpha^n_{2,j}\mathrm{DI}_j + \alpha^n_3 \log(\mathrm{MV}^{n-1}_i) + \alpha^n_4 \mathrm{XTAC}_i + \alpha^n_5 \mathrm{ETAC}_i + \epsilon^n_i$$

Year after new issue	Estimated coefficients of independent variables White T-statistics					
	Intercept	$\log(\mathrm{MV}^{n-1})$	XTAC	ETAC	N	$\overline{R}^2$
$n=1$	−0.049***	0.006***	−0.016***	−0.008	1228	7.85%
	−7.310	6.007	−2.759	−0.925		
$n=2$	−0.041***	0.006***	−0.014***	−0.009	1573	8.48%
	−6.731	7.706	−2.913	−1.082		
$n=3$	−0.035***	0.006***	−0.011**	−0.001	1582	7.00%
	−5.332	7.754	−2.364	−0.141		
$n=4$	−0.045***	0.006***	−0.019***	−0.005	1434	9.42%
	−5.831	8.343	−4.021	−0.707		
$n=5$	−0.049***	0.006***	−0.005	0.003	1262	7.31%
	−7.875	7.143	−0.910	0.360		

This table reports the cross-sectional regressions of the postissue analysts' forecast errors of annual primary earnings per share on a set of control variables (log of market value at beginning of year, and a full set of time and industry dummies) and total accruals (TAC) in the top panel, and on control variables and excess and expected accruals (XTAC, ETAC) in the bottom panel for each postissue year from 1 to 5 relative to offering year 0. Total accruals, excess and expected accruals, log market values, and the dependent variable, AFE^n, $n = 1$ to 5, are calculated as described in Table 2. AFE^n is winsorized at +/−10%. For consistency with the accounting literature, we deleted observations where TAC, XTAC, and ETAC exceed 100% in absolute values. The truncation rule eliminated about 2.5% of the total available sample. Qualitatively similar results are obtained without truncating the sample and winsorizing the analysts' forecast errors. Of the full set of control variables, we report only the market size variable for clarity of exposition. The regression results for the other control variables are available on request.

*** and ** denote significance at 1% and 5% levels using White T, two-tailed tests.

is to control for potential correlations between forecast errors and possible bias in excess accruals because growth effects of new issue firms may not be adequately accounted for in the benchmark used for expected accruals. (6) Instead of issue-year accruals, we use accruals from the year prior to a seasoned equity offering to remove cash inflows raised from the offering as a potential source for spurious correlations between excess accruals and future forecast errors.[15]

[15] The coefficients for excess accruals are all negative, and are statistically significant for one-year ($n = 0$) and three-year ($n = 2$) ahead forecast errors. The smaller sample size using only SEOs reduces the power of the tests.

The cross-sectional regression in Table 5 is run on pooled data across the 10 years from 1980 to 1989; there were too few observations to run annual cross-sectional regressions for the other years (see Table 1 for the time distribution of the number of issuers from 1975 to 1990). The possibility of cross-correlation in the regression errors for pooled data over 10 years may result in overstated T-statistics. Therefore we also perform the cross-sectional regressions annually and compute statistics for the time series of the estimated coefficients. The results (not reported for space reasons) indicate even stronger statistical significance for the negative coefficients on total accruals and excess accruals for the first four years, and the coefficient for year 5 remains insignificant. As before, none of the coefficients on the expected accruals in all five regressions is statistically significant.

2.2 Additional analyses

We report various additional diagnostic analyses in this subsection. We first consider separate regressions for subsamples classified by time period, volume of new issues, growth, and size. Then we introduce three additional variables into the regression in Table 5 to control for other potential effects on forecast errors. These additional variables have interest in themselves as determinants of forecast surprise.

For the subgroup regressions, we run separate regressions for new issues occuring in the pre-1982 and post-1982 subperiods (1982 is the midpoint of our sample period). The regression for hot issues (high new issue volume) include new issues in 1983, 1985, 1986, and 1987, and the regression for the cold issue sample are for all other years. We also run regressions for three book-to-market (high, medium, low) subgroups and three size (small, medium, large) subgroups.

Excess accruals have somewhat greater predictability for postissue forecast errors before 1982, but are statistically significant in both the pre- and post-1982 subperiods. The excess accrual coefficients are not consistently more negative for hot periods than cold periods (statistical significance is higher for hot periods probably because of the larger sample size). No differences in the excess accrual coefficients are observed among the three book-to-market groups.

Of interest is that the excess accrual coefficients are significantly negative for small and medium firms but not large firms, and the level of significance is higher for medium-size firms. Teoh, Welch, and Wong (1998a) report similar size and book-to-market patterns for the negative relation between IPO-year excess accruals and postissue stock returns. They report that the negative relation exists for small and medium-size firms, with highest significance for the medium group but not for the largest IPO firms. They find that the negative relation is similar across the three book-to-market subgroups. Similarly, Teoh, Welch, and Wong (1998b) report a significantly negative relation between pre-SEO excess accruals and post-SEO stock returns for small SEOs and not large SEOs.

Turning to the analysis including three additional control variables, we run the first set of regressions as

$$\mathrm{AFE}^n_{i,j,t} = \alpha^n_0 + \sum_t \alpha^n_{1,t}\mathrm{DY}_t + \sum_j \alpha^n_{2,j}\mathrm{DI}_j + \alpha^n_3\mathrm{TAC}_i + \alpha^n_4\log(\mathrm{MV}^{n-1}_i) + \alpha^n_5\mathrm{AFE}^{n-1}_i + \alpha^n_6\mathrm{CFN}^n_i + \alpha^n_7\mathrm{CEPS}^{n-1}_i + \epsilon^n_i. \quad (3)$$

As before, we again substitute TAC with ETAC and XTAC in a second set of regressions, keeping all other variables the same.

The first new variable in both sets of regressions is the prior period forecast error, AFE^{n-1}. Abarbanell and Bernard (1992) report that AFEs are positively serially correlated, and they conjecture that the inclusion of out-of-date forecasts in the computation of the consensus forecast induces the positive serial correlation. We use AFE^{n-1} for an additional purpose—as an instrument variable for potential missing factors in the original regressions. However, its inclusion lowers our test power if the variable does not predict forecast errors, but is correlated with the other included variables.

McNichols and O'Brien (1997) propose that forecasts are generally overoptimistic because analysts selectively report optimistic forecasts and withhold pessimistic forecasts. Thus the observed postissue forecasts may be overly optimistic because those analysts with pessimistic forecasts may have stopped following the firms when earnings declined. Thus we include CFN^n, which is the change in the number of analysts following the issuer in year n deflated by the number of analysts following in year $n-1$, as a control variable.

The third new variable, CEPS^{n-1}, is the change in primary EPS deflated by the beginning share price in year $n-1$. Abarbanell and Bernard (1992) find that analysts' forecasts are more overoptimistic after an earnings and/or stock return decline. The issuing firms' earnings, on average, underperform the market after the offering, so the analysts' overoptimism in the postissue period could be due to their underreaction to a prior year earnings decline. CEPS serves as a control for this potential confounding effect.

Table 6 generally confirms the robustness of the results in Table 5. Total accruals remain statistically significantly negative for years 1, 2, and 4 at conventional levels, and is significant at the 10% level (one-tailed) for year 3. As before, excess accruals contribute to the predictive power of total accruals in all four years, but not expected accruals (except in one year where expected accruals is also significantly negative at the 5% level). None of the total accruals, excess accruals, and expected accruals variables is significant for the fifth year. Altogether, the evidence confirms the robustness of the results in Table 5 to these additional control variables.

Regarding the additional control variables, AFE^{n-1} coefficients are positive and highly significant in all years both in the top and bottom panel

Table 6
Cross-sectional regression of postissue analysts' midyear consensus forecast error on issue-year accounting accruals and further control variables in new issue firms

$$\mathrm{AFE}^n_{i,j,t} = \alpha^n_0 + \sum_t \alpha^n_{1,t}\mathrm{DY}_t + \sum_j \alpha^n_{2,j}\mathrm{DI}_j + \alpha^n_3\mathrm{TAC}_i + \alpha^n_4\log(\mathrm{MV}^{n-1}_i) + \alpha^n_5\mathrm{AFE}^{n-1}_i + \alpha^n_6\mathrm{CFN}^n_i + \alpha^n_7\mathrm{CEPS}^{n-1}_i + \epsilon^n_i$$

Year after new issue	Estimated coefficients of independent variables and White T-statistics							
	Intercept	TAC	$\log(\mathrm{MV}^{n-1})$	AFE^{n-1}	CFN^n	CEPS^{n-1}	N	$\overline{R}^2$
$n=1$	−0.031***	**−0.024***	0.003***	0.375***	0.002	−0.018	524	17.46%
	−3.096	**−2.252**	2.728	5.938	1.694	−1.094		
$n=2$	−0.025***	**−0.020***	0.004***	0.322***	0.003**	−0.048***	1074	14.96%
	−3.351	**−3.072**	4.174	6.846	2.146	−3.670		
$n=3$	−0.020***	**−0.006**	0.003***	0.310***	0.001	−0.017	1351	13.07%
	−2.876	**−1.266**	3.438	7.383	0.563	−1.314		
$n=4$	−0.041***	**−0.016***	0.005***	0.215***	0.002	0.005	1288	12.03%
	−4.615	**−3.064**	5.291	4.951	1.096	0.409		
$n=5$	−0.039***	**−0.004**	0.004***	0.211***	0.005**	−0.029	1149	11.17%
	−5.820	**−0.713**	4.605	4.606	2.178	−2.801		

$$\mathrm{AFE}^n_{i,j,t} = \alpha^n_0 + \sum_t \alpha^n_{1,t}\mathrm{DY}_t + \sum_j \alpha^n_{2,j}\mathrm{DI}_j + \alpha^n_3\mathrm{ETAC}_i + \alpha^n_4\mathrm{XTAC}_i + \alpha^n_5\log(\mathrm{MV}^{n-1}_i) + \alpha^n_6\mathrm{AFE}^{n-1}_i + \alpha^n_7\mathrm{CFN}^n_i + \alpha^n_8\mathrm{CEPS}^{n-1}_i + \epsilon^n_i$$

Year after new issue	Estimated coefficients of independent variables and white T-statistics								
	Intercept	XTAC	ETAC	$\log(\mathrm{MV}^{n-1})$	AFE^{n-1}	CFN^n	CEPS^{n-1}	N	$\overline{R}^2$
$n=1$	−0.030***	**−0.024****	−0.007	0.004***	0.380***	0.002	−0.018	524	17.28%
	−3.073	**−2.015**	−0.446	2.742	6.048	1.622	−1.125		
$n=2$	−0.027***	**−0.015****	−0.020**	0.004***	0.322***	0.003**	−0.051**	1074	14.52%
	−3.492	**−2.177**	−2.068	4.307	6.809	2.260	−3.751		
$n=3$	−0.019***	**−0.009***	0.005	0.003***	0.307***	0.001	−0.016	1351	12.92%
	−2.710	**−1.807**	0.596	3.332	7.283	0.781	−1.269		
$n=4$	−0.042***	**−0.019*****	−0.010	0.005***	0.210***	0.002	0.005	1288	12.33%
	−4.622	**−3.714**	−1.229	5.372	4.836	1.081	0.435		
$n=5$	−0.039***	**−0.006**	0.001	0.004***	0.199***	0.005**	−0.029***	1149	10.79%
	−5.826	**−0.924**	0.079	4.630	4.327	2.246	−2.793		

This table reports the cross-sectional regressions of the postissue analysts' forecast errors of annual primary earnings per share (AFE^n, $n = 1, \ldots, 5$) on issue-year total accruals (TAC) in the top panel, and excess and expected accruals (XTAC, ETAC) in the bottom panel, and a comprehensive set of control variables. The control variables include $\log(\mathrm{MV}^{n-1})$, log of market value at the beginning of year; a full set of time and industry dummies (not reported); AFE^{n-1}, the lagged analyst forecast error (i.e., the prior year analyst forecast error); CFN^n, the change in the number of analysts' following the issuer in year n from the previous year deflated by the number of analysts following in year $n-1$; and CEPS^{n-1}, the lagged change in primary earnings per share (change in EPS between years $n-2$ and $n-1$) deflated by price at the beginning of year $n-1$. The dependent variables (AFE^n) and the key independent variables, total accruals (TAC), excess accruals (XTAC), and expected accruals (ETAC) are as described in Table 2.

***, **, and * denote significance at the 1%, 5%, and 10% levels using White T, two-tailed test.

regressions, consistent with Abarbanell and Bernard (1992). The positive serial correlation can be induced by stale consensus forecasts, or by persistent overoptimism about the earnings potential of issuers.[16] To the extent that serial correlation in AFE captures the persisting effect of XTAC on AFE^n ($n = 1$ to 5), the lagged AFE^{n-1} in the regression steals some explanatory power from XTAC. The magnitude of the coefficients decline as we get farther away from the issue period, which suggests that improved discounting of XTAC with time reduces the persistence of overoptimism over time.

The coefficients for CFN^n are also all positive, suggesting more overoptimism when there is a drop in analysts' following. The significance levels are lower for this variable, with only two of the five years being significant at conventional levels. The coefficients on CEPS^{n-1} are negative except in year 4, and are statistically significant only in two of the five years. These results are inconsistent with Abarbanell and Bernard (1992), who report that prior year CEPS is positively associated with AFE. One explanation is that AFE^{n-1} and CEPS^{n-1} are positively correlated (average $\rho = 0.66$), so the sign of the coefficient on CEPS^{n-1} may be unstable when AFE^{n-1} is included in the regression. When AFE^{n-1} is excluded from the regression, the coefficients on CEPS^{n-1} are positive for years 1 to 4 and are statistically significant in years 3 and 4.

New issue firms are generally high growth firms [see Korajcyzk, Lucas, and McDonald (1990)], and the observed negative accruals-forecast error relation may result from inadequate consideration of growth effects on accruals and forecast errors.[17] Our results are robust, including preissue net income growth, preissue sales growth, and the book-to-market ratio jointly with and separately from the preissue sales growth variable, to the regressions in Table 6. Preissue sales growth controls for any remaining sales growth effects not fully accounted for in the model for excess accruals. The book-to-market variable is added because stock return underperformance is reported to be most pronounced in high-growth firms [Brav and Gompers (1997)]. The TAC and XTAC variables remain statistically significant for years 1–4 and not year 5, as in Table 6.[18] Thus the results reported in Table 6 are robust with respect to further controls for growth.

In sum, the evidence that excess issue-year accruals, and not expected accruals, predict postissue AFEs is highly robust to alternative measures

[16] In general, staleness in forecasts may lower the test power. If the forecasts are made prior to when the past fiscal year's accruals are disclosed, they may not reflect information contained in these accruals about future earnings. This may lead to a spurious correlation between forecast errors and past accruals. However, this staleness problem is unlikely to be significant in our sample because the accruals are disclosed at the annual report date, which generally precedes the forecasts by a considerable amount of time. For example, AFE^1 precedes the accruals by three months, AFE^2 precedes accruals by 15 months, and so on.

[17] This is not withstanding the robustness reported by Teoh, Wong, and Rao (1998) of the negative relation between accruals and subsequent firm performance with respect to alternative models of expected accruals that control specifically for high growth of new issue firms. See note 12.

[18] The White T-statistics for TAC are $-1.75, -2.87, -1.86, -3.51$, and -1.18, and for XTAC are $-1.70, -2.05, -2.03, -3.67$, and -1.21. None of the ETAC variables is significant.

for accruals, and alternative regression specifications and control variables. During the postissue periods, analysts are on average more optimistic about issuers with higher issue-year excess accruals.

3. Explaining Postissue Stock Return Underperformance

Our evidence so far suggests that analysts' credulity about excess accruals potentially explain the source for the new issues puzzle. The observed four fiscal-year horizon of analysts' credulity is comparable to the five calendar-year horizon for stock returns underperformance documented by Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995). The comparable long horizon of investor and analysts' credulity is noteworthy in that it suggests information inefficiency occurring for a considerable length of time. A potential explanation for the long time length is that analysts remain unaware of their errors until net accrual reversals are observed, and it may take several years before net accruals become negative. We find that postissue accruals remain positive in the first postissue year, become negative only beginning in the second year, and remain negative until the fifth year. The median total accruals are 1.37%, −0.37%, −1.19%, −1.95%, and −1.44% for postissue years $n = 1, \ldots, 5$, respectively; the equivalent mean accruals are 2.51%, −0.86%, −1.81%, −3.16%, and −2.25%. It is to the issuer's advantage to try to mask reversals in accruals for as long as possible to avoid triggering investor litigation against the firm. As growing firms, issuers may be able to mask reversals by continuing to boost accruals to subsume any immediate required reversals in the accruals that were taken previously. Over time, however, it will become increasingly difficult even for growing firms to continue to boost accruals above the required reversals in accruals. At this point, net accruals may become negative. By then, a sufficient amount of time has passed since the new issue. It may then be difficult for investors to argue successfully in court that the reversals were the result of accruals manipulation made during the issue.

Futhermore, we find that the AFEs decline over time for the quartile of issuers with the highest excess accruals (aggressive issuers) and not for the bottom quartile (conservative issuers). For the sample as a whole, the median percentage AFEs are −1.22, −1.73, −1.65, −1.56, −1.52, −1.68, and −1.39 for $n = 1, \ldots, 7$. Year 1 AFEs are smaller relative to other years, perhaps because accruals continue to be manipulated and net reversals have not yet begun. (Recall that the excess accruals are positive in year 1, and only become negative starting in year 2.) Comparing earlier postissue periods in years $n = 2, 3$, and 4 with later periods in years $n = 5, 6$, and 7, the analysts' optimism declined at twice the amount for the aggressive quartile (22%) than the conservative quartile (11%). Thus a greater correction for the forecast error occurred in the group most likely to have manipulated issue-year accruals.

To evaluate our hypothesis that analysts' credulity is a source for the new issues puzzle, we test how analysts' mistakes in interpreting accruals are related to the postissue stock returns. Teoh, Welch, and Wong (1998a, b) report that investors do not discount appropriately for excess accruals at the time of either the IPO or SEO. They find that high excess accruals predict greater postissue stock return underperformance.[19] This outcome is consistent with three possible scenarios: (1) analysts correctly interpret accruals but investors ignore analysts' information; (2) analysts do not understand the implications of accruals for future firm performance, and investors share (and perhaps, are influenced by) the misinterpretation of analysts; or (3) owing to agency problems, analysts act as if they do not understand the implications of accruals, and investors are biased in a fashion similar to the bias in analysts' forecasts. We provide evidence here consistent with the latter two possibilities. In other words, the evidence is consistent with investors making implicit forecast errors in interpreting accruals that are related to, and perhaps influenced by, the systematic errors in analysts' forecasts.

If investors interpret accruals correctly in the face of biased analysts' forecasts, the component of the forecast error predictable by issue-year accruals has no explanatory power for future stock returns. This result obtains even if investors were generally overoptimistic, so long as this optimism is unrelated to analysts' misinterpretation of accruals. In contrast, if investors' overoptimism results from (or is related to) analysts' failure to adjust properly for high accruals, then the predictable component of the postissue forecast errors (based on issue-year accruals) will be correlated with the degree of postissue stock return underperformance.

Thus, to determine whether investor overoptimism is related to analyst misinterpretation of accruals, we decompose annual AFEs after the issue year into a predicted component from accruals and a residual component. We then examine the multiple regression of postissue stock returns on the predictable and the residual components of AFEs.

To obtain predicted forecast errors, AFEs are regressed on excess and expected accruals. The fitted values for each issuer is the predicted forecast error, $\widehat{\mathrm{AFE}}^n$, for $n = 1, 2$, and 3 years after a new issue:

$$\widehat{\mathrm{AFE}}_i^n = \hat{a}_0^n + \hat{a}_1^n \mathrm{XTAC}_i + \hat{a}_2^n \mathrm{ETAC}_i, \quad n = 1, 2, 3. \tag{4}$$

The residual forecast error for firm i, $\epsilon(\mathrm{AFE})_i^n$ is the difference between the foreast error and its predicted forecast error from XTAC_i and ETAC_i. We then run the cross-sectional regression of the issuer's one-year returns on the

[19] These results for SEOs are confirmed by Rangan (1998) and Shivakumar (2000). Shivakumar further shows statistical significance is reduced when a low-power test is applied which does not distinguish earnings release from non-earnings release months. He also refers to an unspecified bias in one of the test statistics used by Teoh, Welch, and Wong (1998b), and concludes from an adjusted calculation that there is no significant relation. However, there does not seem to be *any* set of relevant assumptions under which his bias adjustment calculation would be valid.

predicted and residual forecast errors, and on the one-year market index and firm size:

$$\log(1+\mathrm{Ret}^n)_{i,j,t} = b_0^n + \sum_t b_{1,t}^n \mathrm{DY}_t + \sum_j b_{2,j}^n \mathrm{DI}_j + b_3^n \log(1+\mathrm{RM}^n) + b_4^n \log(\mathrm{MV}_i^{(n-1)}) + b_5^n \widehat{\mathrm{AFE}}_i^n + b_6^n \epsilon(\mathrm{AFE})_i^n + \epsilon_i^n, \quad n = 1, 2, 3. \qquad (5)$$

The issuer's log annual return, $\log(1+\mathrm{Ret}^n)$, is the one-year buy-and-hold return measured with a 90-day lag from the start of the fiscal year. This lag ensures that the accruals are known to investors prior to the returns compounding period. The returns are computed for one to three years ($n = 1, 2,$ and 3) after the fiscal year of the issue. $\log(1+\mathrm{RM}^n)$ is the New York Stock Exchange (NYSE) value-weighted buy-and-hold market index over the same horizon as the issuer's annual return $\log(1+\mathrm{Ret}^n)$. We extend our tests up to $n = 3$ for simplicity. Little statistical significance is obtained in our previous section tests for $n = 5$, and the $n = 3$ returns already overlap with a considerable portion of the period covering the fourth anniversary year of the offering.

Table 7 presents the results of Equation (5). The postissue stock return performance in each of the first three years after the issue is explained by the AFEs in the corresponding years. This can be seen from the sum of the coefficients on the predicted and residual forecast error.[20] Thus investors react to the surprise in earnings as proxied by AFEs. The key result in Table 7 is obtained from the coefficient on the predicted forecast error variable in the regressions for each of the three years. The coefficients on $\widehat{\mathrm{AFE}}^n$ are positive, large, and statistically significant in all three years. For example, the coefficient for year 1 is 13.376, is significant at 0.0002 level, and is about three times larger (statistically significantly) than the coefficient for the residual forecast error. One standard deviation in the predicted forecast error explains 12% of the standard deviation in the one-year return. The explanatory power of the predicted forecast error for stock returns is reduced in years 2 and 3, but remains statistically significant, at the 10% level in year 2 and the 5% level in year 3. Thus the evidence suggests that the analysts' misinterpretation of accruals contributes to investor overoptimism about new issues.

These results taken together suggest the following scenario as a possible explanation for the long-horizon stock return underperformance. Some new issue firms manage their earnings by manipulating accruals upward during the issue period, and then continue to manage accruals and delay subsequent

[20] The statistical significance of the sum of the coefficients on predicted and residual forecast errors is high in each year (at least the 0.0001 level).

Table 7
Cross-sectional regression of annual buy-and-hold stock returns on predicted analyst forecast error (from excess and expected accruals), residual accruals, market return, and firm size

$$\log(1+\mathrm{Ret}^n)_{i,j,t} = b_0^n + \sum_t b_{1,t}^n \mathrm{DY}_t + \sum_j b_{2,j}^n \mathrm{DI}_j + b_3^n \log(1+\mathrm{RM}^n) + b_4^n \log(\mathrm{MV}_i^{(n-1)}) + b_5^n \widehat{\mathrm{AFE}}_i^n + b_6^n \epsilon(\mathrm{AFE})_i^n + \epsilon_i^n,\ n=1,2,3.$$

Dependent variable	Estimated coefficients of independent variables and T-statistics						
	Intercept	$\log(1+\mathrm{RM}^n)$	$\log(\mathrm{MV}^n)$	$\widehat{\mathrm{AFE}}^n$	$\epsilon(\mathrm{AFE})^n$	N	$\overline{R}^2$
$\log(1+\mathrm{Ret}^1)$	−0.119	1.311***	0.063***	13.376***	4.488***	1176	35.91%
	−0.879	12.428	7.038	3.035	11.190		
	0.380	0.000	0.000	0.002	0.000		
$\log(1+\mathrm{Ret}^2)$	−0.217	1.429***	0.038***	6.527*	4.660***	1457	31.13%
	−1.632	14.132	4.683	1.702	12.462		
	0.103	0.000	0.000	0.089	0.000		
$\log(1+\mathrm{Ret}^3)$	−0.558***	1.356***	0.107***	9.175**	4.845***	1469	33.74%
	−3.444	16.142	9.189	2.173	9.515		
	0.001	0.000	0.000	0.030	0.000		

Analysts' forecast errors in years 1 through 3 ($\mathrm{AFE}^n, n = 1, 2, 3$) after a new issue are first regressed on excess and expected accruals (XTAC, ETAC) in the offering year to obtain predicted forecast errors $\widehat{\mathrm{AFE}}^n$ and residual forecast errors $\epsilon(\mathrm{AFE})^n$, $n = 1$, 2, and 3. Buy and hold returns for issuers are compounded beginning 90 days after the fiscal year end for each 12 consecutive months and then logged to obtain the annual log returns $\log(1 + \mathrm{Ret}^n)$, $n = 1$ to 3 after an offering. The annual log returns for each of the three years after an issue are then regressed on the predicted and residual forecast errors, and control variables. The control variables include the firm size ($\log(\mathrm{MV}^{n-1})$), buy-and-hold value-weighted log market return, $\log(1 + \mathrm{RM}^n)$, over the same horizon as the issuer's return, and calendar year (t) and industry (j) dummy variables. The analysts' forecast errors, and excess and expected accrual variables are as defined in Table 2. Year and industry dummy coefficients are not reported for brevity. ***, **, and * denote significance at the 1%, 5%, and 10% levels, two-tailed test.

The F-statistic for difference in coefficients between the predicted and residual forecast errors are $n = 1$: $F = 8.23$, prob $> F = 0.004$; $n = 2: F = 0.81$, prob $> F = 0.37$; $n = 3: F = 1.88$, prob $> F = 0.17$.

reversals of past accruals for as long as possible afterward. Analysts, being overconfident or acting strategically, do not discount sufficiently for this possibility, and so do not reflect the extent of the reversal in accruals in their forecasts of earnings in postissue years. When the accruals actually reverse, the analysts are seemingly surprised. Investors, relying on the analysts' forecasts, are similarly surprised by the reversals, and the initial overpricing of new issues stocks is corrected over time when the reversals occur and actual reported earnings are low.[21]

Recent research has reported that the long-run postissue underperformance is worse if the issuer is smaller, has high issue-year excess accruals [Teoh, Welch, and Wong (1998a, b)], has low institutional ownership [Fields (1999)], experiences a high amount of flipping [selling of the IPO within the first few days after the issue; Krigman, Shaw, and Womack (1999)], and is not venture-capital backed [Brav and Gompers (1997)]. These characteristics are likely to be associated with situations where firms succeed in manipulating accruals, perhaps because the firms are followed by less experienced analysts, have greater agency issues for analysts and management, and their investors

[21] Over time, investors can catch on that analysts are inadequately discounting accruals, which would lead them to compensate by discounting the analysts forecasts more. However, if accounting accrual choices that are available to managers change with evolving accounting rules and changes in the business environment, this learning may be difficult.

face higher costs of and fewer opportunities for arbitraging away inefficiencies. The greater predictability of forecast errors from past accruals for small rather than large issuers, as reported in Section 2.2, is consistent with this conjecture.

4. Comparing Predictability of Affiliated versus Unaffiliated Forecast Errors

This section considers whether analysts' optimistic bias is affected by whether the new issue is underwritten by the brokerage firm that employs the analysts. We refer to analysts of the lead underwriting firms as affiliated and all others as unaffiliated. Recent and current research have reported conflicting evidence on this issue. Dugar and Nathan (1995), Hansen and Sarin (1996), and Lin and McNichols (1998), report no significant differences in forecasts between affiliated and unaffiliated analysts (the former two studies do not focus on new issue firms, so their definition of affiliation is the presence of a banking relation between the firm and the analyst firm). On the other hand, Dechow, Hutton, and Sloan (2000) find significant differences in the long-term growth forecasts between affiliated and unaffiliated analysts. In addition, research on sell-side analyst recommendations (as opposed to the forecasts of earnings themselves) by Lin and McNichols (1998) and Michaely and Womack (1999) report more optimistic recommendations by affiliated analysts than unaffiliated analysts.

Several economic forces suggest differences in forecast errors between affiliated and unaffiliated analysts. Issuers may prefer underwriting firms with favorable analysts' forecasts. The favorable forecasts may result from analysts being credulous about past accruals, consequently extrapolating the high issue-period reported earnings to future periods. This would imply more negative forecast errors for affiliated analysts.

Alternatively, analysts may differ in their incentives to report truthfully and in their degree of access to information about the issuers' projects. For example, Business Week (November 11, 1996) reports that "For many analysts, . . . the pressure to avoid unfavorable reports is intensifying . . . The conflict lies in the dramatic increase in the relative contribution of investment banking fees and revenues to the senior-analyst compensation structure. . . . It can be well over half of total compensation." Furthermore, the article elaborates that analysts often join investment bankers on sales trips, which suggests that affiliated analysts have greater access to information about the issuer than nonaffiliated analysts. This excerpt suggests the possibility that affiliated analysts face greater pressure to issue favorable forecasts but also have greater access to information than unaffiliated analysts.

On the other hand, unaffiliated analysts may experience similar pressures to make favorable reports to win future underwriting business with the issuer or other potential issuers, and to gain access. The Business Week article further states that "Analysts who issue critical reports may have difficulty getting access to the companies they cover. . . . If you go out of the way to say negative things, whether you have an investment banking relationship or not, companies will move to cut you off." Furthermore, unaffiliated analysts may free ride on the information gathering of the affiliated analysts by cascading on the affiliated analysts' forecasts, eroding any initial information superiority. In sum, it is an empirical question how issuer-selection bias, superior information access, and selling pressure trade off between affiliated and unaffiliated analysts to affect their forecast errors, and their credulity with respect to accruals.

Table 8 presents summary statistics of forecast errors between the two groups of analysts, affiliated and unaffiliated. Only the lead underwriter analyst firm belongs to the affiliated group, so the AFE for the affiliated group is the latest midyear forecast of the lead underwriter. For the unaffiliated group, the median midyear consensus forecast among unaffiliated

Table 8
Comparison between affiliated and unaffiliated analysts' forecast errors in postissue periods

	AFE^1	AFE^2	AFE^3	AFE^4	AFE^5
Affiliated					
Mean	−0.025	−0.028	−0.030	−0.028	−0.026
Median	−0.014	−0.017	−0.019	−0.017	−0.015
SD	0.040	0.039	0.042	0.042	0.042
Unaffiliated					
Consensus					
Mean	−0.023	−0.028	−0.028	−0.028	−0.026
Median	−0.013	−0.018	−0.017	−0.016	−0.016
SD	0.039	0.042	0.042	0.043	0.043
Individual					
Mean	−0.019	−0.024	−0.025	−0.024	−0.022
Median	−0.010	−0.014	−0.014	−0.012	−0.011
SD	0.039	0.040	0.040	0.040	0.041
Analyst/offering					
Mean	4.679	4.586	4.862	5.111	5.429
Median	3.000	3.000	3.000	3.000	3.000
SD	5.840	5.373	5.394	5.508	5.670
Panel A					
Affiliated – Consensus unaffiliated					
p-value of T-test	0.308	0.959	0.233	0.959	0.893
p-value of Wilcoxon	0.259	0.999	0.118	0.840	0.852
Panel B					
Affiliated – Individual unaffiliated					
p-value of T-test	0.001	0.020	0.001	0.023	0.026
p-value of Wilcoxon	0.000	0.020	0.000	0.013	0.037

This table reports the summary statistics of analysts' forecast errors of primary earnings per share (AFE^n, $n = 1, \ldots, 5$) in each of the five postissue fiscal years after a new issue. All affiliated forecasts are made by analysts from brokerage firms which are the lead underwriters of the IPO or SEO. All other forecasts are considered unaffiliated, though unaffiliated analysts may be from brokerage firms which also participated as members of the underwriting group of the new issue.

All forecasts are one-year ahead forecasts of annual primary earnings per share (EPS). When there are multiple unaffiliated analysts' forecasts for the offering, panel A reports the median consensus forecast among the unaffiliated analysts' forecasts made within the first six months of the year for the unaffiliated group. Panel B reports the statistics using all available individual unaffiliated forecasts. For the affiliated group, the latest forecast in the first six months is selected in both panels.

Tests for differences between affiliated and unaffiliated groups use the T-test for differences in mean and the Wilcoxon test for differences in median.

analysts is used for the consensus unaffiliated group, whereas all individual unaffiliated analyst forecasts are included in the individual unaffiliated group (so offerings are included multiple times when multiple unaffiliated analysts follow the firm). The number of observations used to compute the statistics for the affiliated and unaffiliated groups will differ depending on whether the issuers are followed by only the underwriter analyst, only an unaffiliated analyst, or both.

We find no discernible difference between affiliated analyst and consensus unaffiliated AFEs in Table 8. The mean and median differences are very small and none is statistically significant for all five years. On the other hand, significant differences exist between the affiliated and unaffiliated groups when individual unaffiliated analysts' forecasts are considered instead of the consensus unaffiliated analysts' forecasts. All the mean and median forecast errors are more negative for the affiliated group than the unaffiliated group, suggesting greater optimism by the affiliated analysts. Larger firms, with a greater number of analysts' following, are over-represented in the sample when individual forecasts among the unaffiliated group are considered. The undue weight given larger firms and the likely correlation among individual analysts may contribute to the discrepancy in results between consensus and individual unaffiliated AFEs.

We test for differential predictive power of accruals for affiliated and unaffiliated forecast errors by adding an intercept and slope interactive dummy variable to the main regressions of Equations (1) and (2). The regression is performed using affiliated and consensus unaffiliated AFEs. An issuer followed by both affiliated and unaffiliated analysts enters twice in the regression.[22] Otherwise, the issuer enters only once in the regression. None of the estimated intercept and slope dummy variables is significant. Otherwise, all previous results are confirmed, and so the results are not reported in a separate table. The evidence suggests perhaps that issuers do not succeed in selecting underwriters with more favorable analysts' forecasts. Alternatively, affiliated analysts do not have superior access to information for more accurate discounting of accruals, or they ignore their more superior information about the accruals because they experience greater selling pressure than unaffiliated analysts.

5. Comparing Issue-Period Accruals with Non-Issue-Period Accruals

In this section we examine whether analysts also have difficulties evaluating accruals in nonissue settings. We compare the predictive power of accruals from issue periods with all non-issue-period accruals (no new issues within

[22] Using individual unaffiliated AFEs as independent observations would allow an issuer to enter more than twice, which places undue weight on large firms (which have larger analyst followings) in the regression and may induce cross-sectional correlation in the regression error term. In addition, the individual unaffiliated analysts' forecasts are likely to be correlated, so the test statistics assuming independence are likely to be overstated. Thus, we consider only the consensus unaffiliated analysts' forecasts in the regression.

five years), and with only non-issue-period accruals ranked in the top quartile by their excess accruals. The latter comparison evaluates whether analysts have as much difficulty interpreting accruals when managers face non-issue-related incentives to boost accruals as during a new equity issue.

We run the regression for Equation (2) now across issuing firms, including nonissuing firms ranked in the top quartile by excess accruals. We use an intercept dummy variable and two slope dummy variables to isolate the incremental new issue effects as follows:

$$\begin{aligned}\mathrm{AFE}^{n}_{i,j,t} = {} & \alpha^{n}_{0} + \sum_{t} \alpha^{n}_{1,t}\mathrm{DY}_{t} + \sum_{j} \alpha^{n}_{2,j}\mathrm{DI}_{j} + \alpha^{n}_{3}\log(\mathrm{MV}^{n-1}_{i}) \\ & + \alpha^{n}_{4}\mathrm{XTAC}_{i} + \alpha^{n}_{5}\mathrm{ETAC}_{i} + \alpha^{n}_{6}\mathrm{ISS}_{i} + \alpha^{n}_{7}\mathrm{ISS}_{i} * \mathrm{XTAC}_{i} \\ & + \alpha^{n}_{8}\mathrm{ISS}_{i} * \mathrm{ETAC}_{i} + \epsilon^{n}_{i}. \end{aligned} \tag{6}$$

The five regressions are for AFEs that lead accruals from one to five years. The intercept dummy variable, ISS, and slope dummies ISS∗XTAC and ISS∗ETAC turn on when the accrual is from the year when an IPO or SEO occurred. These variables measure the incremental forecast bias when accruals are from a new issue year relative to a nonissue year. Results for the comparison with all nonissuers are in panel A of Table 9, and with only large positive-accrual nonissuers in panel B.

Panel A shows that, on average, analysts interpret non-issue-period accruals correctly. The XTAC and ETAC coefficients are not statistically significant in four of the five years. Consistent with our earlier results, forecasts following new issues are overly optimistic. The ISS coefficient alone contributes about an incremental six cents per share (assuming average P/E $= 20$) in each of the five years after a new issue. As before, the incremental predictive power of accruals for new issuers comes from XTAC and not ETAC; ISS∗XTAC is statistically significantly negative in four of the five postissue years, whereas ISS∗ETAC is unremarkable.

Of greater interest, panel B shows that analysts are also overly optimistic about nonissuers with past large positive accruals. As with issuers, the degree of optimism increases with past excess accruals, and less so with expected accruals. The XTAC coefficients are negative in all years, statistically significant at conventional levels in two years, and marginally significant in a third year. The relation with expected accruals is less consistent, with significance in only one year and the opposite sign in another year. Furthermore, there is no incremental predictive power for accruals from issuers relative to large-accrual nonissuers. None of the ISS∗XTAC coefficients is statistically significantly negative, and in one year it is positive and borderline significant. As before, the ISS∗ETAC coefficients are unremarkable. Thus analysts

Table 9
Cross-sectional regression of analysts' forecast errors on lagged total accruals, and excess and expected accruals for issue and nonissue firms

$$\mathrm{AFE}^n_{i,j,t} = \alpha^n_0 + \textstyle\sum_t \alpha^n_{1,t}\mathrm{DY}_t + \sum_j \alpha^n_{2,j}\mathrm{DI}_j + \alpha^n_3 \log(\mathrm{MV}^{n-1}_i) + \alpha^n_4 \mathrm{XTAC}_i + \alpha^n_5 \mathrm{ETAC}_i + \alpha^n_6 \mathrm{ISS}_i + \alpha^n_7 \mathrm{ISS} * \mathrm{XTAC}_i + \alpha^n_8 \mathrm{ISS} * \mathrm{ETAC}_i + \epsilon^n_i$$

All issuing and nonissuing firms
Estimated coefficients of independent variables and White T-statistics

	Intercept	$\log(\mathrm{MV}^{n-1})$	XTAC	ETAC	ISS	ISS* XTAC	ISS* ETAC	N	$\overline{R}^2$
$n=1$	−0.025***	0.004***	−0.001	0.000	−0.003**	−0.015**	−0.010**	18648	6.76%
	−17.419	18.893	−0.383	0.457	−2.106	−2.502	−2.080		
$n=2$	−0.025***	0.004***	−0.008***	−0.000	−0.003	−0.009	−0.005	18490	6.98%
	−16.933	18.864	−2.786	−0.682	−2.417	−1.419	−0.941		
$n=3$	−0.024***	0.004***	−0.002	−0.000	−0.005***	−0.012*	0.001	17716	6.80%
	−15.993	18.388	−0.714	−0.028	−3.463	−1.898	0.186		
$n=4$	−0.023***	0.004***	−0.000	0.001	−0.003**	−0.017**	−0.002	16750	6.68%
	−14.269	18.568	−0.070	0.295	−2.059	−2.433	−0.248		
$n=5$	−0.022***	0.004***	−0.004	0.000*	−0.003*	−0.006	−0.005	15650	6.18%
	−11.734	17.623	−1.433	1.684	−1.878	−0.863	−0.706		

Issuers and top quartile ranked by excess accruals of nonissuers
Estimated coefficients of independent variables and White T-statistics

	Intercept	$\log(\mathrm{MV}^{n-1})$	XTAC	ETAC	ISS	ISS* XTAC	ISS* ETAC	N	$\overline{R}^2$
$n=1$	−0.027***	0.004***	−0.010	0.002	0.000	−0.007	−0.004	4260	6.62%
	−8.426	9.105	−1.203	0.209	−0.056	−0.644	−0.330		
$n=2$	−0.024***	0.004***	−0.019**	−0.016*	−0.003	0.003	0.015	4296	7.59%
	−7.398	10.095	−2.461	−1.714	−1.549	0.357	1.536		
$n=3$	−0.030***	0.004***	−0.014	−0.006	−0.005**	0.006	0.017	4056	7.39%
	−8.643	9.765	−1.600	−0.604	−2.634	0.564	1.263		
$n=4$	−0.027***	0.005***	−0.009	−0.002	−0.002	−0.007	0.002	3793	8.47%
	−7.257	9.768	−0.920	−0.188	−0.767	−0.597	0.149		
$n=5$	−0.021***	0.004***	−0.023***	0.020*	−0.005**	0.021*	−0.013	3509	6.57%
	−5.433	7.582	−2.728	1.712	−2.483	1.822	−0.837		

This table reports the cross-sectional regression of analysts' forecast errors on lagged excess and expected accruals, control variables (log of market value, and a full set of year and industry dummy variables [not reported for brevity]), and an intercept and two slope dummy variables that turn on when the firm undertakes an IPO or SEO during the fiscal year of the accruals. ISS is the intercept dummy variable, and ISS∗XTAC and ISS∗ETAC are slope interactive dummy variables for excess and expected accruals, respectively. The dependent variable, AFE^n is the midyear consensus analysts' forecast errors of annual primary earnings per share, so only one forecast per offering is included in the regression. All other independent variables are as defined in Table 2.

In the top panel, the regression is run using *all* firms with available accruals data in the Compustat tape and IBES midyear consensus analysts' forecasts of one-year ahead earnings from t = 1975–1990. In the bottom panel, the regression is run for issuers and only nonissuers belonging in the highest excess accrual quartile.

***,**, and * denote significance at the 1%, 5%, and 10% levels using White T, two-tailed test.

do just as badly evaluating the accruals of nonissuing firms with large unusual positive accruals as with issuing firms.[23]

These results help explain mispricing of stocks in settings where there are other incentives to boost earnings by manipulating accruals, apart from the new issue setting. Sloan (1996) ranks firms by their accruals and reports that firms belonging in the higher accruals deciles earn significantly more

[23] The predictability of forecast errors from past high accruals for nonissuers is consistent with Abarbanell and Bushee (1997), who report that analysts' forecasts are inefficient with respect to a general set of past accounting ratios.

negative stock returns in future years. Our results here indicate that analysts forecasts can be improved by paying attention to large positive excess accruals, regardless of the circumstances motivating managers to boost these accruals. This will help investors avoid systematic mispricing of stocks.

6. Conclusion

This article has examined whether analysts efficiently process information about future earnings that is contained in past accounting accruals. We evaluate whether analysts systematically underestimate the extent of earnings management, and therefore are credulous that high accruals reflect good news. We then evaluate whether investors fully anticipate analysts' systematic errors arising from their credulity about accruals. We compare analysts' understanding of excess accruals with expected accruals, and between underwriter-affiliated and unaffiliated analysts. Finally, we compare analysts' understanding of accruals in new issue firms with nonissuing firms reporting large positive accruals.

We find that analysts do not account appropriately for past accruals in their forecasts of earnings in future years. Analysts are more overly optimistic about firms with large past accruals. The predictive power of accruals lasts up to four postissue years, a time length equal to the postissue underperformance horizon. The predictive power of accruals comes mainly from the excess component, not the expected component, and is present for medium-size and small firms, but not large firms. If accruals manipulation is harder to detect in smaller firms, our results are consistent with the presence of stock return underperformance for smaller firms only. We also find that underwriter analysts and unaffiliated analysts behave as if they are equally credulous about an issuer's accruals. These results are robust with varying forecast horizons, inclusion of other control variables such as firm size, book-to-market, prior-year AFEs, lagged change in earnings, earnings and sales growth, and alternative measures for excess accruals.

Furthermore, we find that the postissue stock return underperformance is related to the portion of AFEs that is predictable from excess issue-year accruals. Overall, the evidence is consistent with analysts behaving as if they extrapolate earnings numbers to future years without adequately accounting for reversals of past excess accruals and investors failing to discount for analysts' credulity about accruals manipulation. Thus our results suggest that analysts' inability to interpret issue-year accruals contributed to investor mispricing of new issues.

Finally, we find that analysts similarly misinterpret large and positive accruals from nonissuers. This suggests that other circumstances where there are incentives to boost accruals pose as many difficulties for the analysts as do new issue events. Thus analysts' credulity about large positive accruals, regardless of the firm's motive to report high earnings, explain investor mispricing of stocks with past high accruals in general.

Finally, our study also contributes to research on predicting earnings surprise. Because earnings surprise moves stock prices, there is high demand among practitioners in the investment community for models predicting the earnings surprise. While several proprietary and commercial models designed to predict earnings surprise currently exist [discussed in Brown (1997)], there has been little academic research on the determinants of forecast errors. Our results suggest that discretionary accounting accruals are an important determinant of the surprise.

Appendix

A key variable in our study is total accruals, which is the sum of all accounting adjustments to cash flows to obtain reported net income. It is measured as (Compustat item numbers in parentheses)[24]

$$\text{total accruals} = \text{net income (172)} - \text{cash flow from operations (308)}.$$

Following Teoh, Wong, and Rao (1998), we decompose total accruals into an excess and expected component using the cross-sectional modified Jones model. Total accruals in a given year is regressed on the change in sales and the level of property, plant, and equipment for a sample of firms, in the same two-digit SIC industry code as the issuing firm, but excluding the issuing firm. The cross-sectional approach is the only feasible approach for estimating excess accruals of IPO firms without a prior history. It also has the advantage over a time-series model of allowing contemporaneous industry-wide economic conditions to be incorporated in the estimate of excess accruals. A new issue is generally associated with major changes in investment opportunities for the firm and for the industry, and these economic changes influence the analysts' anticipation of necessary accruals to support firm operations independent of managerial manipulation. The common practice by underwriters of comparing market prices and accounting variables of similar firms when pricing equity underscores the importance of incorporating industry-wide economic conditions.

Specifically, for each year t in the test period, we run the following cross-sectional regression:

$$\frac{\text{TAC}_{j,t}}{\text{TA}_{j,t-1}} = b_{0,t}\frac{1}{\text{TA}_{j,t-1}} + b_{1,t}\frac{\Delta\text{SALES}_{j,t}}{\text{TA}_{j,t-1}} + b_{2,t}\frac{\text{PPE}_{j,t}}{\text{TA}_{j,t-1}} + \epsilon_{j,t}, \quad j \in \text{ estimation sample} \quad \text{(A.1)}$$

where TAC is total accruals, ΔSALES is the year-to-year change in sales revenues, PPE is the gross level of property, plant, and equipment, and TA is the beginning total assets. All variables are deflated by beginning total assets to reduce possible heteroscedasticity.

The asset-scaled expected accruals, $\text{ETAC}_{i,t}$, for firm i in year t is computed using the estimated coefficients and change in revenues net of change in trade receivable (A/R) as

$$\text{ETAC}_{i,t} = \hat{b}_{0,t}\frac{1}{\text{TA}_{i,t-1}} + \hat{b}_{1,t}\frac{\Delta\text{SALES}_{i,t} - \Delta\text{A/R}_{i,t}}{\text{TA}_{i,t-1}} + \hat{b}_{2,t}\frac{\text{PPE}_{i,t}}{\text{TA}_{i,t-1}}. \quad \text{(A.2)}$$

[24] Cash flow from operations is unavailable from Compustat prior to 1987, and so is computed as the difference between funds flow from operations (item 110) minus working capital accruals ($[\Delta 4 - \Delta 1] - [\Delta 5 - \Delta 44]$). This definition has been used by Bowen, Burgstahler, and Daley (1986) and DeFond and Jiambalvo (1994), among others. Note that cash flow from operations is estimated as item 110 when working capital accruals are not reported separately in the funds flow statement (format code for item 318 is 2) or the cash by activity statement (format code for item 318 is 3), because Compustat already excludes working capital accruals from item 110 in these cases. See page 111 of Compustat 1994 manual.

The residual total accruals is the asset-scaled excess accruals, XTAC, calculated as

$$\mathrm{XTAC}_{i,t} = \frac{\mathrm{TAC}_{i,t}}{\mathrm{TA}_{i,t-1}} - \mathrm{ETAC}_{i,t}. \tag{A.3}$$

Following the accounting literature, we reduce the change in sales revenue by the net change in trade accounts receivable before computing expected accruals. Because credit sales can be manipulated, the adjustment allows for a clearer interpretation of excess accruals as a measure of discretionary earnings manipulation.

There has been considerable discussion in the literature on the relative degree of success of alternative models in estimating discretionary accruals [see references in Healy and Wahlen (1999)]. Although all available models are imperfect, in a study using simulated data and data from a sample of firms alleged to have overstated earnings by the SEC, Dechow, Sloan, and Sweeney (1995) conclude that the modified Jones model is superior to other models. Any model misspecification introduces noise and may lower the power of our test when excess accruals are interpreted as a measure of discretionary accruals. The estimated regression coefficients would be biased toward zero, suggesting a weaker link between discretionary accruals and forecast errors than is actually the case. However, it is also possible that measurement error could proxy for some other factor that is correlated with AFEs, and thus introduce spurious correlation between discretionary accruals and forecast errors.

We address this possibility by performing extensive diagnostic checks on the estimated regression using various control measures as independent variables and alternative specifications for excess accruals. New issue firms likely differ from nonissuers in their cash-flow positions at the time of the offering, and Dechow (1994) has documented a negative relation between contemporaneous cash flows and accruals. Though it is unclear how differences in cash flows might introduce spurious correlations between excess accruals and future AFEs, we also measure excess accruals using a cash-flow-adjusted model, as in Shivakumar (2000). This approach involves an additional variable, cash flows from operations, in the cross-sectional regression of Equation (A.1). The results of the main regressions in Table 5 are robust with respect to this specification of excess accruals and are not reported.

Because new issue firms are likely to be higher growth firms than average non-issuers [see Korajcyzk, Lucas, and McDonald (1990)], we also include earnings growth in the issue period as an additional control variable in the regressions in Table 5. The results again are robust with respect to this inclusion and are not reported.

References

Abarbanell, J., and V. L. Bernard, 1992, "Tests of Analysts' Overreaction/Underreaction to Earnings Information as an Explanation for Anomalous Stock Price Behavior," *Journal of Finance*, 67, 1181–1207.

Abarbanell, J., and B. Bushee, 1997, "Fundamental Analysis, Future Earnings, and Stock Prices," *Journal of Accounting Research*, 35, 1–24.

Ali, A., 1996, "Bias in Analysts' Earnings Forecasts as an Explanation for the Long-Run Underperformance of Stocks Following Equity Offerings," working paper, University of Arizona.

Barber, B., and J. Lyon, 1997, "Detecting Long-Run Abnormal Stock Returns: The Empirical Power and Specification of Test Statistics," *Journal of Financial Economics*, 43, 341–372.

Barber, B., J. Lyon, and C. Tsai, 1999, "Improved Methods for Tests of Long-Run Abnormal Stock Returns," *Journal of Finance*, 54, 165–201.

Bowen, R., D. Burgstahler, and L. Daley, 1986, "Evidence On the Relationships Between Earnings and Various Measures of Cash Flow," *The Accounting Review*, 61, 713–725.

Brav, A., and P. A. Gompers, 1997, "Myth or Reality? The Long-Run Underperformance of Initial Public Offerings: Evidence from Venture and Nonventure Capital-Backed Companies," *Journal of Finance*, 52, 1791–1821.

Brav, A., C. Geczy, and P. Gompers, 2000, "Is the Abnormal Return Following Equity Issuances Anomalous?" *Journal of Financial Economics*, 56, 209–249.

Brown, L., 1997, "Can ESP Yield Abnormal Returns?" *Journal of Portfolio Management*, Summer, 36–43.

Brown, L., J. Han, E. Keon, Jr., and W. Quinn, 1996, "Predicting Analysts' Earnings Surprise," *Journal of Investing*, 5, 17–23.

Daniel, K., D. Hirshleifer, and A. Subrahmanyam, 1998, "Investor Psychology and Security Market Under- and Over-reactions," *Journal of Finance*, 53, 1839–1886.

Daniel, K., D. Hirshleifer, and S. H. Teoh, 2002, "Investor Psychology in Capital Markets: Evidence and Policy Implications," *Journal of Monetary Economics*, 49, 139–209.

Dechow, P., 1994, "Accounting Earnings and Cash Flows as Measures of Firm Performance: The Role of Accounting Accruals," *Journal of Accounting and Economics*, 18, 3–42.

Dechow, P., A. Hutton, and R. Sloan, 2000, "The Relation Between Analysts' Long-Term Earnings Growth Forecasts and Stock Price Performance Following Equity Offerings," *Contemporary Accounting Research*, 17, 1–32.

Dechow, P., R. Sloan, and A. Sweeney, 1995, "Detecting Earnings Management," *Accounting Review*, 70, 193–225.

DeFond, M. L., and J. Jiambalvo, 1994, "Debt Covenant Violation and Manipulation of Accruals," *Journal of Accounting and Economics*, 17, 145–176.

Dugar, A., and S. Nathan, 1995, "The Effect of Investment Banking Relationships on Financial Analysts' Earnings Forecasts and Investment Recommendations," *Contemporary Accounting Research*, 12, 131–160.

Eckbo, B., R. Masulis, and O. Norli, 2000, "Seasoned Public Offerings: Resolution of the 'New Issues Puzzle'," *Journal of Financial Economics*, 56, 251–291.

Eckbo, B., and O. Norli, 2000, "Leverage, Liquidity, and Long-Run IPO Returns," working paper, Dartmouth College.

Fama, E., 1998, "Market Efficiency, Long-Term Returns and Behavioral Finance," *Journal of Financial Economics*, 49, 283–306.

Fields, L., 1999, "Is Institutional Investment in Initial Public Offerings Related To Long-Run Performance of These Firms?" working paper, Penn State University.

Hansen, R., and A. Sarin, 1996, "Is Honesty the Best Policy? An Examination of Security Analyst Behavior Around Seasoned Equity Offerings," working paper, Virginia Tech.

Healy, P., and J. Wahlen, 1999, "A Review of the Earnings Management Literature and its Implications for Standard Setting," *Accounting Horizon*, 13, 365–384.

Hirshleifer, D., 2001, "Investor Psychology and Asset Pricing," *Journal of Finance*, 56, 1533–1598.

Kothari, S. P., and J. Warner, 1997, "Measuring Long Horizon Security Performance," *Journal of Financial Economics* 43, 301–339.

Korajczyk, R., D. Lucas, and R. McDonald, 1990, "Understanding Stock Price Behavior Around the Time of Equity Issues," in R. G. Hubbard (ed.), *Asymmetric Information, Corporate Finance, and Investments*, University of Chicago Press, Chicago.

Krigman, L., W. Shaw, and K. Womack, 1999, "The Persistence of IPO Mispricing and the Predictive Power of Flipping," *Journal of Finance*, 54, 1015–1044.

Lin, H., and M. McNichols, 1998, "Underwriting Relationships, Analysts' Earnings Forecasts and Investment Recommendations," *Journal of Accounting and Economics*, 25, 101–127.

Loughran, T., and J. Ritter, 1995, "The New Issues Puzzle," *Journal of Finance*, 50, 23–51.

Loughran, T., and J. Ritter, 1997, "The Operating Performance of Firms Conducting Seasoned Equity Offerings," *Journal of Finance*, 52, 1823–1850.

Loughran, T., and J. Ritter, 2000, "Uniformly Least Powerful Tests of Market Efficiency," *Journal of Financial Economics*, 55, 361–389.

McNichols, M., and P. O'Brien, 1997, "Self-Selection and Analyst Coverage," *Journal of Accounting Research*, 35(suppl), 167–199.

Michaely, R., and K. Womack, 1999, "Conflict of Interest and the Credibility of Underwriter Analyst Recommendations," *Review of Financial Studies*, 12, 653–686.

Rajan, R., and H. Servaes, 1997, "Analyst Following of Initial Public Offerings" *Journal of Finance*, 52, 507–530.

Rangan, S., 1998, "Earnings Management and the Performance of Seasoned Equity Offerings," *Journal of Financial Economics,* 50, 101–122.

Ritter, J., 1991, "The Long-Run Performance of Initial Public Offerings," *Journal of Finance*, 46, 3–27.

Shivakumar, L., 2000, "Do Firms Mislead Investors by Overstating Before Seasoned Equity Offerings?" *Journal of Accounting and Economics*, 29, 339–371.

Shleifer, A., 2000, *Inefficient Markets: an Introduction to Behavioral Finance*, Oxford University Press, Oxford.

Sloan, R., 1996, "Do Stock Prices Fully Reflect Information in Accruals and Cash Flows About Future Earnings?" *Accounting Review*, 71, 289–315.

Spiess, K., and J. Affleck-Graves, 1995, "Underperformance in Long-Run Stock Returns Following Seasoned Equity Offerings," *Journal of Financial Economics*, 38, 243–267.

Teoh, S. H., T. J. Wong, and G. Rao, 1998, "Are Accruals During Initial Public Offerings Opportunistic?" *Review of Accounting Studies*, 3, 175–208.

Teoh, S. H., I. Welch, and T. J. Wong, 1998a, "Earnings Management and the Long-Term Market Performance of Initial Public Offerings," *Journal of Finance*, 53, 1935–1974.

Teoh, S. H., I. Welch, and T. J. Wong, 1998b, "Earnings Management and the Underperformance of Seasoned Equity Offerings," *Journal of Financial Economics*, 50, 63–99.