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Can financial statement analysis beat consensus analysts' recommendations?

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Abstract We examine whether investors can exploit financial statement information to identify companies with a greater likelihood of future earnings increases and whether stocks of those companies generate 1-year abnormal returns that exceed the abnormal returns from following analysts' consensus recommendations. Our approach summarizes financial statement information into a "predicted earnings increase score," which captures the likelihood of 1-year-ahead earnings increases. We find that, within our sample of consensus recommendations, stocks with high scores are much more likely to experience future earnings increases than stocks with low scores. A hedge portfolio strategy that utilizes our approach within each consensus recommendation level generates average annual abnormal returns of 10.9 percent over our 12-year sample period, after controlling for previously identified risk factors. These abnormal returns exceed those available from following analysts' consensus recommendations. Our results show that share prices and consensus recommendations fail to impound financial statement information that helps predict future earnings changes.

Keywords Earnings predictions · Financial statement analysis · Consensus recommendations · Abnormal returns · Sell side analysts

JEL Classification G10 · G11 · G14 · G17 · M41

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1 Introduction

We investigate whether share prices and analysts' consensus recommendations fully reflect available financial statement information. Specifically, we test whether investors can use financial statement information ex ante to predict future earnings changes and then use those predictions to execute a trading strategy that will outperform sell-side analysts' consensus recommendations (strong buy, buy, hold, underperform, or sell).

Skepticism about the information content in sell-side analyst's consensus recommendations motivates this study. Consensus recommendations are likely to be most informative and therefore are most likely to influence trading decisions and impact share prices when they unequivocally indicate analysts' directional expectations for future share price performance. However, unequivocal consensus recommendations are rare. Consensus strong buy recommendations arise for only 19.7 percent of our sample. Consensus underperform or sell recommendations occur for only 1.2 percent and 0.4 percent of our sample, respectively.

Consensus buy recommendations are not reliably informative because they occur far more frequently than would seem warranted by ex post stock return performance (53.7 percent of our sample observations even though future median abnormal returns among consensus buys are negative). Consensus hold recommendations (25.0 percent of our sample observations) also lack information content for share prices and trading decisions because they are open to multiple interpretations by investors.[1]

Skepticism about the information in consensus analysts' recommendations is further fueled by prior research results, which are mixed. Although prior research on analysts' earnings forecasts reveals that they do not fully efficiently incorporate financial statement information (for example, Abarbanell and Bushee 1997 and Wieland 2006), it is not yet clear whether analysts' stock recommendations fully reflect financial statement information. Barber et al. (2001) document significant positive abnormal returns to recommendations-based trading strategies but also find that the transaction costs triggered by daily portfolio rebalancing erases the profits. Jegadeesh et al. (2004) report similar findings using 6 month buy-and-hold returns. In contrast, Bradshaw (2004) does not find a relation between the consensus recommendation level and 1-year-ahead size-adjusted returns. Several prior studies even suggest an *inverse* relation between analysts' recommendations and future abnormal returns in certain periods. Barber et al. (2003) find that strong buys (sells) have negative (positive) abnormal returns from 2000 through 2001. In addition,

[1] Investors can interpret consensus hold recommendations to be (1) neutral, (2) ambiguous, or (3) veiled sells. Investors can interpret a consensus hold as neutral, implying the average analyst believes the firm's shares are fairly priced and will perform in line with some benchmark portfolio index over some future holding period. Alternately, a consensus hold may be ambiguous if analysts are roughly equally divided on whether to buy or sell at the current share price. Investors can also interpret some consensus holds as veiled sells, because analysts rarely issue explicit underperform or sell recommendations. Some analysts issue a hold when they wish to disguise their negative beliefs to retain favorable access to the firm's managers and avoid negative repercussions (McNichols and O'Brien 1997; Francis and Soffer 1997; Bradshaw 2004). Because they are open to different interpretations, consensus holds are not clear directional predictions of expected future share price performance.

Drake et al. (2009) find significant negative returns to following analysts' recommendations from 1999 to 2003 and insignificant returns during 1994 to 1998 and from 2004 to 2006. These prior results suggesting analysts' consensus recommendations may not be informative—or worse, may be misleading—motivate our interest to develop and test an earnings-based prediction model that can be used instead of analysts' consensus recommendations.

Our empirical analysis consists of three steps. First, we gather from I/B/E/S the summary recommendation value for each sample firm-year from 1994 through 2005. I/B/E/S creates a summary recommendation measure each month by averaging the numerical values it assigns to all available analyst recommendations. Second, we conduct a simple financial statement analysis process to compute a "predicted earnings increase score" that summarizes the likelihood of a 1-year-ahead earnings increase for each sample firm-year. The predicted earnings increase score uses six financial statement ratios that prior research (for example, Penman and Zhang 2006 and Wieland 2006) has identified as useful signals of the likelihood of 1-year-ahead earnings increases.[2] Within our sample, 59.2 percent of our sample firms realize an earnings increase in the year when the recommendation applies.[3] When we group ex ante these firms each year into quintiles based on our predicted earnings increase score, we find that 63.9 percent of the firm-years in the top quintile generate an earnings increase as compared with 51.3 percent of the firm-years in the bottom quintile. Thus, our predicted earnings increase score provides some predictive information for future earnings changes.

Our third empirical step implements a trading strategy that forms 1 year buy-and-hold portfolios within each consensus recommendation level by taking long (short) positions in the shares of firms in the top (bottom) quintile of the predicted earnings increase score distribution each year. We find that the top (bottom) quintile firms earned average annual abnormal returns of 6.5 (−3.3) percent. The difference in abnormal returns across these two portfolios (9.8 percent) is statistically and economically significant. We also find that, after controlling for previously documented predictors of future returns, including the three factors of the Fama and French (1992) model, this strategy generates significant average annual abnormal returns of 10.9 percent. By comparison, applying a trading strategy that relies solely on consensus recommendations (long positions in consensus strong buys and buys, short positions in consensus underperforms and sells) generates insignificant average abnormal returns of 0.9 percent, after controlling for risk. In addition, we find that our approach is most effective within the consensus hold recommendations, generating average abnormal returns of 19.3 percent after controlling for risk. Our results indicate that consensus analysts' recommendations and share prices do not fully impound the financial statement information in our predicted earnings increase score. Our financial statement analysis approach generates earnings predictions that

[2] We designed the predicted earnings increase score (PEIS) using the prior literature's findings on the information in financial statement ratios but without peeking at the association between PEIS and future earnings changes or past or future stock returns data.

[3] When we split the sample by recommendation level, we find earnings increases generated by 62.1, 60.1, 55.2, and 54.8 percent of firm-years associated with strong buy, buy, hold, and sell recommendations, respectively.

enable a trading strategy to outperform consensus recommendations, particularly when the consensus recommendation is hold.

For academics, this paper contributes new evidence that share prices and consensus recommendations do not fully impound financial statement information. In particular, our study advances antecedent research that examines analysts' recommendations and earnings forecasts conditional on other information (for example, Barber et al. 2003; Jegadeesh et al. 2004; Wieland 2006; Drake et al. 2009).[4] Archival and experimental researchers can use these findings to further study what information analysts do impound in stock recommendations and why they do not appear to impound information in basic financial statement ratios. In the classroom, teachers can use the approach in this study to train current and future analysts on how to extract and exploit the information in financial statements. As a practical matter, our model can help analysts improve their earnings prediction and stock recommendation accuracy and help them avoid issuing hold recommendations. Finally, our trading strategy appears to yield significant abnormal returns and may be a valuable alternative to analysts' consensus recommendations.

We organize the remainder of the paper as follows. In the Sect. 2, we describe our sample and data. In Sect. 3, we present our empirical analyses and results. We provide concluding remarks in Sect. 4.

2 Data sources and sample description

The sample includes all firms with available analyst, financial statement, and returns data necessary to identify the consensus analyst recommendation, construct a predicted earnings increase score, and measure holding period returns during the years 1994 (the smallest sample year with 1,048 firms) through 2005 (2,273 firms). We collect summary analyst recommendations from the Institutional Broker Estimate System (I/B/E/S).[5] We gather annual financial statement data from Compustat. We obtain stock prices, returns, and market capitalization data from CRSP. The sample contains 25,168 firm-year observations in the intersection of requisite data from I/B/E/S, Compustat, and CRSP.

I/B/E/S assigns each contributing analyst's recommendation a numeric value—strong buy (1), buy (2), hold (3), underperform (4), and sell (5)—and then computes the average "summary" recommendation value. We collect I/B/E/S summary recommendations in the fourth month following the fiscal year-end, so that analysts

[4] Our study adds to an already large stream of literature related to analysts' stock recommendations. Research has examined individual analysts' recommendation ability (Mikhail et al. 2004; Li 2005), analysts' use of information in formulating signals for recommendations (Jegadeesh et al. 2004), the performance of recommendations (Barber et al. 2001, 2003, 2006; Ivkovic and Jegadeesh 2004), the information content of recommendations (Womack 1996; Asquith et al. 2005), and the relation between analysts' earnings forecasts and recommendations (Francis and Soffer 1997; Eames et al. 2002; Bradshaw 2004).

[5] Li (2005) states the I/B/E/S database contains recommendations from some of the larger brokerage houses that other databases do not contain. Our sample period extends to 2005, which is important because it contains observations after the adoption of new analyst and financial reporting regulations (e.g. NASD Rule 2711 and SEC Regulation FD).

Table 1 Recommendation level sample composition 1994 to 2005

Year	Strong buy	Buy	Hold	Sell	Total
1994	190	527	310	21	1,048
1995	352	923	442	26	1,743
1996	388	999	477	32	1,896
1997	485	1,097	484	25	2,091
1998	648	1,260	495	19	2,422
1999	574	1,391	521	15	2,501
2000	604	1,364	432	11	2,411
2001	550	1,394	474	11	2,429
2002	356	1,310	491	19	2,176
2003	263	969	774	89	2,095
2004	229	1,093	689	72	2,083
2005	309	1,195	714	55	2,273
Total	4,948	13,522	6,303	395	25,168
Percentage	19.7	53.7	25.0	1.6	

have time to incorporate information from the prior year's financial statements into their recommendations. We assign each mean recommendation value to a consensus recommendation level using the following cutoffs: strong buy (1–1.5), buy (1.51–2.5), hold (2.51–3.5), or sell (3.51–5).[6] This procedure identifies 4,948 firm-years as consensus strong buys (19.7 percent of the sample); 13,522 firm-years as consensus buys (53.7 percent of the sample); 6,303 firm-years as consensus holds (25.0 percent of the sample); and 395 firm-years as consensus sells (1.6 percent of the sample).[7] Table 1 details the number of observations in each recommendation level each year.[8]

We calculate abnormal returns for each firm-year by compounding monthly raw returns over a 1-year holding period and then subtracting the monthly compounded returns on the CRSP size-based decile portfolio to which the firm belongs at the beginning of the holding period. We begin the return accumulation period on the first day of the fifth month following fiscal year-end because we collect the consensus recommendation, which is based on recommendations made (or valid) in the fourth month. This allows market share prices time to incorporate the financial statement information as well as analysts' recommendations based on those financial statements. We end the return accumulation period 1 year later, on the last

[6] Abarbanell and Lehavy (2003) use a similar classification system to form buy, hold, and sell portfolios.

[7] Because only 1.6 percent of our sample observations have consensus recommendations equivalent to either "under-perform" or "sell," we treat them as one combined "sell" category in our empirical analysis.

[8] Prior research provides many insights into individual analysts' earnings forecasts and recommendations, showing that individuals do not fully reflect the information available from financial statement analysis. We test consensus analysts' recommendations because they diversify variation in individual analysts' expectations and represent a proxy for the market's expectations. We therefore seek to test whether analysts' consensus recommendations and share prices fully reflect financial statement information.

Table 2 Descriptive statistics

Variable	Mean	Standard deviation	20th Percentile	Median	80th Percentile	Minimum	Maximum
Panel A: full sample of recommendations (25,168 firm-year observations from 1994 through 2005)							
RECOM	2.089	0.720	2.000	2.000	3.000	1.000	5.000
CR	0.178	0.808	−0.332	0.060	0.516	−0.995	17.207
AR	0.021	0.773	−0.448	−0.079	0.336	−1.856	16.949
Panel B: sample by recommendation levels							
Strong buy (4,948 firm-year observations)							
CR	0.112	0.773	−0.438	−0.009	0.499	−0.995	14.994
AR	−0.032	0.743	−0.530	−0.130	0.326	−1.828	14.795
Buy (13,522 firm-year observations)							
CR	0.161	0.730	−0.310	0.056	0.486	−0.995	14.438
AR	0.017	0.700	−0.420	−0.071	0.321	−1.856	14.309
Hold (6,303 firm-year observations)							
CR	0.255	0.942	−0.283	0.109	0.579	−0.987	17.207
AR	0.068	0.902	−0.437	−0.056	0.366	−1.792	16.949
Sell (395 firm-year observations)							
CR	0.368	1.254	−0.366	0.118	0.722	−0.931	14.354
AR	0.094	1.165	−0.524	−0.090	0.443	−1.550	13.419

RECOM: Mean summary stock recommendation available in the fourth month after the fiscal year-end. We assign each mean recommendation to a consensus recommendation level using the following cutoffs: Strong Buy (1–1.5), Buy (1.51–2.5), Hold (2.51–3.5), and Sell (3.51–5); CR: Cumulative returns for the 1 year holding period beginning the fifth month after fiscal year-end; AR: CR less returns for the corresponding CRSP size-based decile, based on the firm's prior year market value of equity

day of the fourth month following the subsequent fiscal year-end and thereby capture share price movements during the year. If a firm delists during the holding period, we include the delisting return in the calculation of cumulative returns, place the delisting share price into the size-based decile portfolio, and continue cumulating returns through the end of the holding period.

Table 2 provides descriptive statistics on 1-year ahead cumulative and abnormal returns for the full sample (Panel A) and across recommendation levels (Panel B). In the full sample, the median consensus recommendation value is equal to 2 (buy), indicating that analysts tend to advise investors to purchase the shares of the firms they follow. The mean (median) abnormal (size-adjusted) return generated by firms followed by analysts was roughly 2.1 (−7.9) percent. Ironically, across recommendation levels, 1-year-ahead mean and median cumulative and abnormal returns vary inversely with recommendation levels (with the sole exception of median abnormal returns for sells), consistent with the findings in Barber et al. (2003) and Drake et al. (2009).[9]

[9] The descriptive statistics in Table 2 reveal that the future returns data contain some extreme positive and negative observations. We do not delete or winsorize these extreme returns observations because they reflect ex post realizations of returns, which we do not know ex ante. When we form portfolios, we do not

Table 3 presents descriptive statistics for financial statement analysis variables, market multiples, stock returns, and analysts' earnings forecasts across all consensus recommendation levels: strong buy, buy, hold, and sell. We winsorize each variable at the top/bottom percentile to limit the impact of any outliers. Table 3 also reports test statistics comparing these characteristics across strong buys versus buys, buys versus holds, and holds versus sells. These statistics reveal that these characteristics vary significantly across recommendation levels. For example, although rates of return on common equity (ROCE) and profit margins are similar between strong buys and buys, they are significantly greater for buys than for holds, which in turn are higher than for sells. Similarly, market capitalization (MVE) is smallest among strong buys, largest among buys, and smaller among sells than holds. Surprisingly, market-to-book (MTB) ratios vary inversely across recommendation levels; MTB ratios among strong buys are higher than buys, which are higher than holds, which are higher than sells. The statistics in Table 3 also indicate that analysts have more difficulty forecasting earnings for hold and sell firm-years than strong buy and buy firm-years. Mean earnings forecast error and dispersion are significantly lower in strong buy and buy firm-years than hold or sell firm-years. Somewhat surprisingly, the statistics in Table 3 also indicate that these recommendation categories are much more strongly associated with differences in *lagged* raw and abnormal stock returns (CR_prior and AR_prior) than 1-year-ahead *future* raw and abnormal returns (CR and AR). For example, median lagged raw returns range widely from 18.7 percent for strong buy firm-years to 7.1 percent for buy firm-years to −12.3 percent for hold firm-years to −22.6 percent for sell firm-years, whereas median 1-year-ahead returns have a much narrower range, from −0.9 percent to 5.6 percent to 10.9 percent to 11.8 percent, respectively.[10]

3 Empirical analyses and results

In this section, we first describe and demonstrate our financial statement analysis approach to predict future earnings increases. We then describe our trading strategy and the benchmark portfolios that we use to evaluate our trading strategy. We also discuss our results.

3.1 Predicted earnings increase score

We use Wieland's (2006) scoring model, which relies on six financial statement information signals that predict the direction of the change in 1-year-ahead net

Footnote 9 continued
know whether realized returns will turn out to be positive or negative, extreme or not extreme. Thus, to delete or winsorize involves peeking ahead at the returns results. Our empirical results are not sensitive to extreme returns realizations.

[10] Our finding of positive lagged abnormal returns associated with strong buy and buy recommendations is similar to the finding in Jegadeesh et al. (2004) that analysts' buy recommendations include "glamour" stocks (for example, stocks with high momentum, growth, volume, and market multiples). Our data reveal an inverse relation between recommendation levels and future returns, consistent with evidence in Barber et al. (2003) and Drake et al. (2009).

Table 3 Descriptive statistics across recommendation levels

Variable	Level	*N*	Mean	Median	SD	*t*-Statistics		
						Strong buy vs. buy	Buy vs. hold	Hold vs. sell
ROCE	Strong buy	4,948	0.036	0.124	0.507	−0.84		
	Buy	13,522	0.043	0.113	0.460		16.13***	
	Hold	6,303	−0.078	0.040	0.554			4.01***
	Sell	395	−0.196	−0.015	0.737			
Profit margin	Strong buy	4,948	−0.055	0.045	0.491	−1.30		
	Buy	13,522	−0.044	0.043	0.472		13.01***	
	Hold	6,303	−0.151	0.013	0.653			5.46***
	Sell	395	−0.339	−0.016	0.843			
Asset turnover	Strong buy	4,948	1.359	1.196	0.883	9.22***		
	Buy	13,522	1.235	1.078	0.788		1.59	
	Hold	6,303	1.215	1.062	0.795			1.14
	Sell	395	1.168	0.960	0.886			
Capital structure leverage	Strong buy	4,948	2.210	1.762	2.449	−1.52		
	Buy	13,522	2.276	1.853	2.674		−4.71***	
	Hold	6,303	2.477	1.884	3.065			0.25
	Sell	395	2.437	1.792	4.047			
Gross margin	Strong buy	4,948	0.409	0.383	0.202	−3.73***		
	Buy	13,522	0.422	0.395	0.208		11.38***	
	Hold	6,303	0.386	0.357	0.207			3.94***
	Sell	395	0.343	0.298	0.210			

Table 3 continued

Variable	Level	*N*	Mean	Median	SD	*t*-Statistics		
						Strong buy vs. buy	Buy vs. hold	Hold vs. sell
ΔSales	Strong buy	4,948	0.394	0.223	0.613	14.35***		
	Buy	13,522	0.265	0.142	0.512		20.38***	
	Hold	6,303	0.115	0.054	0.413			3.89***
	Sell	395	0.032	−0.008	0.398			
Inventory turnover	Strong buy	4,032	14.692	5.023	29.736	1.67*		
	Buy	11,140	13.817	5.056	28.102		1.91*	
	Hold	5,220	12.930	5.007	26.736			0.58
	Sell	336	12.056	4.493	26.790			
Receivables turnover	Strong buy	4,871	14.274	6.386	30.660	−1.51		
	Buy	13,302	15.065	6.493	31.580		−0.12	
	Hold	6,212	15.123	6.459	30.792			−0.88
	Sell	391	16.543	6.547	32.182			
Current ratio	Strong buy	4,803	3.016	2.335	2.313	6.03***		
	Buy	13,169	2.787	2.139	2.228		2.53**	
	Hold	6,171	2.700	2.049	2.216			−0.69
	Sell	385	2.781	1.928	2.465			
Debt-to-equity	Strong buy	4,948	1.209	0.719	2.195	−2.60***		
	Buy	13,520	1.311	0.836	2.397		−4.95***	
	Hold	6,302	1.508	0.910	3.019			−1.85*
	Sell	395	1.807	0.864	4.416			

Table 3 continued

Variable	Level	*N*	Mean	Median	SD	*t*-Statistics		
						Strong buy vs. buy	Buy vs. hold	Hold vs. sell
PE ratio	Strong buy	4,926	19.229	15.625	60.545	0.47		
	Buy	13,484	18.742	16.367	62.171		7.80***	
	Hold	6,278	11.529	11.250	56.807			−0.70
	Sell	183	44.845	17.777	81.632			
MVE	Strong buy	4,937	758.968	186.785	3,103.550	−16.41***		
	Buy	13,501	2,568.780	465.164 ‘	7,518.570		10.92***	
	Hold	6,296	1,443.900	227.680	4,704.240			3.88***
	Sell	395	521.641	106.840	1,833.910			
MTB ratio	Strong buy	4,937	1.941	2.493	4.730	2.72***		
	Buy	13,501	3.513	2.420	4.418		18.70***	
	Hold	6,295	2.335	1.614	3.435			2.19**
	Sell	395	1.9441	1.170	3.972			
NUM	Strong buy	4,948	3.661	2.000	3.506	−37.84***		
	Buy	13,522	7.189	5.000	6.207		16.30***	
	Hold	6,303	5.680	3.000	5.759			10.20***
	Sell	395	2.694	1.000	3.327			
CR	Strnog buy	4,948	0.103	−0.009	0.695	−4.42***		
	Buy	13,522	0.152	0.056	0.665		−7.15***	
	Hold	6,303	0.227	0.109	0.736			−2.37**
	Sell	395	0.319	0.118	0.922			

Table 3 continued

Variable	Level	*N*	Mean	Median	SD	*t*-Statistics		
						Strong buy vs. buy	Buy vs. hold	Hold vs. sell
AR	Strong buy	4,948	−0.041	−0.130	0.661	−4.67***		
	Buy	13,522	0.008	−0.071	0.631		−3.26***	
	Hold	6,303	0.041	−0.056	0.693			−0.20
	Sell	395	0.048	−0.090	0.844			
CR_prior	Strong buy	4,709	0.392	0.187	0.872	15.26***		
	Buy	13,182	0.193	0.071	0.727		23.33***	
	Hold	6,237	−0.052	−0.123	0.584			2.96***
	Sell	394	−0.142	−0.226	0.545			
AR_prior	Strong buy	4,709	0.245	0.068	0.828	15.42***		
	Buy	13,182	0.055	−0.045	0.683		25.24***	
	Hold	6,237	−0.193	−0.246	0.541			3.74***
	Sell	394	−0.298	−0.364	0.508			
Forecast error	Strong buy	4,827	−0.019	0.010	0.245	−2.51**		
	Buy	13,361	−0.010	0.010	0.222		11.16***	
	Hold	6,181	−0.053	0.000	0.305			3.38***
	Sell	374	−0.109	−0.013	0.378			

Table 3 continued

Variable	Level	*N*	Mean	Median	SD	*t*-Statistics		
						Strong buy vs. buy	Buy vs. hold	Hold vs. sell
Dispersion	Strong buy	4,176	0.174	0.069	0.263	−14.80***		
	Buy	12,593	0.257	0.136	0.328		−6.62***	
	Hold	6,054	0.292	0.165	0.362			−3.71***
	Sell	367	0.365	0.226	0.440			

ROCE: (net income − preferred dividends)/average common equity; Profit margin: (net income − preferred dividends)/sales; Asset turnover: sales/average total assets; Capital structure leverage: average total assets/average common equity; Gross margin: (sales − cost of goods sold)/sales; ΔSales: (salest − salest-1)/salest-1; Inventory turnover: cost of goods sold/average inventory; Receivables turnover: sales/average receivables; Current ratio: current assets/current liabilities; Debt-to-equity: total liabilities/total stockholders' equity; PE ratio: price/earnings-per-share (basic) excluding extraordinary items. The sell category contains a disproportionate number of loss firms, so we delete negative PE ratios for purposes of these descriptive statistics; MVE: price × shares outstanding; MTB ratio: MVE/common equity; NUM: number of analysts in the recommendation; CR: cumulative 1-year-ahead raw returns; AR: cumulative 1-year-ahead size-adjusted returns; CR_prior: cumulative 1-year-prior raw returns; AR_prior: cumulative 1-year-prior size-adjusted returns; Forecast error: actual annual earnings less last consensus forecast for prior period; Dispersion: standard deviation of analysts' forecasts for 1-year-ahead annual earnings

*** Significant at < 0.01; ** significant at < 0.05; * significant at < 0.10

income before extraordinary items (which we refer to as "earnings"). The goal of the scoring model is to partition the cross section of firms into those for which these six financial statement signals combined indicate the earnings change will likely be positive, negative, or uncertain. To implement our scoring model, we measure each of the six signals for each firm-year observation, assign points based on the value of each signal, and then sum the points across all the signals to compute each firm-year predicted earnings increase score (PEIS).[11] We construct PEIS so that it is increasing in the likelihood that next year's earnings will increase. Table 4 (Exhibit 1) summarizes the information in each signal and how we measure and score each signal.

The signals that we use to develop PEIS are fundamental accounting-information-based ratios that have been in use for decades. The specific ratios that we use have been documented in relatively recent research (for example, Wieland 2006, Penman and Zhang 2006, and others) to have predictive power for future earnings changes, which could imply a look-ahead bias in how we construct PEIS. Our results should therefore be interpreted with the proviso that they are not based on out-of-sample tests.[12]

Profitability measures such as return on net operating assets (RNOA) tend to mean revert over time; thus, current profitability provides a signal of future profitability. Penman and Zhang (2006) find the current level of RNOA is negatively associated with future changes in RNOA. A firm that generates extremely high RNOA over time is likely to encounter new competition, which will reduce earnings and RNOA. A firm experiencing extremely low RNOA is likely to take steps to increase future profit margins and improve operating efficiency. We use RNOA to rank firms into quintiles each year and then we assign a point value of -1 to top quintile firms, $+1$ to bottom quintile firms, and 0 to firms in the three middle quintiles.

We decompose RNOA into a profit margin and an asset turnover ratio and further decompose profit margin into a gross margin ratio and a selling, general, and administrative expense ratio. We measure the gross margin signal, ΔGM, as the rate of change in the gross margin less the rate of change in sales. The ΔGM signal captures the growth in gross margin relative to growth in sales, which reflects the firm's control of costs for its production inputs vis à vis market prices for its outputs. Abarbanell and Bushee (1997) find this ΔGM signal relates positively to future earnings changes. We rank observations on the ΔGM variable each year, assign them to quintiles, and assign a point value of $+1$ (-1) to observations in the top (bottom) quintile and 0 to those in the middle three quintiles.

Following Anderson et al. (2003) we measure the ΔSGA signal as the annual change in the ratio of selling, general, and administrative expenses (SGA) to sales.

[11] The scoring model is similar to models used in Lev and Thiagarajan (1993), Abarbanell and Bushee (1997), Piotroski (2000), and Wieland (2006). We do not expect that the PEIS includes the optimal set of financial statement measures that help predict the future change in earnings, but it should distinguish those firms that are more or less likely to experience an earnings increase.

[12] We chose the six signals included in PEIS only based on findings from research on the information in financial statement ratios and not based on any attempt to "fit" PEIS to future data on earnings changes or past or future stock returns.

Table 4 Earnings increase signals (exhibit 1)

Signal	Measure	Information content		Quintile scoring		
				+1	0	−1
RNOA	Operating income/AVGNOA$_t$	Mean reversion in earnings when RNOA is extreme		Bottom	Middle	Top
ΔGM	ΔGM − Δsales where Δ = rate of change	Firm's changing position in input markets relative to output markets		Top	Middle	Bottom
ΔSGA	SGA$_t$/sales$_t$ − SGA$_{t-1}$/sales$_{t-1}$	Changes in operating costs relative to sales	Sales growth	Bottom	Middle	Top
			Sales decline	Top	Middle	Bottom
ΔATO	Sales$_t$/TA$_{t-1}$ − sales$_{t-1}$/TA$_{t-2}$	Changes in the efficiency of the firm's total assets		Top	Middle	Bottom
G^{NOA}	(NOA$_t$ − NOA$_{t-1}$)/NOA$_{t-1}$	Changes in operating asset efficiency, conditional on the level of RNOA	Within RNOA quintiles	Bottom	Middle	Top
ACC	[Operating income − cash flow from operations]/AVGNOA$_t$	Persistence of the accruals component in earnings, controlling for the level of RNOA	Within RNOA quintiles	Bottom	Middle	Top

AVGNOA$_t$ equals the average net operating assets at the beginning and end of the current year. Net operating assets essentially equal total assets minus cash, short-term investments, and accrued liabilities. However, to be consistent with the measurement of net operating assets in Penman and Zhang (2006), we measure it as common shareholders' equity plus financial capital (short-term and long-term financing liabilities plus preferred stock) less financial assets (cash and short-term investments)

ΔGM: denotes the change in gross margin, which equals sales less cost of goods sold; ΔSGA: denotes the change in selling, general, and administrative expenses as a percentage of sales; TA: denotes total assets; ACC: denotes accruals, measured as operating income minus cash flow from operations, scaled by average net operating assets

This ΔSGA signal measures the firm's overhead expenses growth relative to sales growth, but Anderson et al. argue that the interpretation of this signal must be conditioned on the direction of sales growth. They predict and find that when sales increase and SGA expenses increase as a percentage of sales, it implies weak overhead cost control, which does not bode well for future earnings growth. Likewise, during periods of sales growth, if SGA expenses decline as a percentage of sales, it implies overhead cost control and operating leverage, which portends future earnings increases. Conversely, when firms experience sales declines, Anderson et al. predict and find that when SGA expenses grow as a percentage of sales, it signals managers' optimism about future growth in sales and earnings (for example, through new investments in advertising, product and market development, etc.). Similarly, when firms experience sales declines and managers simultaneously cut SGA expenses as a percentage of sales, it signals their pessimism about future growth in sales and earnings.

To capture these different dimensions in our scoring of the ΔSGA signal, we first separate firm-year observations based on whether sales increase or decrease. Within each subset, we rank firms each year into quintiles based on the ΔSGA signal. Within the sales-growth subset each year, when the ΔSGA signal is in the lowest quintile (indicating strong overhead expense control relative to sales growth), we assign +1 point. We assign −1 point to firm-years when the ΔSGA signal is in the highest quintile of the sales-growth subset. Conversely, within the sales-decline subset each year, when the ΔSGA signal is in the highest quintile (indicating managers' optimism), we assign +1 point, and we assign −1 point to sales-decline firm-years when the ΔSGA signal is in the lowest quintile. We assign a point value of 0 when the ΔSGA signal is in the middle three quintiles of the sales-growth or sales-decline subsets.

The firm's operating efficiency affects current and future profitability. Penman and Zhang (2006) find a positive relation between the annual change in the asset turnover ratio (ΔATO) and future change in RNOA. Current year improvements in asset efficiency tend to persist into the future, increasing future RNOA, which commonly (but not necessarily) correspond with earnings increases. We rank firm-year observations each year into quintiles based on ΔATO.[13] We assign a point value of +1 (−1) to observations in the top (bottom) quintiles and 0 to firms in the middle three quintiles.

Penman and Zhang (2006) and Fairfield and Yohn (2001) document that growth in net operating assets, denoted G^{NOA}, interacts negatively with RNOA to affect the sustainability of operating income. Specifically, after controlling for current year RNOA, they find that G^{NOA} relates negatively to 1-year-ahead RNOA. The intuition behind this relation is that, if the current period growth rate in net operating assets is low relative to current period RNOA, it implies increasing operating asset efficiency (for example, operating leverage), which leads to future earnings increases. Conversely, if the current growth rate in net operating assets is high relative to RNOA, it implies an inefficient buildup of operating assets (for example, inventory,

[13] We compute ATO using total assets in the denominator rather than net operating assets. Net operating assets can cause some unrealistically large values of ATO.

receivables, fixed assets), and subsequent earnings decreases. To capture these relations, we score the G^{NOA} signal using a double-sort on RNOA and G^{NOA}. Each year, we rank observations on RNOA and sort them into quintiles. Within each RNOA quintile, we then rank the observations on G^{NOA} and sort them into quintiles. Within each RNOA quintile, we assign a point value of -1 $(+1)$ to firms in the top (bottom) G^{NOA} quintile and 0 to firms in the middle three G^{NOA} quintiles.

Sloan (1996) investigates the accrual and cash flow components of operating income and finds cash flows are more persistent than accruals. We incorporate an accruals measure as a proxy for cross-sectional differences in earnings persistence related to accruals. We measure accruals (ACC) as the difference between operating income and cash flow from operations, and we scale accruals by average NOA. Consistent with Sloan (1996), Penman and Zhang (2006) find a negative relation between accruals and 1-year-ahead RNOA. To isolate the effect of accruals on earnings persistence and to distinguish this effect from mean reversion in RNOA, we score the ACC signal while controlling for current RNOA. Each year we first rank observations on RNOA and sort them into quintiles. Within each quintile we then rank the observations on ACC and place them into quintiles. We assign a point value of -1 $(+1)$ to firms in the top (bottom) ACC quintile within each RNOA quintile. We assign a point value of 0 to firms in the three middle quintiles.

To compute PEIS we sum the scores of all six signals for each firm-year. Based on the scoring of these signals, PEIS ranges from -6 to $+6$ and increases with the likelihood of a future earnings increase.

Table 5 provides descriptive statistics for the predicted earnings increase score model variables for the full sample (Panel A) and each recommendation level (Panel B). The full sample statistics reveal striking differences between firms in the 20th and 80th percentiles (the top and bottom quintile cutoff points) on the financial performance measures. For example, firms at the 20th percentile exhibit 0.4 percent RNOA while those in the 80th percentile exhibit a 29.6 percent RNOA. Firms at the 20th percentile experienced almost no sales growth while those in the 80th percentile had sales growth of nearly 40 percent. We also observe striking differences in financial performance measures within and across each recommendation level sample. Median RNOA, for example, varies with recommendation levels from 17.0 percent for strong buys to 15.7 percent for buys to 8.7 percent for holds and 4.2 percent for sells. Table 5 also reveals significant differences between firm-year observations that fall above the 80th or below the 20th percentiles (the top and bottom quintiles) in each of the recommendation level subsamples.[14]

Table 6 shows that PEIS is effective in predicting the sign of future earnings changes. In this table, we sort the sample each year into quintiles based on PEIS and then examine the ex post sign of the change in earnings. (Note that we lose some observations because some firms do not survive to report 1-year-ahead earnings.) Panel A reveals that 59.2 percent of firms within the full sample experience an

[14] The descriptive statistics in Table 5 reveal that the variables that we use to construct the PEIS include some extreme positive and negative observations. We do not delete or winsorize these extreme observations in constructing PEIS because we do not use the values of the variables per se to compute PEIS and instead just use the cross-sectional ranks of these variables each year. Thus, extreme or winsorized values will not affect a firm's PEIS.

Table 5 Descriptive statistics for predicted earnings increase score model variables

Variable	Mean	Standard deviation	P20	Median	P80	Minimum	Maximum
Panel A: full sample of recommendations (25,168 firm-year observations from 1994 through 2005)							
RNOA	−0.056	11.448	0.004	0.141	0.296	−1,139.88	205.014
ΔGM	−0.116	8.539	−0.085	0.000	−0.023	−803.861	187.451
ΔSGA	0.108	20.142	−0.023	−0.001	0.018	−723.686	2,979.570
ΔSALES	0.300	3.455	−0.011	0.128	0.396	−0.997	514.423
ΔATO	−0.152	1.514	−0.312	−0.017	0.166	−148.048	24.539
G^{NOA}	0.363	1.672	−0.077	0.104	0.499	−9.253	25.560
ACC	−0.040	4.710	−0.120	−0.001	0.117	−425.316	367.714
PEIS	−0.003	1.619	−1.000	0.000	1.000	−6.000	6.000
Panel B: sample by recommendation level							
Strong buy recommendations (4,948 firm-year observations)							
RNOA	−0.012	9.420	0.044	0.170	0.347	−597.744	112.000
ΔGM	−0.302	14.563	−0.069	0.015	0.122	−803.861	93.979
ΔSGA	−0.155	10.463	−0.034	−0.004	0.013	−723.686	114.222
ΔSALES	0.534	7.369	0.051	0.223	0.605	−0.983	514.423
ΔATO	−0.097	1.512	−0.354	0.010	0.266	−54.382	23.778
G^{NOA}	0.552	1.768	−0.029	0.206	0.816	−9.253	25.560
ACC	0.100	5.504	−0.097	0.026	0.178	−45.213	367.714
PEIS	0.000	1.618	−1.000	0.000	1.000	−6.000	6.000
Buy recommendations (13,522 firm-year observations)							
RNOA	−0.094	14.221	0.035	0.157	0.313	−1,139.880	181.185
ΔGM	−0.082	7.454	−0.073	0.004	0.079	−732.092	187.451
ΔSGA	0.023	7.227	−0.023	−0.002	0.015	−268.676	704.551
ΔSALES	0.299	1.398	0.010	0.142	0.403	−0.972	134.667
ΔATO	−0.149	1.693	−0.297	−0.013	0.164	−148.048	24.539
G^{NOA}	0.395	1.771	−0.056	0.123	0.517	−9.253	25.560
ACC	−0.079	5.364	−0.107	0.004	0.118	−425.316	53.300
PEIS	−0.003	1.614	−1.000	0.000	1.000	−5.000	6.000
Hold recommendations (6,303 firm-year observations)							
RNOA	−0.004	4.262	−0.081	0.087	0.220	−62.321	205.014
ΔGM	−0.049	2.215	−0.119	−0.018	0.055	−67.718	87.676
ΔSGA	0.487	37.691	−0.016	0.002	0.030	−63.933	2,979.570
ΔSALES	0.130	0.815	−0.077	0.054	0.223	−0.974	48.812
ΔATO	−0.205	1.083	−0.321	−0.039	0.111	−47.128	4.321
G^{NOA}	0.168	1.357	−0.150	0.028	0.268	−9.253	25.560
ACC	−0.074	1.461	−0.160	−0.024	0.072	−35.040	78.725
PEIS	−0.004	1.647	−1.000	0.000	1.000	−6.000	6.000
Sell recommendations (395 firm-year observations)							
RNOA	−0.109	5.074	−0.275	0.042	0.147	−67.770	59.224
ΔGM	0.014	3.047	−0.161	−0.035	0.049	−14.447	53.684

Table 5 continued

Variable	Mean	Standard deviation	P20	Median	P80	Minimum	Maximum
ΔSGA	0.239	4.601	−0.027	0.004	0.046	−31.516	76.440
ΔSALES	0.091	1.354	−0.178	−0.008	0.131	−0.997	25.285
ΔATO	−0.118	0.698	−0.297	−0.042	0.102	−11.137	2.068
G^{NOA}	0.034	1.039	−0.354	−0.036	0.185	−3.922	10.217
ACC	0.091	3.867	−0.209	−0.053	0.043	−36.072	46.992
PEIS	−0.043	1.459	−1.000	0.000	1.000	−5.000	5.000

RNOA: operating income/$AVGNOA_{t-1}$

AVGNOA: average net operating assets from the beginning and ending of the prior year

NOA: common equity + debt in current liabilities + total long-term debt + preferred stock − cash and short-term investments + other

ΔGM: Δ [sales less cost of goods sold][b] − Δsales where Δ = rate of change

ΔSGA: $SGA_t/Sales_t - SGA_{t-1}/Sales_{t-1}$

ΔSALES: $(sales_t - Sales_{t-1})/Sales_{t-1}$

ΔATO: $Sales_t/TA_{t-1} - Sales_{t-1}/TA_{t-2}$

G^{NOA}: $(NOA_t - AVGNOA_{t-1})/AVGNOA_{t-1}$

ACC: [operating income − cash from operations]/$AVGNOA_{t-1}$

PEIS: Predicted earnings increase score, equal to the sum of firm specific signals' scores

earnings increase, whereas 63.9 percent of the firms in the highest PEIS quintile report an earnings increase, while only 51.3 percent of the firm-years within the lowest PEIS quintile report an earnings increase. We perform the same analysis within each sample of consensus recommendation levels and report the results in Panel B. PEIS is most informative within the consensus hold recommendation sample, wherein 66.3 (42.5) percent of the firm-years in the highest (lowest) PEIS quintile generate an earnings increase the next year.[15] We are surprised to observe, however, that our PEIS approach provides fairly poor predictive accuracy among strong buy recommendation firm-years but quite good predictive accuracy among sell recommendation firm-years. Overall, PEIS provides information that effectively predicts future earnings changes among all consensus recommendation levels except strong buys.

3.2 Portfolio and trading strategies

Given that PEIS distinguishes the likelihood of future earnings increases among buy, hold, and sell recommendation firm-years, we now turn to the key question of this study: can investors use PEIS to pick winners and losers that will outperform

[15] For completeness, we note that, when we delete from our computations of PEIS the outlying top and bottom percentile of the observations for each variable each year, then PEIS prediction accuracy for this reduced sample changes marginally (64.4 percent of the firm-years in the top PEIS quintile and 43.3 percent of the firm-years in the bottom PEIS quintile generate earnings increases).

Table 6 Predictive accuracy of predicted earnings increase scores

PEIS Quintile[a]	Earnings increases	Earnings decreases	Percentage of increases
Panel A—full sample (23,012 firm-year observations during 1994 through 2005)			
5	2,379	1,342	63.9
4	2,690	1,667	61.7
3	3,795	2,457	60.7
2	2,886	2,127	57.6
1	1,883	1,786	51.3
Overall	13,633	9,379	59.2
Panel B—sample by recommendation level			
Strong buy recommendations (4,565 firm-year observations)			
5	436	281	60.8
4	548	337	61.9
3	818	441	65.0
2	607	351	63.4
1	428	318	57.4
Overall	2,837	1,728	62.1
Buy recommendations (12,438 firm-year observations)			
5	1,274	719	63.9
4	1,475	879	62.7
3	2,074	1,305	61.4
2	1,611	1,136	58.6
1	1,047	918	53.3
Overall	7,481	4,957	60.1
Hold recommendations (5,668 firm-year observations)			
5	636	324	66.3
4	628	428	59.5
3	845	663	56.0
2	630	599	51.3
1	389	526	42.5
Overall	3,128	2,540	55.2
Sell recommendations (341 firm-year observations)			
5	33	18	64.7
4	39	23	62.9
3	58	48	54.7
2	38	41	48.1
1	19	24	44.2
Overall	187	154	54.8

[a] We denote PEIS as 5 for firm-years in the top quintile of the earnings increase score distribution each year, indicating the highest likelihood of an earnings increase next year. We denote PEIS as 1 for firm-years in the bottom quintile of the earnings increase score distribution each year, indicating the lowest likelihood of an earnings increase next year

consensus analysts' recommendations? If share prices efficiently incorporate the information in PEIS, then hedge portfolios formed using PEIS will not earn consistent abnormal returns. In this section, we describe our portfolio formation methods and benchmark portfolios. This section concludes with a discussion of the results of our trading strategy tests.

3.2.1 Portfolio formation and benchmark portfolios

Our primary trading strategy, which we label *the fundamental strategy*, takes equally weighted long (short) positions in the firms in the highest (lowest) quintiles of the distribution of PEIS within each recommendation level each year. This strategy tests the abnormal returns an investor could expect to generate by relying solely on our financial statement analysis approach within each consensus recommendation category. If market prices and consensus analysts' recommendations do not fully incorporate the financial statement information signals we use to predict future earnings increases, then we expect this strategy to generate positive abnormal returns, on average.

Our benchmark strategy, which we label *the buy/sell strategy* creates a hedge portfolio by taking long positions in the (more common) strong buy and buy recommendations against equally weighted short positions in the (relatively rare) sell recommendations. This zero-investment strategy captures the abnormal returns an investor could expect to earn from following analysts' directional recommendations. If analysts' directional recommendations provide valuable information, then the strategy should generate positive abnormal returns, on average. We expect our fundamental strategy to generate greater positive abnormal returns than the buy/sell strategy if conditioning the consensus recommendations on the predicted earnings increase score helps pick winners and losers.

Because we predict and find our earnings prediction approach to be most informative among consensus hold recommendations, we also test *the conditional hold strategy*, which takes long (short) positions in those firms for which the consensus analysts' recommendation is hold and the PEIS falls in the top (bottom) quintile of the sample distribution that year, predicting the likelihood of increasing earnings in the forthcoming year. If market share prices for consensus hold firms do not completely incorporate the financial statement information that we use to form PEIS, then the conditional hold strategy should generate positive abnormal returns. We expect our conditional hold strategy to generate greater positive abnormal returns than the fundamental strategy and the buy/sell strategy if conditioning on the PEIS provides relatively greater predictive power for picking winners and losers from among stocks with nondirectional (hold) recommendations than from among stocks in the market as a whole.

We also compare the conditional hold strategy returns to a less restrictive strategy, which we label *the unconditional hold strategy*, that simply takes long positions in all firms for which the consensus analysts' recommendation is hold, without conditioning on information from financial statement analysis. We expect our conditional hold strategy to generate higher abnormal returns than the

unconditional hold strategy if conditioning on the PEIS adds predictive power for portfolio returns performance.

In addition to testing buy and hold abnormal returns across these different portfolio strategies, we also measure and test the abnormal returns to each strategy using an approach similar to Bernard and Thomas (1990). We estimate the following regression to simulate a zero-investment portfolio while controlling for other determinants of future returns:

$$\begin{aligned} AR_{t+1} = {} & b_0 + b_1 HEDGE_t + b_2 MTB_t + b_3 RET_{t-1} + b_4 EPRATIO_t + b_5 ACC_t \\ & + b_6 BETA_t + e_t. \end{aligned} \quad (1)$$

AR represents size-adjusted abnormal returns for the 1-year holding period. $HEDGE_{jt}$ takes the value of one (zero) for firms for which the trading strategy suggests taking a long (short) position. We include the following five characteristics in the regression to control for the effects of variables seemingly associated with expected returns: (1) the market-to-book ratio (MTB); (2) momentum associated with abnormal returns in the prior fiscal year (RET_{t-1}); (3) earnings yield (EPRATIO); (4) accruals (ACC); and (5) beta (BETA).[16] We mean-adjust all of the control variables to normalize them (similar to Beneish and Vargus 2002). Given that the HEDGE variable only takes values of zero or one, we interpret its slope coefficient estimate in the regression equation as the return to a zero-investment hedge portfolio in the hedge factor after controlling for the effects of all of the other variables.[17] We also provide data on the number of years the trading strategies generate positive abnormal returns to help calibrate the extent to which they represent risk or anomalous returns (Bernard et al. 1997).

3.2.2 Trading strategy results

Table 7, Panel A, contains descriptive statistics on cumulative raw and abnormal annual returns across PEIS quintiles, as well as the average abnormal return to the fundamental strategy within each recommendation level. The average abnormal return among consensus strong buy recommendations is −3.2 percent, whereas after conditioning on PEIS, the abnormal return is 5.8 percent (positive but not significantly different from zero). The average abnormal return among consensus buy recommendations is 1.7 percent, but after conditioning on PEIS, the abnormal return is 4.1 percent (marginally significant). Consistent with our prediction that our approach would be most effective among consensus hold recommendations, we find the average abnormal return among consensus hold recommendations after

[16] We base the inclusion of the control variables on evidence in (1) Fama and French (1992) that beta and the book-to-market ratio explain future returns, (2) Jegadeesh (1990) and Jegadeesh and Titman (1993) that short-run returns tend to persist in the subsequent year, (3) Haugen and Baker (1996) that low P/E ratio firms outperform high P/E ratio firms on a risk-adjusted basis, and (4) Sloan (1996) that trading strategies based on the extreme deciles of accruals generate abnormal returns.

[17] We also estimated Eq. (1) including size to control for the possibility that nonlinear size effects influence our size-adjusted abnormal returns. As we report in the next section, our results remain essentially the same.

Table 7 Buy and hold abnormal returns performance 1994 through 2005

	All	PEIS Quintile					Fundamental strategy
		1	2	3	4	5	5–1
Panel A: Buy and hold abnormal returns by predicted earnings increase score quintiles within recommendation level[a]							
Strong buy							
N	4,948	814	1,047	1,353	947	787	
CR (%)	11.2	4.8	11.8	12.2	14.8	11.2	
AR (%)	−3.2	−9.7	−2.8	−1.4	0.1	−3.9	5.8
Buy							
N	13,522	2,147	2,964	3,636	2,578	2,197	
CR (%)	16.1	13.7	13.7	17.7	16.7	18.6	
AR (%)	1.7	−1.1	0.4	3.8	1.7	3.0	4.1*
Hold							
N	6,303	1,018	1,368	1,654	1,191	1,072	
CR (%)	25.5	16.7	16.2	25.2	30.0	41.1	
AR (%)	6.8	−2.1	−1.5	7.6	10.6	20.3	22.4***
Sell							
N	395	50	89	125	69	62	
CR (%)	36.8	5.7	33.5	42.3	46.4	45.3	
AR (%)	9.4	−17.1	5.6	15.1	13.4	20.3	37.4*

Trading strategy	Investment position	Portfolio	Mean		
			N	AR (%)	Difference (%)
Panel B: Benchmark trading strategy returns					
Buy/sell	Long	Strong buy/buy	18,470	0.4	
	Short	Sell	395	9.4	−9.0**
Fundamental	Long	PEIS Quintile 5	4,118	6.5***	
	Short	PEIS Quintile 1	4,029	−3.3***	9.8***

CR: Cumulative returns for the 1 year holding period beginning the fifth month after fiscal year end; AR: CR less cumulative returns for the corresponding CRSP size-based decile, based on the firm's prior year market value of equity

* Denotes $p < .10$; ** denotes $p < .05$; *** denotes $p < .01$

[a] We sort the hold recommendation firms into quintiles based on PEIS. Quintile 5 (1) indicates the highest (lowest) PEIS scores, which reflect the highest (lowest) likelihood of a 1-year-ahead earnings increase

conditioning on PEIS is 22.4 percent ($p < .01$). Within consensus holds, the average abnormal returns monotonically increase with the PEIS quintiles. Surprisingly, among the relatively rare consensus sell recommendations, the average abnormal return after conditioning on PEIS is a whopping 37.4 percent (but only marginally significant).

Table 7, Panel B, compares abnormal returns to buy and hold portfolios formed from the full sample using the fundamental strategy versus the buy/sell strategy. The fundamental strategy, which takes long positions in firm-years with the highest likelihood of future earnings increases (PEIS quintile 5) within each recommendation level and short positions in firm-years with the lowest likelihood of future earnings increases (PEIS quintile 1) within each recommendation level, yields average annual abnormal returns of 9.8 percent ($p < .01$). The buy/sell strategy, which simply takes long positions in all strong buy and buy consensus recommendations and short positions in all consensus sell recommendations, yields significant *negative* abnormal returns of −9.0 percent ($p < .05$). The dramatic difference in abnormal buy and hold returns results suggest our financial statement analysis-based trading strategy approach outperforms analysts' consensus recommendations.[18]

We further investigate whether an investor could capture significant abnormal returns by implementing our trading strategy after controlling for previously identified predictors of future returns. Table 8 reports the results from estimating Eq. (1) for the fundamental strategy and the buy/sell strategy. In addition, we report results comparing our conditional hold strategy with an unconditional hold strategy. We estimate Eq. (1) using annual regressions, report the mean of the coefficient estimates across the 12 sample years, and assess statistical significance using the time-series of the standard errors of the coefficients (Fama and MacBeth 1973).[19] In the first column of results, we document that the buy/sell strategy earns positive but insignificant 0.9 percent annual abnormal returns, on average, after the effects of the control variables. This strategy generates abnormal returns that are positive in eight out of 12 years. These findings suggest that users of analysts' consensus recommendations should not expect to earn significant positive abnormal returns.

In the second column of results in Table 8, we detail the abnormal returns one could earn by following the fundamental strategy, which takes long (short) positions in the shares of firms in the top (bottom) PEIS quintile within each recommendation level. The fundamental strategy generates average annual abnormal returns of 10.9 percent ($p < .01$) after the effects of the control variables and positive abnormal returns in eleven out of 12 years. This finding is consistent with results reported in prior studies that indicate market share prices do not fully incorporate financial statement information (for example, Ou and Penman 1989, and Abarbanell and Bushee 1998). These results suggest that investors could earn greater returns by ignoring analysts' stock recommendations and picking stocks simply using financial statement information that predicts future earnings increases.[20]

[18] When we winsorize or delete the top and bottom percentile of the distribution of realized returns each year, we obtain results that are quantitatively and qualitatively similar to those in the paper. We do not believe winsorizing or deleting realized returns observations is appropriate because it requires peeking ahead to the returns results, which are not available at the time of portfolio formation.

[19] We also estimate the models in pooled cross-sectional regressions and obtain similar results.

[20] When we form portfolios using a less restrictive approach with long/short positions in the top/bottom quintile of PEIS each year (rather than the top/bottom quintile within each recommendation level each year), the abnormal returns results generally improve by roughly a full percentage point in both the buy-and-hold results in Table 7 and the controlled regression results in Table 8.

Table 8 Trading strategy returns 1994 through 2005

$(AR_{jt+1} = b_0 + b_1 HEDGE_t + b_2 MTB_t + b_3 RET_{t-1} + b_4 EPRATIO_t + b_5 ACC_t + b_6 BETA_t + e_t)$

	Buy/sell	Fundamental	Unconditional hold	Conditional hold
Long Portfolio:	Strong buy/buy	PEIS Quintile 5	Hold	PEIS Quintile 5
Short Portfolio:	Sell	PEIS Quintile 1		PEIS Quintile 1
Intercept	−0.002	−0.026*	0.085*	−0.018
HEDGE	0.009	0.109***		0.193***
MTB	0.000	−0.001	−0.001	−0.002
RET_{t-1}	0.019	0.011	0.103	0.090**
EPRATIO	−0.010	−0.035	−0.041	0.004
ACC	0.000	0.000	0.000	0.000
BETA	−0.007	0.001	0.040	0.054
N (number of years)	18,263	7,845	6,228	2,061
HEDGE > 0	8/12	11/12**	9/12	12/12**

AR_{jt+1} = the sum over the holding period of the differences between monthly returns for firm *j* and returns for the corresponding CRSP size-based decile, based on firm *j*'s prior year market value of equity; HEDGE: an indicator variable equal to 1 for long positions and 0 otherwise. We indicate long and short positions in each regression at the top of each column; MTB: market-to-book ratio, computed as market value of equity divided by the book value of equity; RET_{t-1}: prior fiscal year abnormal return; EPRATIO: earnings-to-price ratio, computed as income before extraordinary items divided by market value of equity; ACC: accruals, computed as operating income less cash flow from operations; BETA: the slope coefficient of the regression of the firm's return on the return to the equally weighted CRSP index, estimated using daily returns over calendar year *t* (approximately 250 trading days)

* Denotes $p < .10$; ** denotes $p < .05$; *** denotes $p < .01$

The third column of results in Table 8 shows that the unconditional hold strategy, which takes long positions in all firms with consensus hold recommendations, earns a statistically significant 8.5 percent average abnormal return, after controlling for risk. This finding implies that hold recommendations represent overly pessimistic views of future abnormal returns, on average.

The rightmost column of results in Table 8 shows that the conditional hold strategy earns significant annual abnormal returns of 19.3 percent ($p < .01$) on average, after controlling for previously identified predictors of future returns.[21] The conditional hold strategy produces positive abnormal returns in 12 out of 12 years. By comparison, the conditional hold strategy yields on average an additional 10.8 percent annual return above the unconditional hold strategy (19.3 vs. 8.5 percent),

[21] We also test a portfolio strategy including all sample hold recommendation stocks using relative weighting based on PEIS score rank. In our study, the higher the PEIS score the more likely the firm will experience an earnings increase so we scale our hedge variable from zero to one based on the quintile in which each falls each year. Specifically, we code our hedge variable as 4/4, 3/4, 2/4, 1/4, and 0/4, for the top to bottom quintile PEIS scores each year, respectively. The approach generated average annual abnormal returns of 18.6 percent and positive abnormal returns in 12 out of 12 years.

which illustrates the value of financial statement analysis within hold recommendations.[22]

In general, the abnormal returns generated by the fundamental strategy and the conditional hold strategy, both of which condition on predicted future earnings changes, significantly exceed the returns generated by the benchmark strategies. This indicates that users of analysts' consensus recommendations can use financial statement information to distinguish firms based on predicted future earnings changes and generate superior abnormal return performance.

4 Conclusion

This study investigates consensus recommendations from a financial statement users' perspective. Specifically, we test whether one can use financial statement information ex ante to predict future earnings changes and then use those earnings change predictions to execute a trading strategy to pick winners and losers among consensus analysts' recommendations. Our tests essentially ask whether analysts' consensus recommendations and share prices fully reflect the earnings prediction information in financial statements.

Our financial statement analysis approach relies on six financial statement ratios that we use to produce a predicted earnings increase score, which summarizes the likelihood that a firm will generate an earnings increase in the next year. We find that the predicted earnings increase score significantly enhances the accuracy of earnings change predictions for consensus buy, hold, and sell recommendation firms but not for consensus strong buy recommendation firms. We then use the predicted earnings increase score to form portfolios, taking long (short) positions in firms with higher (lower) likelihood of future earnings increases within each recommendation level. We find that this strategy earns significant positive abnormal returns, beyond the returns generated by less restrictive strategies and after controlling for risk factors known to explain expected returns (such as size, beta, and market-to-book ratios).

The six financial statement ratios we use to develop our scoring model have been in use for decades. However, the specific ratios we use have been documented in relatively recent research (for example, Wieland 2006, Penman and Zhang 2006, and others) to have predictive power for future earnings changes, which could imply a look-ahead bias in how we construct our scoring model. Therefore, our results should be interpreted with caution because they are not based on out-of-sample tests. We must also qualify our results by cautioning that the abnormal returns we observe using our financial statement analysis approach may only appear in our sample period or in periods when analysts turn out, ex post, to be really wrong.

Our study builds on the existing research literatures that examine analysts' stock recommendations, financial statements analysis, and market efficiency. For

[22] We also estimated Eq. (1) including a size variable, to control for the possibility that nonlinear size effects could influence our size-adjusted abnormal returns. Our results remain essentially the same. For example, the conditional hold strategy returns change from 19.3 percent without the size variable to 18.9 percent with the size variable, and they remain positive in 12 out of 12 years.

accounting and finance academics, this paper contributes striking new evidence that share prices and analysts' consensus recommendations do not fully impound financial statement information. Research scholars can use these findings to further study what financial statement information analysts do (and do not) use to form stock recommendations and why they seemingly do not fully exploit financial statement information. For teaching purposes, our approach can be a useful exercise to help current and future analysts better understand how to extract and exploit financial statement information. As a practical contribution, our predicted earnings increase score can assist analysts who wish to avoid issuing hold recommendations and seek to improve their earnings prediction and stock recommendation accuracy. Finally, the trading strategy test in this study may be valuable for investors who seek an alternative to analysts' stock recommendations.

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