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Earnings Relevance of Accounting-Guided Fundamental Signals

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ABSTRACT

This paper uses just the items in Compustat to develop a proxy for operating leverage and studies operating leverage as a fundamental signal for predicting future earnings. The evidence indicates operating leverage is not relevant in predicting next-year EPS change but is a significant and positive predictor of long term growth in earnings, with the condition that earnings are positive in the current year and in the long-term future year. With this condition imposed, operating leverage is significant in predicting long-term growth in earnings in thirteen-of-fourteen years tested with average p-value 0.017 for the fourteen-years tested. All fourteen yearly coefficients were positive, indicating a robust, direct relationship to long-term growth. Other fundamental signals were developed and studied for free-cash flows, market share, and debt-to-assets, and evidence indicates that these three along with operating leverage significantly contribute to the explanatory/predictive power of models previously developed using the expert guidance of security analysts. In addition, evidence is consistent with the macroeconomic recessions that began during 2001 and near the end of 2007 having substantially affected the relevance of many of the studied fundamental signals during 2000 and 2006 in predicting next-year earnings changes.

JEL Classification: G170

Keywords: Financial Forecast, Operating Leverage, Fundamental Signals, Earnings Relevance, Macroeconomic Recessions

I. INTRODUCTION

FASB's "Statement of Financial Accounting Concepts No. 8" says, "Investors', lenders', and other creditors' expectations about returns *depend on their assessment of the amount, timing, and uncertainty of the prospects for future net cash inflows to the entity.* Consequently, existing and potential investors, lenders, and other creditors need *information to help them assess the prospects for future net cash inflows to an entity*." In defining the most important or "*fundamental*" qualitative characteristics of general purpose financial reporting, Concept Statement 8, Chapter 3, states that the "*fundamental* qualitative characteristics are *relevance* and faithful representation." (Italics added)

It is inferred from Concept Statement No. 8 that the FASB intends general purpose financial statements be useful for estimating firms' future accounting earnings, given that accounting earnings are the accrual-basis counterpart to cash-basis "net cash inflows." In this study, the phrase "earnings-relevance" is used to mean the relevance of the current and prior reported financial statement information in explaining and predicting future earnings reported in future financial statements. The predictors (independent variables) used in these studies are termed "fundamental signals" or "signals" and the analysis is labeled "Fundamental Analysis." The FASB refers to the accounts and their associated dollar values that appear in the financial statements as "items," and "fundamental signals" are usually combinations of these "items" (Ou and Penman, 1989). Stated in these terms, this research studies the relevance of certain fundamental signals to North American firms' next-year accounting earnings changes during 1991-2008, and long-term growth during 1991-2004.

The 1997 article by Abarbanell and Bushee titled "Fundamental Analysis, Future Earnings, and Stock Prices" (Abarbanell and Bushee, 1997) (henceforth, AB-97) is the foundation research for this study. AB-97 has been called one of the "foundation" articles in fundamental analysis (Richardson, Tuna, and Wysocki, 2010). AB-97 states, "we investigate how detailed financial statement data (fundamental signals) enter the decisions of market participants by examining whether current changes in the signals are informative about subsequent earnings changes" (AB-97, page 1). This study follows the AB-97 approach that "predicting accounting earnings, as opposed to explaining security returns, should be the central task of fundamental analysis. Studying the links between fundamental signals and future earnings changes allows us to test directly the validity of the economic intuition that underlies the original construction of the signals" (AB-97, page 1).

II. BACKGROUND

Ou and Penman (1989) (OP-89) and Lev and Thiagarajan (1993) (LT-93) analyzed the "value-relevance" of the fundamental signals by relating the signals to future stock returns. OP-89 used a "statistical search" methodology to identify fundamental signals from which they then predicted future returns, and found fundamental analysis identifies equity values not currently reflected in stock prices. LT-93, like OP-89, tested the value relevance of fundamental signals, but used the fundamental signals that security analysts had reported using in making their earnings forecasts and

recommendations; hence, LT-93 used the expert guidance of security analysts to identify the fundamental signals studied in their research.

AB-97 used the same fundamental signals used by LT-93, except AB-97 used a modified definition of effective tax rate (ETR). The fundamental signals used in the AB-97 model are: (1) Inventory (metric), (2) Accounts Receivable (metric), (3) Gross Profit (metric), (4) Adverse or Qualified Audit Reports (Indicator), (5) Use LIFO for Inventory Valuation (Indicator), (6) Labor Force (metric), (7) Effective Tax Rate (metric), (8) Selling and Administrative Expenses (metric), and (9) Capital Expenditures (metric).

AB-97 used contemporaneous accounting earnings changes and the fundamental signals listed above in multivariate linear regression models to predict firms' future earnings, such as next-year earnings change or long-term growth in earnings. Models such as the AB-97 model relate future accounting earnings to current financial statement information and, thus, assess the "earnings-relevance" of the financial statement information represented in the fundamental signals. AB-97 found that these nine fundamental signals predict next-year earning better than the time series models used by researchers for large size firms; but for small and medium-size firms, the time series model predictions for next year earnings are at least as accurate as the fundamentals' predictions. Abarbanell and Bushee (1998) find evidence that the fundamental signals provide information about future returns that are associated with future earnings news.

Cohen, Dey, and Lys (2008) found that, whereas accrual-based earnings management increased steadily from 1987 until the passage of the Sarbanes Oxley Act (SOX) in 2002, accruals-based earnings management decreased significantly following the passage of SOX. Also, the level of real earnings management activities declined prior to SOX but increased significantly after SOX, suggesting that firms switched from accrual-based to real earnings management methods after the passage of SOX.

Anderson, Banker, and Janakiraman (2003) find that selling, general, and administrative (SG&A) costs are "sticky" because they increase on average 0.55% per 1% increase in sales but decrease only 0.35% per 1% decrease in sales. Balakrishnan, Petersen, and Soderstrom (2004) show that stick costs response to a decline in activity levels is smaller (larger) than that for an increase only when capacity is currently strained (in excess). Anderson, Banker, Huang, and Janakiraman (2007) demonstrate that future earnings are positively related to changes in the SG&A cost ratio in periods in which revenue declines, inconsistent with traditional interpretation of SG&A cost changes.

Bernard and Noel (1991) find that inventory disclosures can improve predictions of future sales and earnings beyond the degree of accuracy achievable based on past sales and earnings alone. Sloan (1996) reports that the relative magnitudes of the cash and accrual components of current earnings are relevant to future earnings. Fairfield, Sweeney, and Yohn (1996) find disaggregating accounting earnings into extraordinary items, discontinued operations, operating income, non-operating income, taxes, and special items improves the current-year earnings relevance to next-year return on equity. Banker and Chen (2006) propose an earnings forecast model decomposing earnings into components that reflect variability of costs with sales revenue and stickiness in costs with sales declines (essentially, embodying the traditional fixed and variable cost behavior model) that predicts one-year-ahead returns on equity better than

do other models based on line items reported in income statements and statements of cash flows.

III. HYPOTHESES

Beginning in 1991 and carrying forward for each year thereafter through 2008, this study builds upon AB-97 and seeks to address the following research questions:

1. Can financial and managerial accounting concepts guide the development of fundamental signals that, when added to earnings-signals models previously developed based on security analysts' expert guidance, significantly increase the model's predictive power?
2. What effect, if any, did the three macroeconomic recessions that occurred during 1991-2008 have on the predictive power (relevance) of earnings-signals models?

Considering these research questions led to the following hypotheses:

Hypothesis 1: Fundamental signals based on financial and managerial accounting concepts can significantly increase the earnings predictive power of models comprising fundamental signals based on security analysts' expert guidance.

Hypothesis 2: The three macroeconomic recessions that occurred during 1991-2008 substantially impacted the predictive power (earnings relevance) of earnings-signals models.

IV. METHODOLOGY

This research builds upon AB-97's methodology for testing the earnings-relevance of the studied fundamental signals in predicting change in next-year earnings per share (EPS) during 1991-2008, and in predicting long-term growth in earnings during 1991-2004. Managerial as well as financial accounting concepts were followed (a "concepts guided" approach) to develop or identify four metric fundamental signals that are added to the AB-97 model. The four added signals are Operating Leverage, Change in Market Share, Change in Debt-to-Assets Ratio, and Change in Free Cash Flows. These signals are intended to be conceptually different from the AB-97 signals. The AB-97 fundamental signals are essentially the same as the LT-93 signals that are based on what security analysts reported using in making their forecasts. Hence, the LT-93/AB-97 signals were identified using an "expert guided" approach. One objective of this study is to determine whether fundamental accounting concepts can guide the development or identification of signals that, when added to the signals that analysts said they used, significantly increase the earnings-relevance of the expanded model.

In addition to reporting the average of the yearly regression results, the yearly earnings-signals regression results are reported, showing each signal's yearly regression coefficient and an indication of whether or not the signal was significant. Also, yearly adjusted R-square values for the full model regressions are reported. Hierarchical Regression is used to analyze the unique contribution to the full model's explanatory/predictive power (adjusted R-square) made by contemporaneous earnings

change (CHGEPS), the block of AB-97 signals, and each of the "added" signals. Hierarchical regression was used to test whether the "added" signals based on "concepts guidance" could uniquely contribute significant explanatory/predictive power above that provided by the signals identified through "expert guidance."

A. Data Sources

The financial statement data used in this study was obtained from the Wharton Research Data Services (WRDS) Compustat "North America Fundamentals Annual - updated monthly." AB-97 ended with the reference year 1990. Hence, this research studied 1991 through 2008 for one-year-ahead EPS change, and 1991 through 2004 for long-term growth. Testing the earnings-signals models was restricted to North American firms with annual financial statement information recorded in Compustat. Only annual reporting periods and long-term growth were studied; quarterly financial statements were not evaluated in this study.

B. Dependent Variables

Table 1 defines and the three dependent variables used in this study.

Table 1
Definitions of dependent variables

One-Year-Ahead Earnings (CEPS1) As defined in AB-97's Table 1.	(ADJ_EPS_Tplus1 - EPS_T) / prcc_f_Tminus1, where ▪ ADJ_EPS_Tplus1 = (ajex_T / ajex_Tplus1) * EPS_Tplus1 ▪ prcc_f_Tminus1 is the Compustat item "prcc_f" for the closing stock price for the prior (t-1) year ▪ EPS_Tplus1 is Compustat item "epspx" for the one-year future (t +1) year ▪ EPS_T is Compustat item "epspx" for the current (t) year ▪ ajex_T and ajex_Tplus1 are Compustat item "ajex" for the current year and next future year respectively
Long-Term Growth in Earnings (CEPSL) As defined in AB-97's Table 1.	Geometric Mean Growth Rate = (((ADJ_EPS_Tplus5 / EPS_T) ^ 0.2) - 1), where ▪ ADJ_EPS_Tplus5 = (ajex_T / ajex_Tplus5) * "epspx" for year t+5 ▪ EPS_T is Compustat item "epspx" for the current (t) year ▪ ADJ_EPS_Tplus5>0 and EPS_T>0

C. Four Fundamental Signals added to the AB-97 Metric Signals

Table 2 defines and the four added fundamental signals developed or identified in this study based on managerial and financial accounting concepts. The definitions and formulas for AB-97's "change in current-year EPS" (CHGEPS) and seven metric fundamental signals (INV, AR, CAPX, GM, S&A, ETR, and LF) were used in this

study as defined in AB-97's Table 1, therefore, these definitions are not repeated in Table 2. The AB-97 indicator signals "AQ" (existence of qualified audit report) and "EQ" (whether or not LIFO was used by a firm) are indicator variables used in AB-97 but were not used in this study. One reason is that these two indicators are no longer listed in Compustat as items to select for download. AB-97 state, "LT (LT-93) identify twelve accounting-related fundamental signals referred to repeatedly in analysts' reports and financial statement analysis texts. We focus on the nine variables included in LT's full sample, described in panel A of Table 1. These signals are calculated so that the association between each signal and returns is negative. In the case of INV for example, an increase in finished goods inventory that outstrips sales demand is predicted to indicate bad news for earnings and vice versa" (Abarbanell and Bushee, 1997, page 3). The four fundamental signals added in this study are constructed so that the association between each signal and the future-earnings dependent variable was expected to be positive. The OPERATING_LEVERAGE signal is computed using only firms' reference-year (current-year) data; the other three added signals are based on changes in current-year value from the prior-year value or average of the prior two years values.

D. Developing a Proxy for Operating Leverage when Restricted to using only the Data Items Available in Compustat

Financial statements do not categorize costs by fixed and variable behavior. In addition, manufacturing firms are not required to report direct materials, direct labor, or manufacturing overhead costs used in manufacturing, and, hence, these items are not contained in Compustat.

The "Cost-Volume-Profit" or "CVP" Income Statement has the following format:

Sales
(Total Variable Costs)
Contribution Margin
(Total Fixed Costs)
Operating Income

Using the last three lines of the CVP income statement, Contribution Margin - Total Fixed Costs = Operating Income. With simple algebra, Contribution Margin = Operating Income + Total Fixed Costs. If Operating Leverage = Contribution Margin / Operating Income, then, with substitution, Operating Leverage = (Operating Income + Total Fixed Costs) / Operating Income. Operating income after depreciation "oiadp" is available in Compustat, but Total Fixed Costs is not. To estimate Total Fixed Costs, this study begins with the following statement in LT-93, "Most administrative costs are approximately fixed…" (LT-93, page 196). Thus, the general selling and administrative expenses reported in the Income Statement (Compustat item "xsga") are one of the components used in this study's estimate of total fixed costs. Depreciation and amortization expense is a separately reported item in Compustat (Compustat item "dp") that is not included in "xsga." (This fact can be demonstrated by downloading from Compustat the following items: "sale," "cogs," "xsga," "dp," and "oiadp" for any number of firms for any year and verifying that oiadp = sale - cogs - xsga - dp in every case.)

Table 2
Fundamental signals added to AB-97 fundamental signals

CHG_MKTSHR Change in Market Share (Source: Developed in this study)	CHG_MKTSHR = ((sale (t) / IND_SALE_SUM_T) - (((sale (t-1) / IND_SALE_SUM_Tminus1) + (sale (t-2) / IND_SALE_SUM_Tminus2)) / 2)) / (((sale (t-1) / IND_SALE_SUM_Tminus1) + (sale (t-2)/ IND_SALE_SUM_Tminus2)) / 2), *where* sale (t) = Compustat item "sale" for the studied firm for the current (reference) year t IND_SALE_SUM (t) = sum of Compustat item "sale" for all firms within the studied firm's four-digit SIC industry for the current (reference) year t

CHG_FCF
 	
Change in Free Cash Flows
 	
(Source: the Free Cash Flows ratio described in financial accounting textbooks)
	FCF = [oancf (t) – capxv (t) – dv (t)] / at (t), *where*
	
	oancf is Compustat "oancf "-- Operating Activities Net Cash Flow
	capx is Compustat "capxv" -- Capital Expenditures for Property Plant and Equipment
	dv is Compustat "dv" -- Cash Dividends (Cash Flow)
	at is Compustat item "at" for total assets
	
	CHG_FCF = [FCF (t) – FCF (t-1)] / FCF (t-1) where t is the current year and FCF is as previously defined.
	
	It is possible that FCF can be negative for any given year. Hence, the following logic is intended to provide the correct sign of the change:
	
	If FCF (t-1) > 0 And FCF (t) > 0 Then
	CHG_FCF = (FCF (t) – FCF (t-1)) / FCF (t-1)
	If FCF_Tminus1 < 0 And R_FCF_T < 0 Then
	CHG_FCF = -1 * [(FCF (t) – FCF (t-1)) / FCF (t-1)]
	If R_FCF_T < 0 And FCF_Tminus1 > 0 Then
	CHG_FCF = (FCF (t) – FCF (t-1)) / FCF (t-1)
	If R_FCF_T > 0 And FCF_Tminus1 < 0 Then
	CHG_FCF = -1 *[(FCF (t) – FCF (t-1)) / FCF (t-1)]

CHG_DEBT_AT Change in Debt-to-Total Assets (Source: the debt-to-total assets ratio	CHG_DEBT_AT = DEBT_AT_T - ((DEBT_AT_Tminus1 + DEBT_AT_Tminus2) / 2)) / ((DEBT_AT_Tminus1 + DEBT_AT_Tminus2) / 2), *where* DEBT_AT_T = Compustat "lt" (total liabilities) / Compustat "at" (total assets) for the current year t DEBT_AT_Tminus1 = Compustat "lt" (total liabilities) / Compustat "at" (total assets) for the year that is prior to the current (reference) year

described in financial accounting textbooks)	DEBT_AT_Tminus2 = Compustat "lt" (total liabilities) / Compustat "at" (total assets) for the year that is two years prior to the current (reference) year
OPERATING_ LEVERAGE (Source: Concept of Operating Leverage defined in managerial accounting textbooks, but OPERATING_ LEVERAGE proxy is developed in this study)	OPERATING_LEVERAGE = {Compustat "oiadp" (t) + Compustat "xsga" (t) + Compustat "dp" (t) + [Compustat "dpvieb" (t) – Compustat "dpvieb" (t -1) – (Compustat "dp" (t) – Compustat "am"(t))]} / Compustat "oiadp" (t) where t = reference year and Compustat items are: "oiadp" = operating income after depreciation "xsga" = selling and administrative expenses "dp" = depreciation and amortization expense "dpvieb" = ending balance of accumulated depreciation "am" = amortization expense The expression "[Compustat "dpvieb" (t) – Compustat "dpvieb" (t -1) – (Compustat "dp" (t) – Compustat "am"(t))]" is applicable only for manufacturing firms and is set to zero for non-manufacturing firms.

Hence, the second component of Total Fixed Costs is the depreciation and amortization expense reported in the Income Statement, namely the Compustat item "dp." For non-manufacturing firms, the sum of these two components, "xsga" and "dp," is this study's proxy for total fixed costs. The Compustat item "am" is the amortization expense component of "dp." Hence, ("dp" - "am") equals the depreciation expense reported in the Income Statement. The amount represented by ("dp" - "am") should be the depreciation of only the firm's non-manufacturing property, plant, and equipment (PP&E). In accordance with Absorption Costing, the depreciation of the manufacturing PP&E should be allocated along with other manufacturing overhead to work-in-process (WIP) and finished goods (FG) and expensed in the Income Statement as part of cost of goods sold (COGS) only when the finished goods are sold. Depreciation of all of the firm's PP&E (both manufacturing and non-manufacturing PP&E) should equal ("dp" - "am") plus the manufacturing PP&E depreciation. Hence, manufacturing depreciation should equal total depreciation on PP&E less ("dp" - "am"). Compustat has an item for the ending balance of total accumulated depreciation (Compustat item "dpvieb") that is obtained directly from firms' Balance Sheets. Compustat no longer has the item "dpvir" for the depreciation on retirements. Hence, just the current-year change in "dpvieb" is used as an approximation for total current-year depreciation, without considering retirements. Hence, total depreciation for the current year is estimated as [dpvieb (t) - dpvieb (t-1)], and manufacturing depreciation equals [dpvieb (t) - dpvieb (t-1)] - [dp (t) - am (t)]. This logic was used in developing the formula for the Operating Leverage proxy shown in Table 2.

V. RESULTS FROM TESTING EARNINGS-RELEVANCE OF FUNDAMENTAL SIGNALS

Table 3 reports the average results for 1991-2008 for all firms except services firms, when the AB-97 dependent variable, "next-year EPS change" (CEPS1), is regressed on the full model of independent variables comprising: AB-97 "current-year EPS change" (CHGEPS); AB-97 seven metric fundamental signals (INV, AR, CAPX, GM, S&A, ETR and LF); and the four fundamental signals added in this study:

1. Change in Free-Cash Flows (CHG_FCF)
2. Change in Market Share (CHG_MKTSHR)
3. Change in Total-Debt-to-Total Assets ratio (CHG_DEBT_AT)
4. Operating Leverage (OPERATING_LEVERAGE).

Table 4 displays the yearly regression results that were used to derive the average results shown in Table 3 (averages shown at the bottom of Table 4 match the average beta coefficient values shown in Table 3). Providing yearly beta coefficients estimates along with an indication of each signal's significance provides insight into how the earnings-signals relationship changed over time.

Table 3
Summary of yearly regressions of CEPS1 on all fundamental signals for 1991-2008

Fundamental Signals (Independent Variables or "Signals")	Avg. Beta	Avg. Sig.	Total # Yrs Sig. at alpha = .05	Total # Yrs Sig. at alpha = .10	NEG	NEG SIG**	POS	POS SIG**
(Constant)	0.082	0.180	10	1	3	0	15	10
CHGEPS	-0.285	0.069	15	1	13	12	5	3
INV	-0.013	0.615	0	0	11	0	7	0
AR	-0.056	0.467	3	0	13	3	5	0
GM	0.072	0.389	2	2	13	1	5	1
S&A	0.016	0.277	3	0	12	2	6	1
ETR	0.321	0.201	8	1	13	4	5	4
LF	0.062	0.458	2	1	12	2	6	0
CAPX	0.040	0.338	4	1	2	0	16	4
CHG_FCF	0.001	0.632	1	0	5	0	13	1
CHG_DEBT_AT	0.474	0.041	15	0	0	0	18	15
CHG_MKTSHR	-0.128	0.279	10	2	15	10	3	0
OPERATING_ LEVERAGE	0.000	0.486	3	0	12	2	6	1

"Full Model" Average Adjusted R-Square and Average Number of Firms Studied Each Year

Avg. Adj. R^2:	**0.092**
Avg. # of Firms per Year:	1,787
Avg. yearly Durbin Watson:	1.926

Note: All fundamental signals are CHGEPS, the seven AB-97 metric fundamental signals, and the four added fundamental signals.

Table 4
Beta regression coefficients from yearly regressions of CEPS1 on all fundamental signals for 1991-2008

Year	CHG EPS	INV	AR	GM	S&A	ETR	LF
1991	-0.079*	-0.024	0.047	-0.187*	-0.336**	0.831**	0.123
1992	-0.224**	0.005	-0.007	-0.032	-0.071	-0.140**	-0.037
1993	-0.265**	0.009	-0.042**	-0.035	-0.046	0.179**	-0.125**
1994	-0.309**	-0.003	-0.033	-0.007	-0.049	-0.069	0.016
1995	-0.319**	-0.009	-0.032**	0.029	0.023	-0.018	-0.078**
1996	-0.176**	0.000	0.000	-0.043	0.011	-0.071	-0.016
1997	-0.277**	-0.004	-0.033**	-0.015	-0.021	-0.020	-0.011
1998	-0.241**	-0.007	-0.018	-0.009	-0.035	-0.148**	-0.002
1999	0.008	-0.004	0.014	0.001	-0.014	-0.248**	-0.044
2000	**1.105****	**0.140**	**-0.367**	**2.432****	**1.451****	**6.159****	**0.654**
2001	0.199**	-0.034	0.107	0.238	0.222	-0.447	0.217
2002	0.419**	-0.012	-0.059	0.169	0.659	-0.561**	-0.195
2003	-0.631**	-0.259	-0.329	-0.387	-1.200	0.025	0.077
2004	0.057	0.006	-0.205	-0.005	0.310	-0.095	0.767
2005	-0.199**	0.003	-0.008	-0.004	-0.027	-0.027	-0.017
2006	**-2.907****	**-0.038**	**-0.071**	**-0.752****	**-0.459****	**0.668****	**-0.065**
2007	-0.816**	-0.002	0.034	-0.072*	-0.091	-0.185**	-0.076
2008	-0.466**	0.001	-0.014	-0.024	-0.042	-0.050	-0.069**
Avg.	**-0.285**	**-0.013**	**-0.056**	**0.072**	**0.016**	**0.321**	**0.062**

Year	CAPX	CHG FCF	CHG DEBT AT	CHG MKT SHR	Oper. Leverage	Adj. R^2
1991	0.009	0.000	0.362**	-0.227**	-0.001	**0.036**
1992	0.010	0.001	0.154**	-0.048**	-0.001**	**0.062**
1993	0.009*	-0.002	0.119**	-0.071**	0.000	**0.090**
1994	0.009	0.001	0.087**	-0.084**	0.001**	**0.041**
1995	0.009	0.001	0.108**	-0.077**	0.000	**0.104**
1996	-0.001	0.002**	0.041**	-0.002	0.000	**0.020**
1997	0.005	0.000	0.047**	-0.034**	-0.001**	**0.076**
1998	0.028**	0.000	0.099**	-0.044**	0.000	**0.078**
1999	-0.017	0.000	0.193**	-0.084**	0.000	**0.018**
2000	**0.064**	**0.002**	**1.295****	**0.212**	**0.001**	**0.190**
2001	0.067	0.014	1.442**	0.137	0.001	**0.003**
2002	0.088	0.000	1.124**	0.030	0.003	**0.060**
2003	0.071	0.000	2.141**	-1.273**	-0.001	**0.337**
2004	0.224	0.002	0.858	-0.024	-0.001	**-0.001**
2005	0.012**	0.000	0.076**	-0.029*	0.000	**0.070**
2006	**0.110****	**0.000**	**0.111**	**-0.528****	**0.001**	**0.272**
2007	0.006	0.001	0.079	-0.019	0.000	**0.076**
2008	0.025**	0.000	0.192**	-0.133**	0.000	**0.131**
Avg.	**0.040**	**0.001**	**0.474**	**-0.128**	**0.000**	**0.092**

Note: All fundamental signals are CHGEPS, the seven AB-97 metric fundamental signals, and the four added fundamental signals.

The AB-97 signals are constructed to have an expected negative relationship with CEPS1 (a negative sign for the coefficient estimate), whereas the four added signals are constructed to have a positive relationship. Table 3 and Table 4 show the averages of the yearly coefficients for the AB-97 signals during 1991-2008 are negative for INV, AR, but unexpectedly positive for GM, SA, ETR, LF, and CAPX. However, when the results for the macroeconomic downturn years, 2000 and 2006, are removed from Table 4, and a 16-year average is computed for the remaining years, the 16-averages for the beta coefficients are:

CHGEPS	INV	AR	GM	S&A	ETR	LF	CAPX
-0.207	-0.021	-0.036	-0.024	-0.044	-0.065	0.033	0.035

By removing 2000 and 2006, the signs of the average coefficients for the AB-97 signals match AB-97's expected negative relationship to CEPS1 during 1991-2008, except for LF and CAPX. As discussed in AB-97 and shown in Panel 1 of Table 3, AB-97 found an unexpected positive average relationship for AR for 1983-1990, whereas this study found the expected negative relationship for 1991-2008, when 2000 and 2006 are removed. This study found the same positive relationship for CAPX as found by AB-97. AB-97 states, "The CAPX signal coefficient is unexpectedly positive, suggesting that an increase in capital expenditures in excess of the industry average is actually bad news for one-year-ahead earnings. On the one hand, new capital projects do not usually affect earnings immediately but the related depreciation charges do. On the other hand, if the CAPX signal is negatively related to security returns as hypothesized by LT, then the sign of the relation between the CAPX signal and future

earnings changes should eventually reverse. There is no evidence of such a reversal in our data as the mean CAPX signal coefficients are positive for one-, two-, three-, four-, and five-year-ahead earnings changes (not reported in the tables). In most cases, the mean coefficients are over two standard deviations from zero. This suggests that the CAPX variable may not capture the theoretical relation LT had hypothesized." Regarding the Labor Force signal (LF), this study consistently obtained the unexpected positive average coefficient for LF. However, Table 3 shows 12 of the 18 yearly coefficients for LF were negative. The positive 18-year average coefficient for LF (.062) is due to the large positive values of .654, .217 and .767 for 2000, 2001 and 2004, respectively.

Using Table 4, the coefficients for a year just prior to the start of an economic recession can be analyzed to see how the sign, size, and significance of each coefficient may have deviated from the coefficient's 18-year average. Three economic recessions occurred in the U.S. during 1991-2009: (1) July 1990 – March 1991 with Gross Domestic Products (GDP) declining −1.4%, (2) March 2001–November 2001 with GDP declining −0.3%, and (3) December 2007-June 2009 with GDP declining −5.1%

Table 4 indicates the largest differences in the coefficients occurred during 2000, one year prior to the start of the 2001 recession, and during 2006, one year prior to the start of the 2007-2009 recession. The evidence provided in Table 4 is consistent with **Hypothesis 2** that the macroeconomic recessions occurring during 2001 and 2007 substantially affected the relevance of many of the studied fundamental signals during 2000 and 2006 in predicting next-year earnings changes. The evidence is also consistent with the differences between pre-recession economic conditions existing during 2000 vis-à-vis 2006 being reflected in differences in the sign and/or significance of the fundamental signal coefficients during 2000 vis-à-vis 2006. This evidence is in contrast to AB-97's statement that, "Overall, macroeconomic trends have little effect on the informativeness (or lack thereof) of the fundamental signals for future earnings," and the findings of this study, when testing with low-GDP and high-GDP partitions during 1991-2008, and suggests macroeconomic recessions substantially affect fundamental signals' earnings relevance. If complex and varying sets of non-economic and economic shocks bring about a recession, then predicting recessions with economic trends and averages must be, at best, problematic, and finding the true relationships between fundamental signals and recessions, challenging.

Table 5 shows the 1991-2008 hierarchical regression results for All-except-Services firms, when "next-year EPS change" (CEPS1) is regressed first on CHGEPS, then on the block of seven AB-97 signals, and then in succession on each of the fundamental signals added in this study.

On average, "current-year change in EPS" (CHGEPS) accounted for 74% of the overall explanatory power of the full model in predicting "next-year EPS Change" (CEPS1) for All-except-Services firms during 1991-2008. For the same firms and timeframe, the seven, metric AB-97 signals taken together contributed on average 16% of the explanatory/predictive power of the full model. The AB-97 seven signals' 16% contribution was unique to and not contributed by CHGEPS. The four added signals taken together contributed to a significant 10% increase in average adjusted R-square above that contributed by CHGEPS and the AB-97 signals. These results are consistent with **Hypothesis 1** that a "concepts guided" approach may identify additional

fundamental signals that significantly increase the predictive power of earnings-signals models based primarily on the "expert guidance" of security analysts.

Table 5
Hierarchical regression results where dependent variable is one-year-ahead EPS change (CEPS1) for 1991-2000

Blocks	Average Adj. R^2 After the Block is Added	Count of Years where R^2 Change from the Added Block was significant at alpha = .05	Average Percent of Adj. R^2 of Full Model Contributed just by the Added Block of Signals
CHGEPS	0.069	15	74%
AB-97 Seven Signals	0.084	12	16%
CHG_FCF	0.084	1	0%
CHG_DEBT_AT	0.090	15	7%
CHG_MKTSHR	0.092	10	3%
OPERATING_ LEVERAGE	0.092	3	0%

Table 6 reports the average results for 1990-2004 for All-except-Services firms, when the AB-97 dependent variable, "long-term earnings change" (CEPSL) is regressed on the full model. The definition and formula for the dependent variable CEPSL are provided in Table 1, and the definitions and formulas for the four added fundamental signals are provided in Table 2. The definitions for the AB-97 fundamental signals are provided in AB-97, Table 1.

Table 6
Average of regression coefficients from yearly regressions of CEPSL on all fundamental signals for 1991-2004

Fundamental Signals (Independent Variables or "Signals")	Avg. Beta	Avg. Sig.	Total # Yrs Sig. at alpha = .05	Total # Yrs Sig. at alpha = .10	NEG	NEG SIG**	POS	POS SIG**
(Constant)	0.077	0.036	11	1	1	0	3	11
CHGEPS	-0.155	0.160	8	1	13	8	1	0
INV	-0.015	0.507	3	0	11	3	3	0
AR	0.004	0.424	2	0	6	1	8	1
GM	0.051	0.301	3	2	3	0	1	3
S&A	0.026	0.425	2	0	2	1	2	1
ETR	-0.263	0.275	5	4	13	5	1	0
LF	0.016	0.429	0	1	4	0	0	0
CAPX	0.009	0.348	2	2	2	0	2	2
CHG_FCF	0.000	0.542	0	0	7	0	7	0
CHG_DEBT_AT	0.069	0.214	6	2	2	0	2	6
CHG_MKTSHR	-0.023	0.338	4	2	9	3	5	1
OPERATING_ LEVERAGE	0.007	0.017	13	0	0	0	4	13
"Full Model" Average Adjusted R-Square and Average Number of Firms Studied Each Year								
Avg. Adj. R^2:		0.050						
Avg. # of Firms per Year:		859						
Avg. yearly Durbin Watson:		1.994						

Note: All fundamental signals are CHGEPS, the seven AB-97 metric fundamental signals, and the four added fundamental signals.

Table 7
Beta regression coefficients from yearly regressions of CEPSL on all fundamental signals for 1991-2004

Year	CHG EPS	INV	AR	GM	S&A	ETR	LF
1991	-0.038	0.000	-0.070**	0.039	0.014	-0.475**	0.078
1992	-0.098*	0.007	-0.019	0.063	0.007	-0.680**	-0.018
1993	-0.190**	-0.009	0.017	0.019	0.007	0.224	0.016
1994	0.021	0.005	-0.006	0.037	-0.027	-0.483*	0.045
1995	-0.314**	-0.037**	0.039	0.000	0.053	-0.229	0.051
1996	-0.101	-0.010	0.004	-0.084	-0.154**	-0.003	0.024
1997	-0.389**	-0.038**	-0.041	0.033	0.032	-0.022	0.003
1998	-0.282**	-0.001	0.034	0.091*	0.049	-0.491**	-0.055
1999	-0.184**	0.000	-0.014	-0.037	0.040	-0.499*	0.022
2000	-0.037	-0.009	0.021	0.136**	0.060	-0.241*	0.022
2001	-0.313**	-0.021	-0.005	-0.078	0.006	-0.581*	0.062
2002	-0.052**	0.001	0.004	0.194**	0.149**	-0.141**	0.082*
2003	-0.051**	-0.040	0.040	0.222**	0.098	-0.002**	-0.063
2004	-0.146	-0.057**	0.053**	0.075*	0.035	-0.053	-0.042
2005	-0.155	-0.015	0.004	0.051	0.026	-0.263	0.016
2006	-0.038	0.000	-0.070**	0.039	0.014	-0.475**	0.078
2007	-0.098*	0.007	-0.019	0.063	0.007	-0.680**	-0.018
2008	-0.190**	-0.009	0.017	0.019	0.007	0.224	0.016
Avg.	0.021	0.005	-0.006	0.037	-0.027	-0.483*	0.045

Table 7 (continued)

Year	CAPX	CHG FCF	CHG DEBT AT	CHG MKT SHR	Oper. Leverage	Adj. R^2
1991	0.006	0.000	0.110**	0.023	0.006**	0.043
1992	0.011*	-0.002	0.028	-0.020	0.008**	0.040
1993	0.009	0.000	0.088**	0.002	0.011**	0.074
1994	0.006	0.000	0.085**	-0.007	0.009**	0.030
1995	0.014*	0.000	0.030	0.072**	0.007**	0.033
1996	0.004	-0.001	-0.005	0.028	0.012**	0.038
1997	-0.001	0.001	0.088**	-0.005	0.004**	0.035
1998	0.004	0.001	0.048	0.013	0.006**	0.039
1999	0.011	0.000	-0.005	-0.052**	0.005**	0.032
2000	0.020**	0.001	0.090**	-0.075**	0.006**	0.074
2001	0.005	0.001	0.079*	-0.101**	0.012**	0.081
2002	0.025**	0.000	0.205**	-0.051*	0.008**	0.109
2003	0.016	0.000	0.074*	-0.082*	0.006**	0.060
2004	-0.010	0.000	0.058	-0.059	0.002	0.018
2005	0.009	0.000	0.069	-0.023	0.007	**0.050**
2006	0.006	0.000	0.110**	0.023	0.006**	0.043
2007	0.011*	-0.002	0.028	-0.020	0.008**	0.040
2008	0.009	0.000	0.088**	0.002	0.011**	0.074
Avg.	0.006	0.000	0.085**	-0.007	0.009**	0.030

Note: All fundamental signals are CHGEPS, the Seven AB-97 metric fundamental signals, and the four added fundamental signals.

In contrast to being insignificant in predicting "next-year EPS change" (CEPS1), Table 6 indicates OPERATING_LEVERAGE was a significant, positive predictor of "long-term earnings growth" (CEPSL) in 13 of 14 years, with a 14-year average p-value of 0.017.

Table 7 displays the yearly regression results that were used to derive the average results shown in Table 6 (averages shown at the bottom of Table 7 match the average beta coefficient values shown in Table 6). As with predicting CEPS1 reported in Table 4, providing yearly beta coefficients estimates along with an indication of each signal's significance provides insight into how the earnings-signals relationship changed over time when predicting CEPSL. The variance in the yearly signal coefficients and full-model adjusted R-square values is less in Table 7 in predicting CEPSL than in Table 4 in predicting CEPS1. The substantial differences from 18-year averages in the 2000 and 2006 reference-year coefficients apparent in Table 4 in predicting CEPS1 for recession years 2001 and 2007 respectively are not as evident in Table 7 in the 1996 and 2002 reference-year coefficients for predicting CEPSL for 2001 and 2007 respectively.

Table 8 shows the 1991-2004 hierarchical regression results for All-except-Services firms, when "long-term earnings growth" (CEPSL) is regressed first on CHGEPS, then on the block of seven AB-97 signals, and then in succession on each of the "added" signals.

Table 8
Hierarchical regression results where dependent variable is long-term growth (CEPSL) for 1991-2004

Blocks	Average Adj. R^2 After the Block is Added	Count of Years where R^2 Change from the Added Block was significant at alpha = .05	Average Percent of Adj. R^2 of Full Model Contributed just by the Added Block of Signals
CHGEPS	0.006	9	11%
AB-97 Signals	0.020	6	29%
CHG_FCF	0.020	0	0%
CHG_DEBT_AT	0.024	6	9%
CHG_MKTSHR	0.027	4	6%
OPERATING_ LEVERAGE	0.050	13	46%

On average, current-year change in EPS (CHGEPS) accounted for just 11% of the overall explanatory power of the full model in predicting long-term change in earnings (CEPSL) for All-except-Services firms during 1991-2004. For the same firms and timeframe, the seven, metric AB-97 signals taken together contributed on average 29% of the explanatory/predictive power of the full model. The four added signals taken together contributed to a 60% increase in average adjusted R-square above that contributed by CHGEPS and the AB-97 signals. These results are consistent with **Hypothesis 1** that a "concepts guided" approach may identify additional fundamental signals that significantly increase the predictive power of earnings-signals models based primarily on the "expert guidance" of security analysts

VII. SUMMARY

The evidence is consistent with macroeconomic recessions that began during 2001 and near the end of 2007 having substantially affected the relevance of many of the studied fundamental signals during 2000 and 2006 in predicting next-year earnings changes. The evidence is also consistent with the differences between pre-recession economic conditions existing during 2000 vis-à-vis 2006 being reflected in differences in the sign and/or significance of the fundamental signal coefficients during 2000 vis-à-vis 2006.

A proxy for Operating Leverage was developed as a fundamental signal by using just the items available in Compustat. Whereas operating leverage was not relevant in predicting next-year EPS change, the evidence indicates this signal was a very significant and positive predictor of long-term growth in earnings, with the condition that earnings are positive in the current year and in the long-term future year. With this condition imposed, operating leverage was significant in predicting long-term growth in earnings in thirteen-of-fourteen years tested, and the *average* p-value is 0.017 for the fourteen-years tested. All fourteen yearly coefficients were positive, indicating a strong, direct relationship to long-term growth. Operating leverage alone uniquely contributed 46% of the full-models predictive power in predicting long-term growth in earnings, with the condition that earnings would remain positive in the long run.

Evidence indicates the four added fundamental signals identified in this study based on fundamental financial and managerial accounting concepts significantly contribute to the explanatory/predictive power of models previously developed using the expert guidance of security analysts.

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