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Fundamental Signals, Future Earnings, and Abnormal Returns

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Abstract

In this paper, I investigate how fundamental signals derived from the financial statements predict changes in future EPS and abnormal stock returns in the short and long term. My approach uses methodology consistent with Abarbanell & Bushee [1997 & 1998], updated with more recent data.

Keywords

financial statements, EPS, abnormal stock returns

Disciplines

Business

FUNDAMENTAL SIGNALS, FUTURE EARNINGS, AND ABNORMAL RETURNS

By

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Abstract:

In this paper, I investigate how fundamental signals derived from the financial statements predict changes in future EPS and abnormal stock returns in the short and long term. My approach uses methodology consistent with Abarbanell & Bushee [1997 & 1998], updated with more recent data.

Introduction:

There are two primary target audiences for my research project. First, finance and accounting researchers in academia who study fundamental signals and the connection to earnings may be interested in this project. Abarbanell & Bushee [1997 & 1998] are still influential in this field of study with over 1500 citations between the two papers. Despite this, their conclusions are based on old data from 1983 to 1990. Updating the paper with more recent data would be useful to see if the relationships they found have persisted or whether they have changed. The second target audience is financial professionals who may benefit from better understanding the relationship between fundamental signals, future earnings and stock returns, which may be of use in forecasting and valuation.

Literature Review:

Begining with Ball and Brown (1968), many studies have attempted to study the relationship between accounting information and stock market returns. The topic has been studied with a range of motivations, including to assess the value relevance of accounting standards (Holthausen and Watts, 2001), and to test the efficient market hypothesis (Gonedes 1972). A substantial portion of current research on the relationship between financial statement

information and stock market performance attempts to find associations between aggregate accounting performance measures, particularly measures of earnings, and market returns. Kothari, 2001 provides a comprehensive review of the existing literature and motivations for the research in this topic. Many studies have found associations between stock performance and aggregate performance measures such as historical cost earnings, current cost earnings, cash flow from operations, and residual earnings. There is some research that has attempted to incorporate other ratios to predict stock price. Penman (1998) uses a combination of price-earnings and price-to-book ratios to forecast earnings and return on equity. Abarbanell and Bushee 1997 examines nine signals derived from financial statements relating to individual line items, including inventory, accounts receivable, capital expenditures, and gross margin. The paper finds significant associations between changes in these fundamental signals and changes in EPS and abnormal returns. Abarbanell and Bushee identified these variables based on prior assumptions of what signals should be important in predicting future changes in EPS and abnormal returns.

Many studies have examined the motivations and relevance of the associations between accounting variables and market returns from the perspective of different parties and have attempted to apply academic valuation theories to interpret the significance of accounting information. For example, Holthausen and Watts, 2001 examine whether financial standard setters, in particular FASB, are motivated by the value-relevance of financial metrics. Much of the prior literature betrays the the assumption that equity-valuation is the primary function of financial statements and that standard setters do, or at least should, construct the rules of accounting in a manner most consistent with determining equity value. Holthausen and Watts

reject this assumption, and instead offer various additional purposes of financial reporting, including use in debt contracts. Their paper also suggests a need for researchers to develop a theory of the motivations and uses of accounting statements. Many other papers incorporate metrics derived from the financial statements into discount models, including discounted cash flow models, excess earnings models, and dividend discount models, to compare the market's valuation with that implied from accounting information. The majority of existing research focuses on predicting equity value and stock returns. Penman (1998) uses price to earnings and the price to book ratio as input variables in predicting future earnings. Other researchers have focused on studying specific industries, Fields et al. (1998) and Vincent (1999) studied financial metrics specific to real estate investment trusts.

Data:

The data used in this paper was taken from the Wharton Research Data Services (WRDS) and includes accounting and stock price data for publicly traded firms from the year 2000 to 2018. WRDS is particularly useful in providing financial statements data including, inventory, accounts receivable, gross margin, selling, general, and administrative expense, and capital expenditures, which are used to calculate the fundamental signals used in this paper. The stock price data is taken from the CRSP database through WRDS. Abarbanell & Bushee [1997] used data from 1983 - 1990. The data I use is updated for a more recent period from 2000 to the most recent year available. This more recent dataset allows this paper to update the results of Abarbanell & Bushee [1997], and see whether the relationships they found have changed in recent decades.

One of the reasons this and related topics are well studied by academic researchers is the abundance of available data. The SEC requires U.S. public companies to publish detailed financial records quarterly in Form 10-Q and annually in Form 10-K. In the United States, there are standardized rules regulating financial record keeping and presentation of financial information according to Generally Accepted Accounting Principles (GAAP). Furthermore, there are multiple databases that aggregate the accounting information for all public companies, and additionally contain adjusted and standardized accounting data to allow for better comparison across companies. WRDS contains accounting information on public companies through Compustat. CRSP contains detailed information on stock price history. Financial professionals and investors depend heavily on the reliability of these financial data, and there is strong economic, legal, and regulatory incentives for reporting entities to present financial data accurately and in compliance with SEC regulations. The availability of detailed and reliable financial data has allowed accounting and finance researchers to study a wide range of phenomena relating to public companies, and the validity of my research design is bolstered by its reliance on this accessible and reliable data.

Predictor Variable: Fundamental Signals

I incorporate key data from the financial statements including, inventory, accounts receivable, gross margin, selling, general, and administrative expense, and capital expenditures to construct fundamental signal variables consistent with those used by Lev and Thiagarajan [1993] and later by Abarbanell & Bushee [1997 & 1998]. Lev and Thiagarajan [1993] choose these variables

because they are consistently referred to in analyst reports, and they have a convincing a priori economic justification for how they should affect future earnings. This method contrasts with that used by some other researchers, notably Ou and Penman [1989], which considers a broader range of fundamental signals and tests for those signals that are most significantly related to changes in future earnings and contemporaneous returns. I favor the approach of Lev and Thiagarajan [1993], for several reasons. First, data mining for significant relationships is likely to result in associations due to chance given the large set of candidate variables. It also can lead to statistically significant relationships between fundamental signals and future earnings that have no obvious economic justification. Furthermore, as is the case in Ou and Penman [1989], the set of variables that are significant may change across different time periods with little justification for the inclusion/exclusion of certain variables in some periods but not in others. Using the a priori approach of Lev and Thiagarajan [1993] and Abarbanell & Bushee [1997 & 1998] avoids these issues, and is the approach adopted in this paper.

The fundamental signals are calculated based on the change in a particular accounting variable, standardized for a change in sales for a given firm in a given year. Table 1 defines the fundamental signals used in this study, which are based on those use in Abarbanell & Bushee [1997] and Lev and Thiagarajan [1993].

Table 1

Definitions of Fundamental Signals

Signal	Measurement
Inventory (INV)	Δ Inventory - Δ Sales
Accounts Receivable (AR)	Δ Accounts Receivable - Δ Sales
Capital Expenditures (CAPX)	Δ Industry CAPX - Δ Firm CAPX
Gross Margin (GM)	Δ Gross Margin - Δ Sales
Selling and Administrative Expenses (SGA)	Δ SGA - Δ Sales
Labor Force (LF)	Δ (Sales / #Employees)

Table 2

Definitions of Dependent Variables

Singal	Measurement
One-Year-Ahead-Earnings (CEPS1)	[Adj. EPS_{t+1} - EPS_t] / P_{t-1}
Long-Term Growth in Earnings (CEPSL)	[Adj. EPS_{t+5} - EPS_t] / P_{t-1}
One-Year Abnormal Returns (CAR1)	$AR = R_{it} - [\alpha + \beta R_{mt}]$
Three-Yea Abnormal Returns (CAR3)	$\Pi (1 + AR_t) - 1$, $AR_t = R_{it} - [\alpha + \beta R_{mt}]$

Table 3

Regression of Change in Forward One Year EPS on Fundamental Signals

CEPS1 ~ CHGEPS + INV + AR + CAPX + GM + SGA + LF					
Coefficients:					
	Estimate	Std. Error	t-value	Pr(>|t|)	Signif. Code
(Intercept)	0.0024227	0.0009344	2.593	0.00962	**
CHGEPS	-0.0188001	0.0160507	-1.171	0.24167	
INV	-0.0124364	0.0060156	-2.067	0.03888	*
AR	0.0079724	0.0065584	1.216	0.22433	
CAPX	0.0016786	0.0018696	0.898	0.36941	
GM	0.0050436	0.0076724	0.657	0.51104	
SGA	-0.0044868	0.0113679	-0.395	0.69313	
LF	-0.0276333	0.0108940	-2.537	0.01130	*

Table 4

Regression of Change in Long-term EPS on Fundamental Signals

CEPSL ~ CHGEPS + INV + AR + CAPX + GM + SGA + LF					
Coefficients:					
	Estimate	Std. Error	t-value	Pr(>|t|)	Signif. Code
(Intercept)	0.012112	0.003113	3.891	0.000104	***
CHGEPS	-0.238491	0.053474	-4.460	8.82e-06	***
INV	-0.005170	0.020041	-0.258	0.796458	
AR	-0.013760	0.021850	-0.630	0.528962	
CAPX	-0.016416	0.006229	-2.636	0.008488	**
GM	0.015033	0.025561	0.588	0.556528	
SGA	0.030593	0.037873	0.808	0.419345	
LF	0.032252	0.036294	0.889	0.374342	

Table 5

Regression of 1 Year Abnormal Returns on Fundamental Signals

CAR1 ~ CHGEPS + INV + AR + CAPX + GM + SGA + LF					
Coefficients:					
	Estimate	Std. Error	t-value	Pr(>|t|)	Signif. Code
(Intercept)	-0.032635	0.008027	-4.066	5.04e-05	***
CHGEPS	1.419322	0.137878	10.294	< 2e-16	***
INV	-0.061226	0.051675	-1.185	0.23628	
AR	-0.109698	0.056338	-1.947	0.05171	
CAPX	0.042516	0.016060	2.647	0.00820	**
GM	0.098782	0.065907	1.499	0.13414	
SGA	-0.147363	0.097651	-1.509	0.13150	
LF	-0.272238	0.093581	-2.909	0.00368	**

Table 6

Regression of Long-term Abnormal Returns on Fundamental Signals

CAR3 ~ CHGEPS + INV + AR + CAPX + GM + SGA + LF					
Coefficients:					
	Estimate	Std. Error	t-value	Pr(>|t|)	Signif. Code
(Intercept)	-0.188455	0.015607	-12.075	< 2e-16	***
CHGEPS	1.895068	0.268082	7.069	2.41e-12	***
INV	-0.007044	0.100474	-0.070	0.9441	
AR	-0.147261	0.109540	-1.344	0.1790	
CAPX	0.072918	0.031226	2.335	0.0197	*
GM	0.229413	0.128146	1.790	0.0736	
SGA	-0.471885	0.189869	-2.485	0.0131	*
LF	-0.218180	0.181954	-1.199	0.2307	

Dependent Variables:

Table 2 defines the dependent variables studied in this paper. Their definitions are consistent with those found in Lev and Thiagarajan [1993] and in Abarbanell & Bushee [1997]. The regression equations reported in tables three through six are based on those used by Abarbanell & Bushee [1997], which examine the relationship between the change in fundamental signals and the change in future earnings and abnormal returns. The response variable, CEPS1, is defined as the change in EPS from year *t* to year *t + 1,* deflated by the stock price at the close of year *t -1* for firm *i* in year *t*. The other dependent variables are the change in future EPS over a 5

year horizon, cumulative abnormal returns over the next year (CAR1), and cumulative abnormal returns over the next three years (CAR3).

Interpretation of Results

Table 3 presents the results of the regression of the change in EPS over the next year on the fundamental signals. I found significant relationships at the 5 percent level for the INV and LF signals. This result differs from that found by Abarbanell & Bushee [1997], where in addition to INV and LF, the AR, CAPX, and GM variables were found to have significant coefficients in their regression with one-year change in EPS. The regression results in this are based on a two-tail test for the significance of the coefficients. This differs from the method used by Abarbanell & Bushee [1997], which employed a one tail test of significance. Abarbanell & Bushee [1997] constructed each fundamental signal such that the expected relationship with the dependent variable would be negative. They justified this based on economic intuition and their a priori assessment of whether a certain variable should contribute or detract from future EPS growth. This paper, however, does not assume the direction of the relationship between the fundamental signals and the response variables. This paper's departure from the methodology of Abarbanell & Bushee [1997] is due in part to the fact that Abarbanell & Bushee [1997] found certain coefficients including CAPX to have the opposite sign of what they predicted. In addition, I don't find the economic logic of all the proposed directional relationships to be entirely obvious.

The regression for the long term changes in EPS over a five year period is presented in Table 4. The intercept is significantly positive at the 0.001 level. The change in the previous year's EPS has a negative coefficient and is significant at the 0.01 level. CAPX is significant at the 0.01 level and has a negative slope. The results for my regression of long term changes in EPS differ from those found by Abarbanell & Bushee [1997], namely Abarbanell & Bushee [1997] found almost all of their short term significant relationships disappear with the longer horizon, and they found no significant relationship for either changes in EPS over the previous year or for CAPX.

CAPX, CHGEPS, and the labor force variable are all significant in the regression for abnormal returns over the subsequent year on fundamental signals. The results are presented in Table 5. For a three year horizon the regression of future cumulative abnormal returns on the change in current year EPS and the fundamental signals shows capital expenditure is significantly positive at the 0.05 level as is selling, general and administrative expenses. The change in current year EPS shows a positive coefficient and is significant at the 0.001 level. CAPX, labor force, and changes in EPS prove to be fairly consistently significant predictors of the dependent variables in the fitted models explored in this paper.

Notably, other fundamental signals including INV, AR, and GM were not found to be significantly predictive of future changes in EPS or future cumulative abnormal returns, which differs from the general pattern of results found in Abarbanell & Bushee [1997]. Based on these results I conclude that the relationship between certain fundamental signals and response

variables has likely changed over time. One possible explanations for these differing results is the material changes in the industry composition of the economy since the early 1990s, which may have systematically affected the nature of interactions of fundamental signals with changes in future earnings. An obvious change in industry composition is the rise of the high tech sector in recent decades. The assumption seems justified that technology firms have different working capital requirements than traditional brick and mortar firms. This could lead to changes in the strength of the associations observed between fundamental signals relating to working capital such as INV and AR, and future earnings in the time period subsequent to that considered by Abarbanell & Bushee [1997]. Specifically, I would expect working capital variables to have become less important than in the past, given the fact that tech firms have shorter operating cycles and there is more a focus placed by analysts on the nature and innovation of the product lines, and less on the management of working capital, compared to brick and mortar retailers. It is also possible that the financial crisis of 2008 may have changed the relationships among fundamental signals. One mechanism, by which this is possible is a change in the availability of lines of credit offered by stores since the financial crisis. While the diminished significance of fundamental signals based on working capital variables are consistent with these explanations it is difficult to attribute with a causal explanation given the multitude of economic factors that have changed over the economic period. Another point worth noting about the results found in this paper is the fact that the CAPX is one of the few consistently significant fundamental signals in the regression models, and capex is the only signal that is constructed to be standardized by industry level. It is not clear why Lev and Thiagarajan [1993] initially choose to control only changes in CAPX for industry averages, and not follow this procedure for other fundamental

signals. Future papers in this area could consider alternative definitions of fundamental signals that include industry controls, which may alter the results found. Further research can also attempt to examine more closely the causes of the changing strengths of fundamental signals over time.

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