# FUNDAMENTAL SIGNALS, FUTURE EARNINGS AND SECURITY ANALYSTS' EFFICIENT USE OF FUNDAMENTAL SIGNALS DURING 1991 THROUGH 2008

by

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# ABSTRACT

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This dissertation builds upon one of the foundation articles in *Fundamental Analysis*, written by Abarbanell and Bushee [1997] (AB-97), that studied the relationship of fundamental signals (combinations of items reported in the financial statements) to future accounting earnings during 1983-1990. Guided by fundamental financial and managerial/cost accounting concepts, this study adds fundamental signals to the AB-97 earning-signals model. The added fundamental signals include proxies for operating leverage, market share, markup, and total manufacturing costs. A revised ("Experimental") long-term growth variable is introduced that allows for negative EPS (loss) values in the geometric mean growth rate computation. The expanded model is

used to analyze the earnings-relevance of the studied fundamental signals during 1991-2008, and the results for each of the AB-97 signals as well as each of the added signals are evaluated. The AB-97 methodology for analyzing security analysts' efficient use of the fundamental signals is modified to express utilization efficiency as a percent, and analysts' actual forecast error rates are computed and compared to the analysts' utilization percents. The results include the finding that the operating leverage proxy is a consistently significant and important predictor of long-term growth, giving rise to the recommendation that GAAP requires firms to report an estimate of their annual total fixed costs, or at least that manufacturing firms report their total annual manufacturing overhead costs. Hierarchical regression results indicate that the added fundamental signals provide significant incremental explanatory/predictive power above that provided by the AB-97 fundamental signals that were based on the guidance of security analysts. Also, the results provide marginal support for analysts' efficient use of the fundamental signals in making their one-year-ahead EPS forecast revisions having increased after EDGAR in 1996 and after Regulation FD in 2000.

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# CHAPTER 1

# INTRODUCTION

## 1.1 Overview of the Study

In September 2010, the FASB issued “Statement of Financial Accounting Concepts No. 8” titled “Conceptual Framework for Financial Reporting Chapter 1, The Objective of General Purpose Financial Reporting, and Chapter 3, Qualitative Characteristics of Useful Financial Information.” The new concept statement supersedes FASB Concepts Statements No. 1, Objectives of Financial Reporting by Business Enterprises, and No. 2, Qualitative Characteristics of Accounting Information. In the new statement, FASB 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 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 Penman (1989)]. Stated in these terms, this research studied selected fundamental signals during 1991-2008 and evaluated the relevance of these signals in predicting North American firm’s next-year accounting earnings changes and long-term growth. In addition, this study evaluated security analysts’ actual error rates in forecasting firms’ next-year earnings and long-term growth during 1991-2008, and compared the actual error rates to a measure of how efficiently the analysts used the studied fundamental signals.

Abarbanell and Bushee [1997] (henceforth, AB-97) state 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 one to test directly the validity of the economic intuition that underlies the original construction of the signals.” This dissertation seeks to address the following research questions pertaining to fundamental analysis:

1. Can fundamental financial accounting concepts guide the development of fundamental signals that significantly increase the predictive power of models that have been developed using the “expert-guidance” of security analysts?

2. Can managerial/cost accounting concepts guide the development of fundamental signals that are significantly related to future financial accounting earnings?

3. On average, how accurate have security analysts actually been in forecasting next-year earnings and long-term growth?

4. How efficiently have security analysts used the studied fundamental signals in making their next-year earnings and long-term growth forecast revisions?

5. Does security analysts' efficient use of the studied fundamental signals have any relationship to their actual forecast error rates?

6. Did Regulation FD affect security analysts' efficient use of financial statement information? That is, did the enactment of the rules restricting analysts' communication with firms' management correspond with security analysts' more efficiently using the studied fundamental signals?

7. Did EDGAR innovations in computerizing the presentation of financial statement information affect security analysts' efficient use of financial statement information?

8. Did Sarbanes-Oxley affect the relevance of financial statement information, and if so, how? For example, did current-year earnings become more relevant with less earnings management in the post-SOX era?

Regarding research question 2 above, the author was fortunate to have been able to attend the 2010 Doctorial Consortium held June 16-20, 2010 in Lake Tahoe. On the last day of the consortium, Dr. Robert Bloomfield, while speaking as member of a stage panel, raised a question regarding how managerial/cost accounting concepts might be integrated in studying financial accounting. This dissertation study, in part, addressed Dr. Bloomfield's call, by developing fundamental signals based on managerial accounting concepts that the evidence indicates are significantly related to future accounting earnings.

To attempt to address the research questions listed above, this dissertation study had three major objectives:

1. Seek to increase the explanatory/predictive power of the earnings-signals model used in AB-97 by employing an "accounting concepts-guided" search to identify added fundamental signals not used by Ou and Penman [1989] (henceforth, OP-89), Lev and Thiagarajan [1993] (henceforth, LT-93) or AB-97.

2. Use the expanded earnings-signals model developed in objective 1 to evaluate the relevance of the fundamental signals during 1991-2008. All of the AB-97 metric fundamental signals are included exactly as defined by AB-97 in the expanded model. The results using the AB-97 signals for 1991-2008 are reported and compared to the results reported by AB-97 for 1983-1990. In addition, the results using the added signals are reported for 1991-2008. The explanatory/predictive power (measured by adjusted R-square) of the yearly regressions will be evaluated to see if significance changes in the average explanatory/predictive power of the studied fundamental signals may have significantly changed during 1991-2008. This evaluation includes a study of the difference in the average explanatory/predictive power of earnings before and after Sarbanes-Oxley.

3. Use the expanded earnings-signals model developed in objective 1 as a benchmark to examine how efficiently the security analysts' used the fundamental signals during 1991-2008. The methodology developed by AB-97 is used with modification as a basis for this research. In addition, report analysts' actual error rates in making next-year earnings and long-term growth forecast revisions and compare the actual error rates to the analysts' efficient use of the studied signals. Analysts' use of the fundamental signals is evaluated before and after EDGAR and Regulation FD.

#### *1.1.1 Objective 1–Theory Guided Search for Adding Fundamental Signals*

The foundation research articles for this dissertation were OP-89, LT-93, and AB-97, but this research primarily builds upon the AB-97 article titled "Fundamental Analysis, Future Earnings, and Stock Prices" published in the 1997 Journal of Accounting Research. Richardson, Tuna, Wysocki (2010) recently called AB-97 one of the "foundation" articles in fundamental analysis. One of the objectives of this present research has been to perform for 1991-2008 essentially the same study reported by AB-97 in their table 2 for 1983-1990. In their table 2, AB-97 report their results from regressing next-year EPS change on their fundamental signals for 1983-1990, along with their results for regressing long-term growth on the same fundamental signals for 1983-1987. Beginning in 1991, this study continues the AB-97 analyses through 2008 for next-year EPS change and through 2004 for long-term growth.

Another objective of this research has been to identify or develop fundamental signals (henceforth, the "added" signals) based on fundamental accounting concepts. These added signals are included along with the AB-97 metric signals in the full model used for studying 1991 through 2008. Previous research has used "statistical search" (OP-89) and "expert-guided" search (LT-93) methods to identify fundamental signals. This study sought to use both financial and managerial/cost accounting fundamental concepts as the guidance for developing or identifying added signals. The overarching guidance is provided by the FASB concept statements, but supplemental to the FASB concept statements are the concepts and principles found in accounting textbooks commonly used in universities and colleges to teach first-year students the fundamental principles of financial and managerial accounting. To operationalize this "concepts-guided" approach, the textbook, *Accounting–Tools for Business Decision Making*, third edition by Kimmel, Weygandt, and Kieso, (henceforth, KWK) was used as the representative first-year accounting textbook commonly used in universities and colleges, with the caveat that KWK guidance must be in accordance with FASB Concept Statements. It was convenient that KWK addresses both fundamental financial accounting and fundamental managerial/cost accounting principles and concepts in one textbook, because this study sought to use both financial and managerial fundamental accounting concepts to develop the added fundamental signals. The definitions for some of the added signals (for example, Free Cash Flows) come directly from KWK. Other added signals have their formulas provided in KWK, but not all of the data called for in the formula is directly provided in Compustat. For example, KWK defines operating leverage as contribution margin divided by net income, but contribution margin is not an item reported in Compustat. Other managerial accounting variables not reported as items in Compustat are: direct materials, direct labor, total manufacturing costs, cost of good manufactured, total variable cost, and total fixed costs. How these measures may be proxied using only the items available in Compustat is another objective of this research. None of the added signals were used by OP-89, LT-93, or AB-97.

#### *1.1.1.1 Replicating the AB-97 Model*

The AB-97 model uses contemporaneous accounting earnings changes and other fundamental signals constructed from current and prior accounting and non-accounting information. The fundamental signals are the independent variables in a multivariate linear regression model that predicts firms' next-year earnings change. In a similar manner, the same independent variables (signals) predict long-term growth. Models such as the AB-97 model relate future accounting earnings to current financial statement information and assess the earnings-relevance of the financial statement information represented in the independent variables (fundamental signals). In contrast, the OP-89 and LT-93 models analyze the value-relevance of the fundamental signals by relating the signals to future stock returns. A given signal can be relevant to both future returns and future earnings.  For example, all but one (ETR) of the signals used by AB-97 to predict future accounting earnings were exactly the same signals used by LT-93 to predict future abnormal returns.  For the firms studied during 1983-1990, AB-97 showed future one-year-ahead earnings changes were significantly related to many of the fundamental signals that they included in their model.  AB-97 also showed that long-term (five-year ahead) earnings growth for the studied firms was significantly related to some of their fundamental signals.  Before attempting to build upon the work of AB-97, an attempt was made to replicate AB-97 table 2, in order to obtain a better understanding of the AB-97 model and methodology.  Once the AB-97 earnings-signals model had been replicated, the model was then expanded by including the fundamental signals identified or developed in this study.  Non-accounting/non-metric signals were not included in this research.  For example, the "AQ" indicator variable used by LT-93 and AB-97 that indicates whether a qualified or adverse audit opinion was issued was not used in this study.  The goal was to include only signals that are wholly constructed from the information reported in the financial statements.

*1.1.2  Firm Categories*

Before identifying the added fundamental signals, firms were divided into categories based on the type of inventory reported in the firm's Balance Sheet. The categories are ALL-except-Services, Services, Manufacturing and Wholesale-Retail-Primary-Products.  Segregating out manufacturing firms allowed for the computation of new items not provided in Compustat.  For example, cost of goods manufactured is not an item available in Compustat, but was computed for manufacturing firms by obtaining reasonable assurance that all the cost of goods sold for a firm was the cost of the firm's finished goods sold. With this caveat, cost of goods manufactured equals ending balance of finished goods (Compustat "invfg") plus cost of goods sold (Compustat "cogs") minus beginning balance of finished goods (Compustat "invfg" for prior year). Total manufacturing costs is not an item available in Compustat, but total manufacturing costs was computed for manufacturing firms using the cost of goods manufactured previously computed. Total manufacturing costs equals ending work-in-process (Compustat "invwip") plus Cost of Goods Manufactured minus beginning work-in-process (Compustat "invwip" for the prior year).

The non-Manufacturing firms were divided into two separate categories, Service and Wholesale-Retail-Primary-Products. The Service group by definition has zero inventories, and hence is a group of firms that was not studied by OP-89, LT-93 or AB-97, since their models included an inventory signal (the INV signal for LT-93/AB-97). Finally, the ALL-except-Services category is defined as the combination of the manufacturing and wholesale-retail-primary-products categories, which is equivalent to the group of firms studied by AB-97 in their table 2, except that AB-97 conditioned their sample of firms by requiring every firm have at least one analyst's forecast for the future earnings type being predicted. This study drops this condition, when not studying analysts' forecast efficiency in Objective 3.

*1.1.3 Hierarchical Regression Using Blocks of Fundamental Signals*

With the added signals identified, the next step is to segregate all of the signals into groups (blocks) for hierarchical regression analysis. With this methodology, it is possible to determine the incremental explanatory/predictive power contributed by each successively added block of signals.  Block 1 is just the current-year change in EPS signal, block 2 is the AB-97 fundamental signals, block 3 is the group of signals added in this study applicable to the firm category being studied, and block 4 is the Operating Leverage signal.  For Manufacturing, the third block is separated into two blocks: block 3 is the group of signals added in this study applicable to the ALL-except-Services and block 4 is the group of signals applicable only to Manufacturing firms, with block 5 the Operating Leverage signal. One-year-ahead EPS change is then regressed on the model as each block of signals is successively added until the all of the signals have been added to make up the full model.  The incremental explanatory power (change in adjusted R-square) provided by each added block of signals is then analyzed.  The same procedure is repeated, regressing long-term growth on the blocks of signals.

Using Hierarchical Multivariate Linear Regression as just described allows one to see the unique contribution to the explanatory power (adjusted R-square) that each block of signals contributes, expressed as a percent of the adjusted R-square of the full-model.  For example, if the adjusted R-square of the full model is .100 and the Adjusted R-square for each block is: current-year EPS change (CHGEPS) = .015; plus the AB-97 signals = .055 (.040 increase); plus the ADDED signals = .090 (.035 increase); and plus Operating Leverage = .100 (.010 increase), then it can be concluded that CHGEPS, AB-97, ADDED and Operating Leverage contribute respectively 15%, 40%, 35% and 10% of the total explanatory/predictive power of the full model.

An advantage of Hierarchical Multiple Regression is that it is one way to deal with multicolinearity among the independent variables (IVs). When a block is added, the increment in adjusted R-square resulting from the added block is based only on the *unique* contribution of the added block of signals that was not already contributed by any of the variables previously added. Adding the blocks in sequence: 1st CHGEPS, 2nd AB-97, 3rd ADDED, 4th Operating Leverage, one is able to see the unique contribution of the AB-97 IVs above that of CHGEPS, the unique contribution of the ADDED IVs above that contributed by CHGEPS and theAB-97 IVs, and the unique contribution of Operating Leverage beyond that of CHEGEPS, AB-97 and ADDED IVs.

*1.1.4 Objective 2–Studying Changes in Fundamental Signals' Relevance during 1991-2008*

Objective 2 is to use the earnings-signals models developed in objective 1 to analyze the yearly incremental R-square changes for 1991 through 2008 for next-year earnings change and 1991 through 2004 for long-term growth. The expectation was that the fundamental signals' overall relevance (measured in adjusted R-square of the full model) increased during the twenty-year period studied, as a result of new FASB standards having improved the relevance of financial statements. It is also hypothesized that Sarbanes-Oxley has improved the relevance of earnings reported in firms' Income Statements, as a result of less earnings management in the post-SOX era vis-à-vis in the pre-SOX era.

*1.1.5 Objective 3–Assess Analysts' Efficient Use of the Fundamental Signals*

Objective 3 is to study security analysts' efficient use of fundamental signals in making revisions to next-year earnings and long-term growth forecasts. It was expected that analysts' efficient use of the fundamental signals increased following regulation FD, due to reduced availability of non-financial statement information that was previously provided through analysts' relationships with firm managers. It is also expected that analysts' efficient use of the fundamental signals increased after the implementation of EDGAR, because EDGAR provided electronic versions of financial statement information that was intended to facilitate the use and analysis of the financial information reported. The AB-97 methodology for assessing security analysts' efficient use of the studied fundamental signals is used, with the following modifications:

1. Use I/B/E/S *detail* analysts' forecast rather than I/B/E/S *summary* analysts' forecasts used by AB-97, because I/B/E/S summary forecasts computed one month after the reference-year earnings announcement date may include analysts' forecasts made prior to this announcement date.

2. When regressing the AB-97 forecast revision dependent variable (FY1+1, FY1+5, LTG+1 or LTG+5) on the fundamental signals studied, use the exact same group of firms as was used for regressing the next-year earnings change (CEPS1) or long-term growth (CEPSL) on the studied fundamental signals. This method allows for a comparison of the adjusted R-squares from the two regressions. If the same signals using the same firms explain the analysts' forecast revisions for next-year earnings with an adjuster R-square that equals or exceeds the adjusted R-square from regressing next-year earnings change on the same signals using the same firms, then it can be inferred that the analysts were completely efficient in their use of the fundamental signals when making their forecast revisions. However, if the adjusted R-square from regressing analysts' forecast revisions on the fundamental signals is less than the adjusted R-square from regressing next-year earnings change (or long-term growth) on the fundamental signals, then the ratio of the first adjusted R-square to the second provides a measure of the analysts' percent utilization of the fundamental signals studied.

# CHAPTER 2

# BACKGROUND AND LITERATURE SEARCH

## 2.1 Prior Research–Fundamental Analysis

Ou and Penman (1989) (OP-89) said Fundamental Analysis uses fundamental information (fundamentals or fundamental signals) in the reported financial statements of a firm to determine the value of that firm. The market value (stock price) may vary from the fundamental value, but will gravitate over time to the value indicated by the fundamentals. However, how to use fundamental values to determine firm value has not been specifically determined. Many accounting and finance textbooks use ratio analysis to indicate such constructs as profitability, liquidity, and turnover, but exactly how the ratios relate to firm value is not specified. OP-89 surveyed the accounting literature and initially identified 68 ratios and other fundamental signals.

To study the relationship of these signals on firm value, OP-89 used binary logistic regression to combine selected fundamental signals into one indicator of whether the next-year earnings would increase or decrease. To do this, OP-89 first processed the 68 initially selected signals in separate univariate logistic regression equations and, from this process, narrowed the signals down to 34 signals that had P-value significance equal to or less than 0.1. These 34 signals are reported in OP-89's table 3. It is from these 34 signals that this study chose the OP-89 signals used in this study's model. OP-89 then used hierarchical multivariate logistic regression to narrow the final model down to sixteen signals. The multivariate logit results of the model indicated whether a given next-year earning change would be + or -. Based on the predictions of the model, OP-89 then created a portfolio of firm's stock and traded in these stocks based on the logistic regression predictions. The adjusted return using the Logit predictions measured over a two-year period was about 7%, supporting the contention that the fundamentals do provide useful information for investors about future earnings, and thus, firm value.

To recap, OP-89 used a statistical search methodology to identify fundamental signals from which they then predicted future returns. Ou and Penman (1989) conclude that fundamental analysis identifies equity values not currently reflected in stock prices. Greig (1992) and Stober (1992) reevaluate the Ou and Penman (1989) and reach a different conclusion. While significant abnormal returns are earned by the hedge portfolio, no significant incremental predictive ability is evident, after controlling for cross-sectional differences in CAPM beta and firm size. They conclude that this value measure predicts future returns, because it proxies for expected returns, not because it captures abnormal returns associated with stock price valuations different from fundamental signal's valuations. Abarbanell & Bushee (1998) say the Ou and Penman (1989) methodology used too many accounting ratios and lack conceptual basis for choosing the financial signals assumed to be related to future earnings. To overcome these weaknesses, Lev and Thiagarajan (1993) ("LT-93") introduce 12 financial signals claimed by analysts in their writings to be the signals used by analysts in valuating securities.

Lev Thiagarajan (1993) (LT-93), like OP-89, also tested the value relevance of fundamental signals, but rather than using a statistical search methodology for signals, LT-93 used the fundamental signals that security analysts said in their pronouncements that analysts use in forming their forecasts and recommendations. Thus, the selection of the signals to use in the LT-93 study was expert guided. The twelve fundamental signals that LT-93 used were:

1. Inventory
2. Accounts Receivable
3. Allowance for Doubtful Accounts (removed)
4. Gross Profit
5. Adverse or Qualified Audit Reports
6. Use LIFO for Inventory Valuation
7. Orders Backlog (removed)
8. R&D (removed)
9. Labor Force
10. Income Tax Rate
11. Selling and Administrative Expenses
12. Capital Expenditures

The following quote from their article shows LT-93 found some of the fundamental signals above to be not generally applicable to most firms: "In table 3 the author reported estimates from a much larger sample, roughly 500-600 firms per year, where the data requirements for R&D, provision for doubtful receivables, and order backlog were removed. These three fundamentals caused the largest loss of firms in the restricted sample (e.g., order backlog was reported by only 35% of the sample firms). This larger sample is quite representative, including firms from practically every four-digit industry on Compustat, except electrical utilities and finance companies. When LT-93 regress abnormal stock returns on change in current earnings and the nine remaining fundamental signals, they found the fundamental signals added the explanatory power (adjusted R-square) by about 70% over the explanatory power of the traditional price-earnings model without the fundamental signals. In table 3 (value-relevance of fundamental signals: full sample), LT-93 reports the following adjusted R-square values from regress returns on current year pre-tax earnings and their nine fundamental signals:

| Year | Adj. R-Square |
|---|---|
| 1983 | 0.19 |
| 1984 | 0.17 |
| 1985 | 0.13 |
| 1986 | 0.15 |
| 1987 | 0.18 |
| 1988 | 0.39 |
| Average: | 0.20 |

Only the six latest years of the LT-93 study are shown, since these years were also part of the AB-97 study that covered 1983-1990. AB-97 used these same nine fundamental signals in their model, except that AB-97 modified the definition of effective tax rate (ETR). As reported later on in this research, the author replicates the AB-97 model.

| Year | Adj. R-Square | OBS Count |
|---|---|---|
| 1983 | 0.10 | 330 |
| 1984 | 0.10 | 380 |
| 1985 | 0.25 | 427 |
| 1986 | 0.10 | 492 |
| 1987 | 0.04 | 501 |
| 1988 | 0.07 | 577 |
| Average: | 0.11 | 451 |

Adjusted R-Square values for AB-93 should be different than the corresponding LT-93 values, because the LT-93 dependent variable is annual excess stock returns whereas the AB-93 dependent variable is one-year-ahead earnings (CEPSI). Yet, there are some similarities between the AB-97 and LT-93 results. Lt-93's roughly 500-600 firms per year is not too far off AB-97's average 451 firms per year, and LT-97 average adjusted R-square of 0.20 is comparable to AB-97's average R-square of 0.11.

LT-93 said fundamental signals are better than time series models for determining the earnings response coefficient (ERC), growth, and persistence of earnings. Comparison of the adjusted R-square of the full model with those of the benchmark indicates that the signals contributed significantly to the explanation of excess return variance, beyond reported earnings. In almost every year, the adjusted R-square of the full model is larger than that of the benchmark and, in some years, substantially so. Most of the large R-square differences between the full and benchmark models occur in the 1980s, where the average improvement in R-square is about 70%. A partial-F test indicates that the combined incremental contribution of the fundamental signals over earnings to the explanation of cross-sectional return variability is statistically significant (.05 level) in every year.

Abarbanell Bushee (1997) (AB-97) writes that a better test of the informativeness of the fundamental signals is to show how well the signals predict future earnings. According to AB-97, the fundamental signals should be used to predict/explain future earnings, not security returns, since that is a truer test of the economic intuition that went into the original construction of the fundamentals. 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
2. Accounts Receivable
3. Gross Profit
4. Adverse or Qualified Audit Reports
5. Use LIFO for Inventory Valuation
6. Labor Force
7. Effective Tax Rate
8. Selling and Administrative Expenses
9. Capital Expenditures

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. AB-97 regressed security analysts' one-year earnings forecasts on earnings and nine fundamental signals, and found gross margin (GM), effective tax rate (ETR), and labor force cost (LF) had OLS estimated coefficients that were significant at alpha = .05. Other fundamental signals such as inventory, accounts receivable, and use of LIFO were not significant in the relationship between SA Forecast earnings and current earnings and the fundamental signals. In section 3.2, AB-97 states, "We find that the fundamental signals have incremental explanatory power, relative to current-year earnings. The average R2 of the regressions of future earnings on the signals and current earnings is approximately .16, compared to an average R2 of .07 for regressions of one-year-ahead earnings changes on current earnings changes (not reported in the table)." In the replication of AB-97's table 2 results, the author obtained an average R-square of .11, as compared to AB-97's .16 for one-year-ahead earnings.

The section titled "4.1.10 Results Obtained from Replicating AB-97" in objective 2: Studying Changes in Fundamental Signals' Relevance (1991-2008) that follows, provides a description of replication results, and gives reasons that may explain the .06 difference in R-square. Regarding the security analysts' efficient use of the fundamental signals, AB-97 found that security analysts use some but not all of the fundamental information available when they make their earnings forecasts revisions.

Also, AB-97 regress SA-one-year-ahead-annual-earnings forecast on current earnings and the fundamental signals, in order to assess how efficiently security analysts use the fundamental signals when they make their forecast revisions just after the current year financial information is made available. This proposal's table 1 contains the AB-97 definition for all of the dependent variables used in this study, including the dependent variable that AB-97 used to study analysts' efficient use of fundamental signals, which is the "One-Year-Ahead Forecast Revision" or "$FY1^{+1}$.". The methodology developed by AB-97 defines $FY1^{+1}$ = $[[F_{t+1}^{+1} - EPS_t] - [F_{t+1}^{-11} - F_t^{-11}]$, where $F_{t+1}^{+1}$ is the consensus analysts' one-year earnings (EPS) forecast for a given firm announced one month after the date when the year t (current or reference year) financial statements were released. $EPS_t$ is the actual EPS reported by the firm for the reference year t. $F_{t+1}^{-11}$ is the consensus analysts' forecast for the next-year (year t+1) EPS, announced eleven months prior to the actual date of the release of the current year t financial statements. $F_t^{-11}$ is the consensus analysts' forecast for the current year t EPS, announced eleven months prior to the actual date of the release of the current year t financial statements. This dependent variable is intended to measure analysts forecast revisions for next year earnings. AB-97 found that SA do use some (but not all) of the fundamental signals (financial statement data) in making their forecasts. AB-97 also assesses the analysts' efficient use of fundamental signals in making long-term growth forecast revision just after the current year financial statements are released. AB-97 regresses the dependent variable "long-term growth forecast revision" or $LTG^{+1} = F_{ltg}^{+1} - F_{ltg}^{-11}$. $F_{ltg}^{+1}$ is the analysts' consensus summary forecast for long-term growth made one month after the current-year earnings announcement date, and $F_{ltg}^{-11}$ is the analysts' consensus summary forecast for long-term growth made eleven months before the current-year earnings announcement date.

Abarbanell Bushee (1998) (AB-98) develop an investment strategy that depends upon the ability of the LT-93 fundamental signals to generate abnormal returns as future earnings are realized. They provide evidence that fundamental analysis improves the prediction of earnings by showing that the abnormal return to the strategy is strongly associated with one-year-ahead earnings changes. In addition, AB-98 show their results are not closely related to abnormal returns associated with book-to-market or firm size, which proxy for risk. Hence, risk may not be a complete explanation for the abnormal returns they studied.

Piotroski (2000) studied fundamental signals' association with future stock price adjustments for a sample of value stocks with high Book-to-Market value, and find that less than 44% of all high Book-to-Market companies earn positive market-adjusted returns in two years following portfolio formation. The results indicate that investors use the reported fundamentals to evaluate whether a company will ultimately be a strong or weak company. Using nine fundamental signals relating to three areas of the firm's financial condition: profitability, financial leverage, liquidity and operating efficiency, they classify firms in ten portfolios depending on the signals' implication for future prices and profitability. Their results show that the mean returns earned by a high book to market investor can be increased by at least 7.5% annually through the selection of financially strong high Book-to-Market firms. In addition, an investment strategy that invests in expected winners and shorts expected losers generates a 23% annual return. Like AB-97 and AB-98, their results support the ability of fundamental signals to predict future firm performance. Firms classified as weak based on their fundamental signals have lower future earnings realizations and are five times more likely to encounter business failure, as measured by performance-related delisting, than strong firms.. Moreover, approximately 1/6 of total annual return difference between ex-ante strong and weak firms is earned over just twelve trading days of quarterly earnings announcement. These evidences suggest that the market fails to efficiently incorporate past accounting information into stock prices.

Guthrie (2006) demonstrated that increases in operating leverage can be associated with reductions in expected rate of return, thereby contradicting the teachings found in textbooks that operating leverage and the expected rate of return should be positively related. As Guthrie says, "All that is required to overturn the usual result is to allow the firm to cease operations if it becomes sufficiently unprofitable."

Elleuch and Trabelsi (2009) studied whether fundamental signals strategy based can predict stock returns and shift the distribution of returns earned by an investor by separating eventual winners stocks from losers. Results showed that fundamental signals can be used to improve the entire distribution of future returns earned by an investor. Their results show that fundamental signals have a positive and significant correlation with future earnings performance.

Shen and Lin (1993) find that stock returns respond differently in different levels of governance. The beneficial response is greater in the strong governance firms than in the weak ones.

Fairfield and Whisenant (2009) document that the analysts who are with the Center for Financial Research and Analysis (CFRA) identify firms whose operating performance is expected to deteriorate significantly in the coming year. Firms identified by CFRA deliver significantly lower operating performance in the year following the report release.

Zhang and Yang (2009) study the association between six of the LT-93/AB-97 fundamental signals and the future one-year ahead accounting earnings. However, they do not study the association between fundamental signals and long-term growth, and they do not add "new" signals to those used by LT-93/AB-97. Factor analysis employed to summarize the selected six LT-93/AB-97 fundamental signals into three factors: profitability, investment and labor. The results show their fundamental signal factors significantly explain the one-year-ahead future earnings and one-year-ahead earnings per share.

Brown (2007) showed that in the first three quarters of the fiscal year, managers have more opportunity for earning management (EM), because quarterly reports are not audited by the external auditors. However, in the fourth quarter, when the external auditors are auditing the annual financial statements, the opportunities for EM are constrained by the independent audit. Hence, managers turn to forecast guidance whereby they attempt to influence security analysts to lower the analysts' earnings forecast. The managers guide analysts forecasts lower through their relationships with the analysts, because the annual audit constrains EM to raise earnings. Brown (1987) found that security analysts (SA) quarterly forecasts are more accurate than time series (TS) models. One reason for this is that analysts have access to more information than just the prior earnings. The TS ARIMA univariate (random walk) of earnings provides a forecast of future earnings based on past (random walk) of prior earnings. But it has been shown that the SA use much more than just the prior earnings reports. Taffler 2004 found evidence that security analysts (SA) under react to the fundamental signals in the financial statements.

Following the publication of the AB-97 study, the Enron and other scandals lead to the passage of the Sarbanes Oxley Act (SOX) in July 2002. Since 2002, many studies have examined the impact of SOX and other regulatory requirements on the qualities (relevance, reliability, verifiability, independence) of financial information (which include the fundamental signals such as sales, selling and administrative expenses, and inventory reported in the published financial statements) used by investors and security analysts. Some studies have found evidence supporting the claim that the quality of accounting information has increased with SOX. Bedard (2006) examined firms that performed a Section 404 internal control assessment and found that there was a significant decrease in the number of unexpected accruals, providing evidence of greater reliability of financial statements in a firm's first year of Section 404 controls.

Cohen, Dey, and Lys (2007) found that, whereas accrual-based earnings management increased steadily from 1987 until the passage of 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. (Now entitled “Real and Accrual-based Earnings Management in the Pre- and Post-Sarbanes Oxley Periods,” this Working paper was originally entitled in 2004 as “The Effect of the Sarbanes Oxley Act on Earnings Management: What Has Changed?” A 2005 version was entitled “Trends in Earnings Management and Informativeness of Earnings in the Pre- and Post-Sarbanes Oxley Periods.”) Bartov and Cohen (2007) found a significant decrease in companies meeting or beating analyst expectations by adjusting accruals and undertaking expectations management. (The author’s own presentation on October 28, 2009 reported a significant decrease in the frequency of 802 firms studied in meeting or beating analysts' quarterly earnings forecasts in the post SOX era vis-à-vis the pre-SOX era.) Gordon, Loeb, Lucyshyn, and Sohail (2006) find that companies have increased their voluntary disclosure of information security activities. With information security defined to include computer-based systems security related to protecting the confidentiality, integrity, and availability of information, the authors find strong indirect evidence that corporate information security activities are receiving more focus since the passage of SOX than before SOX was enacted.

Published just prior to SOX, the Bartov, Givoly and Hayn (2002) study provides support that for the notion that the decline in earnings management could inhibit managers' ability to signal their private information about future earnings by finding that firms who meet or beat expectations have higher future operating performance. The authors find that firms that meet or beat current analysts' earnings expectations (MBE) enjoy a higher return over the quarter than firms with similar quarterly earnings forecasts errors that fail to meet these expectations. This premium to meeting/beating forecasts is achieved, although somewhat smaller, where earnings or analysts' expectations were managed.

Some studies have found evidence that SOX has not resulted in increased quality of accounting information. Begley Cheng and Gao (2009) examined how governance and regulatory reforms surrounding the SOX affected analysts' information environment, specifically the quality of financial analysts' common and private information, using information quality measures based on characteristics of financial analysts forecasts as developed in Barron, Kim, Lim and Stevens (1998). They find that

SOX caused a temporary increase in the quality of public information, but that this increase vanished after one year and that overall quality has since remained below pre-SOX levels. “These results suggest that overall, financial analysts have not experienced an increase in their information quality as measured by the characteristics of their forecasts.” They posit that this result is caused by Section 304 disclosure penalties that motivate managers to disclose less information, even though the precision of the information that is disclosed has increased. Koh, Matsumoto, and Rajgopa (2007) find that although the use of accrual-based earnings management has declined in the post-SOX era, it seems to have been largely replaced by management of expectations about earnings. “In the post-scandal period, firms meet or just beat analysts’ forecasts less often. Managers rely less on income-increasing discretionary accruals and more on earnings guidance.” Williams, DaDalt, Sun, and Yaari (2008) used a sample of earnings announcements for firms that habitually meet/beat analysts’ forecasts between 1999 and 2004, and found that the incidence of expectations (earnings) management decreased following the enactment of regulation FD and Sarbanes Oxley. (The authors state, “The enactment of Regulation Fair Disclosure limited the firms’ private access to analysts and therefore increased the cost of managing expectations. The passage of the Sarbanes-Oxley Act of 2002 likewise, increased the costs associated with managing earnings.”)

In addition, the authors found that the market reactions to meeting/beating earnings expectations (MBE) achieved through managing expectations declined significantly following the enactment of Regulation FD, but not to MBE achieved by managing earnings following the enactment of the Sarbanes-Oxley Act. "We have examined firm's use of strategies to MBE during a period spanning two significant regulatory changes, Regulation FD and SOX. Results demonstrate how increases in the costs associated with earnings and expectation management change both managements' choice of and capital markets' reaction to different meet/beat expectations (MBE) strategies. Specifically, it was found that the number of firms that MBE via managing expectations sharply declined in the year Regulation FD was enacted, with a similar pattern for firms that MBE via managing earnings around the enactment of SOX. This pattern is consistent with regulatory changes resulting in increases in the costs associated with using these strategies. It is argued that there are two types of firms that MBE: strong firms and weak firms. Using a sample of firms that habitually use MBE, evidence is found that the market's ability to distinguish between the two groups has improved over time. While significant changes were found in the market reactions to expectations management around the enactment of Regulation FD, a statistically insignificant change was found in the reaction to earnings management following the passage of SOX. Brown and Pinello (2007) report that managers play earnings surprise games to avoid negative earnings surprises by managing earnings upward or by managing analysts' earnings expectations downward. The authors investigate the effectiveness of the financial reporting process at restraining earnings surprise games. Because the annual reporting process is subject to an independent audit and more rigorous expense recognition rules than interim reporting, it provides managers with fewer opportunities to manage earnings upward. The authors find that, relative to interim reporting, annual reporting reduces the likelihood of income-increasing earnings management and, to a lesser extent, of negative surprise avoidance, but increases the magnitude of downward expectations management. The authors' findings suggest that regulatory attempts to monitor corporations' internal checks and balances are likely to be more effective at curbing upward earnings management than at mitigating negative surprise avoidance.

### 2.2 Sarbanes-Oxley Act

The Sarbanes-Oxley Act (Public Company Accounting Reform and Investor Protection Act, July 30, 2002, Public Law 107-204 US–referred to as SOX) has had a significant and far-reaching impact on controls over financial reporting. For example, Section 302 requires reporting companies' CEOs and CFOs to certify (1) the accuracy of their company's periodic financial reports (including quarterly reports) and (2) the reliability of their company's internal control systems relating to financial statements and general disclosures. Also, Section 906 contains criminal sanctions for violations of these requirements. Section 304 states that executives must forfeit their equity and incentive-based bonuses and profits when their company is required to "prepare an accounting restatement due to the material noncompliance of the issuer, as a result of misconduct, with any financial reporting requirement under the securities law." Section 404 requires that companies prepare an internal control report containing an assessment of the effectiveness of the internal control structure and procedures of the issuer for financial reporting and that the company's external auditors attest to and report on this assessment. Under Sections 302 and 404, the senior management of companies is required to report to the SEC any material weaknesses in their company's internal controls. In addition, Section 301 requires that all public companies establish independent audit committees consisting entirely of independent directors, and that this committee is provided with independent legal counsel. The independent audit committee is given direct responsibility for the appointment, compensation, and oversight of the work performed by their company's independent auditors.

### 2.3 Regulation Fair Disclosure (FD)

Regulation Fair Disclosure is an SEC ruling that was implemented in October 2000. It mandates that all publicly traded companies must disclose material information to all investors at the same time. Regulation FD fundamentally changed how companies communicate with investors and analysts by bringing better transparency and more frequent and timely communications. Following the enactment of this regulation, most of the corporate announcements have been issued in press releases or during conference calls and are summarized at websites.

### 2.4 EDGAR

The EDGAR is a system mandated by the SEC for automating the collection, validation, indexing, acceptance, and forwarding of public companies' financial information, including the quarterly (Form 10-Q) and annual (Form 10-K) financial statements filed with the SEC. The SEC requirement for using EDGAR was phased in over a three-year period ending 6 May 1996, by which time all public domestic companies have been required to submit their filings via EDGAR, except for hardcopy paper filings, which were allowed under a hardship exemption.

In June 1999, the SEC began accepting live filings submitted to EDGAR in Hypertext Markup Language (HTML) as well as documents submitted in American Standard Code for Information Interchange (ASCII) format. HTML is a language for describing web pages. It is not a programming language; rather, it is a markup language consisting of a set of markup tags used to describe web pages. Because HTML documents contain HTML tags and plain text that describe web pages, HTML documents are also called web pages. A web browser such as Internet Explorer reads HTML documents and displays them as web pages. The browser does not display the HTML tags, but uses the tags to interpret the content of the page. HTML does not provide users with a machine-readable form of the displayed data. Hence, users cannot automatically download HTML-displayed data into their computers and must copy and paste or hand-key the data from the HTML web page into spreadsheets, tables or files stored in their computers.

In April 2000, the SEC issued Release No. 33-7855 adopting amendments to existing rules and reforms to reflect changes in filing requirements resulting from the implementation of the next stage of EDGAR modernization. The rules provide for use of the Internet as a means of filing, acceptance of HTML documents with graphic and image files, and expanded use of hyperlinks. These features became available on the system on May 30, 2000. The EDGAR system accepts both ASCII and HTML documents as official filings. As of 4 November 2002, the SEC required all foreign companies to use EDGAR in filing their financial reports with the SEC. However, this study will be limited to US firms.

# CHAPTER 3

# HYPOTHESIS DEVELOPMENT

During the past two decades, the FASB has enacted and amended accounting standards within the guidance set by the Concept Statements. One of the objectives, stated in the Concept Statements, is that general accounting information be relevant to predicting firms' future performance. Therefore, it is hypothesized that the earnings-relevance of financial statement information in helping users of the financial statements to predict firms' next-year earnings changes has increased during 1991-2008. Hence, Hypothesis 1:

## 3.1 Hypothesis 1

1a The predictive/explanatory power of the full model of fundamental signals used in this research to predict future one-year ahead accounting earnings changes significantly increased during 2000-2008 as compared to 1991-1999

1b Same as 1a above, except for long-term (five-year) growth during 1998-2004 as compared to1991-1997.

A "concepts-guided" approach was used in this research to identify the "added" fundamental signals that were included along with the AB-97 signals in the full model. In contrast, LT-93 used an "expert-guided" approach, whereby the fundamental signals were selected based upon what security analysts mentioned using in their writings. The AB_97 signals were essentially a subset of the same signals used by LT-93, so the AB-97 signals were also identified based on "expert-guidance." It is hypothesized that the "concepts-guided" search can identify fundamental signals that significantly increase the explanatory/predictive power above that provided by just the signals identified through “expert guidance.” Hence, Hypothesis 2:

### 3.2 Hypothesis 2

2a Adding the block of fundamental signals identified in this study using the guidance of fundamental financial and managerial/cost accounting concepts can significantly increase the explanatory/predictive power of earnings-signals models that predict one-year-ahead EPS change with just those metric fundamental signals identified in prior research (LT-93 and AB-97) using the guidance of experts (security analysts).

2b Same as 2.a above, except for long-term (five-year) growth

The Sarbanes-Oxley Act of 2002 (SOX) brought about far reaching improvements in the system of internal controls over publicly-traded firms’ financial reporting systems. These control improvements likely reduced earnings management activities and improved the representational faithfulness (completeness and accuracy) of public firms’ general purpose financial statements. With less earnings management, current-year earnings should have become more relevant in predicting next-year earnings and long-term growth in the post-SOX era vis-à-vis the Pre-SOX era. Hence, Hypothesis 3:

### 3.3 Hypothesis 3

3a As a result of SOX, the earnings relevance of change in current-year earnings (CHGEPS) in predicting next-year earnings change (CEPS1) significantly increased in the post-SOX era vis-à-vis the Pre-SOX era.

3b Not performed for long-term growth, since 2004 is as far as the data would allow for assessing long-term growth.

With the SEC mandate to use EDGAR electronic filings starting in the mid 1990s, users of the financial statements had access to electronic versions of the financial statements during the post EDGAR era (1996 and after) that were not available in the pre-EDGAR period studied (1991-1995). The electronic financial statements should have improved security analysts' efficient use of the financial statements by facilitating analysts' access to the electronically-displayed financial statement information. Analysts should have more timely access to financial statement information with EDGAR as compared to before EDGAR. Hence, Hypothesis 4:

### 3.4 Hypothesis 4

4a In the post-EDGAR era, security analysts more efficiently utilized the studied fundamental signals in making their one-year-ahead EPS forecast revisions vis-à-vis in the pre-EDGAR era."

4b Same as Hypothesis 4a, except for long-term (five-year) growth forecast revisions.

Regulation FD placed limits on the communications that analysts could have with the managers of the firms whose future earnings they were forecasting. Therefore, security analysts should have used Financial Statement information more after Regulation FD, as an alternative source of information in lieu of the information they were receiving from management prior to Regulation FD. Hence Hypothesis 5:

### 3.5 Hypothesis 5

5a In the post-Regulation FD era, security analysts more efficiently utilized the studied fundamental signals in making their one-year-ahead EPS forecast revisions vis-à-vis in the pre-regulation FD era.

5b Same as Hypothesis 5a, except for long-term (five-year) growth forecast revisions.

In addition to these five hypotheses, there is also a hypothesized expectation for each of the Added fundamental signals about how each signal should be related to next-year earnings change and to long-term growth. For ease of readability, these hypothesized expectations are stated within the discussion of the results for each added fundamental signal. For each added signal, the concepts guidance that led to the addition of the signal in this study is discussed, and the expected results are hypothesized. Then, the results are presented and the results are compared to the hypothesized expectations.

# CHAPTER 4

# METHODOLOGY

## 4.1 Objective 1: Building an Improved Earnings-Signals Model

### *4.1.1 A Concepts-Guided Search to Identify Added Signals*

The FASB Statements on Financial Accounting Concepts was the overarching guidance for developing or identifying the "added" fundamental signals included along with the AB-97 fundamental Signals in the full models used in this research. In addition, the KWK textbook was used as the representative accounting principles textbook commonly used in college and university first-year accounting courses. Finally, the information on fundamental analysis contained in accounting and finance journal articles was also used as a source of guidance in identifying added signals.

### *4.1.2 Statistical Analysis*

Ordinary Least Squares (OLS) Multivariate Linear Regression was used to regress each dependent variable ("DV"= "next-year EPS change" or "long-term growth") on the independent variables ("IVs" or fundamental signals) for each category of firms (All-except-Services, Manufacturing, Wholesale-Retail-Primary-Products, and Services). Next-year earnings change was regressed on the studied fundamental signals for every year from 1991 through 2008, and long-term growth was regressed on these same signals for every year from 1991 through 2004. The adjusted R-square from each regression represented the explanatory/predictive power of the model tested. The regression beta for each IV (fundamental signal) is reported as an estimate of the IV's sign to indicate whether the relationship with the DV is direct (positive) or indirect (negative). The p-value is reported for each IV as an indication of the IV's significance in predicting the DV.

Hierarchical OLS multivariate linear regression is used to analyze the incremental increase in adjusted R-square provided by each block of signals added to build the full model. The model blocks are (1) change in current-year EPS, (2) change in current EPS plus the AB-97 metric fundamental signals, (3) the signals in block 2 plus the added signals applicable to the category of firms evaluated, (4) for manufacturing category only, the fundamental signals applicable only to manufacturing firms, and (5) the operating leverage signal. The explanatory power of the model blocks was measured using adjusted R-square from the OLS regressions, and the incremental contribution of each block of signals was measured by the significance of the change in R-square when the block of signals is added to the model, as well as by the percent of the full model's adjusted R-square contributed by the added block of signals.

### *4.1.3 Data Source*

All of the financial statement data used in this study was obtained exclusively from the Wharton Research Data Services (WRDS) Compustat "North America Fundamentals Annual - updated monthly." All of the security analysts' forecast data was obtained from WRDS I/B/E/S "Detail History - Detail File with Actuals." The Compustat data was not complete for 2010 at the time of the study, and hence 2009 was the latest year with complete data. Since the models using next-year EPS change require complete data one year in advance of the reference year, 2008 was the latest reference year that could be studied for next-year EPS change. Likewise, since computing long-term growth requires an annual EPS value five years in the future, 2004 was the latest year for which long-term growth could be studied. 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. This research was restricted to publicly traded North American firms who's annual financial statement information was recorded in Compustat.

*4.1.4 Removing the Extreme Values from the Fundamental Signals*

LT-93 states, "Given some extreme values of the fundamental signals, mainly due to small denominators in the percentage change computation, we eliminated the extreme 1% of each fundamental signal. Analysis of the regression residuals indicated existence of some outliers. Based on an analysis of residual (greater than three) and Cook's D statistic (greater than one), these were removed." (LT-93, page 199, footnote 13) AB-97 states, "Because small denominators in the measurement of the signals can lead to extreme values, we followed the same truncation and outlier analysis procedures as Lev and Thiagarajan [1993]." (AB-97, footnote "d" to table 2, page 5)

In this study, first, all firms with a dependent variable (DV) or an independent variable (IV) that has a univariate standardized t value greater than +3 or less than -3 were excluded. Then, for the remaining firms, the Mahalanobis Distance was computed for the multivariate independent variables (IVs) taken together, and firms were excluded that had a Chi-square probability less than or equal to .001, with parameters being the Mahalanobis Distance and the number of IVs used in the regression. This conservative approach was expected to provide more consistent results throughout the years studied, by excluding the effects of the minority of firms with "extreme values." The goal was to determine results and conclusions that would be generally applicable to the majority of firms.

One exception to the above was that, in the study of analysts' efficient use of the fundamental signals, the forecast revision DVs (FY1+1, FY1+5, LTG+1 and LTG+4) did not have their values with standardized t values greater than +3 or less than -3 excluded, when regressed on the same firms used to predict the future earnings DVs (CEPS1 and CEPSl). The future earnings DVs received this treatment for each firm, but the corresponding forecast revision DV for the firm did not. This approach allowed the forecast revision DV and future earnings DV to be regressed on the same firms, thereby allowed the ratio of the adjusted R-square values from the two regressions to be computed as a measure of analysts' efficient utilization of the fundamental signals.

*4.1.5 Dependent Variables*

The AB-97 Dependent Variables (DVs) used in this study are exactly the same as defined by AB-97 (defined in table 1 of AB-97), except that this study revises the period for collecting long-term growth forecasts from one to three months, and IBES Detail forecasts are used rather than Summary forecasts. The period for collecting long-term growth forecasts was extended from one to three months, in order to more likely capture at least one long-term growth Detail forecast. In addition, this study introduces a new DV, "Experimental" long-term growth (EXP_CEPSL), which includes the firms that had a net loss in either the current year or in the five-years-ahead year.

The DVs are generally defined as follows.

CEPS1 = Change in one-year ahead EPS, used exactly as defined in AB-97

CEPSL = Long-Term Growth over a five-year horizon, computed using the geometric mean growth rate formula, exactly as defined in AB-97. In this study, this DV is called “Conventional CEPSL”, because it is computed using only positive values for EPS in the current year and only positive values of EPS in the five-years-ahead year in the geometric mean growth rate formula. This variable is how long-term growth has been computed in prior research.

EXP_CEPSL = “Experimental” Long-Term Growth over a five-year horizon. This DV is introduced in this study as a revision to Conventional CEPSL. This DV is computed with the same geometric mean growth rate formula used to compute Conventional CEPSL, but the calculation permits either negative or positive values for EPS in the current year and in the five-years-ahead year. This study shows the results using both the Experimental CEPSL and the Conventional CEPSL, whenever long-term growth results are reported. By allowing negative EPS values, the Experimental CEPSL is able to study how the fundamental signals may predict future long-term performance for firms that have a loss in the current year and/or in the five-years-ahead year. These firms are excluded when using Conventional CEPSL.

FY1 = Analysts’ revisions of their next-year EPS forecasts. This variable is defined in this study exactly as defined by AB-97 in their table 1. The “FY1+1” DV compares the analysts’ next-year EPS forecasts made during the month beginning one month after the current-year earnings announcement date to the analysts’ next-year EPS forecasts made for the same firms during the month that started eleven months prior to the current-year earnings announcement date. The "FY1+5" DV compares the analysts' forecasts made during the month beginning five months after the current-year earnings announcement date to the analysts' forecasts made for the same firms during the month that began seven months prior to the current-year earnings announcement date.

LTG = Analysts' revisions of their long-term forecasts. The "LTG+1" DV compares the analysts' long-term growth forecasts made during the three-month period beginning one month after the current-year earnings announcement date to the analysts' forecasts made for the same firms during the three-month period beginning eleven months prior to the current-year earnings announcement date. The "LTG+4" DV compares the analysts' long-term growth forecasts made during the three-month period beginning four months after the current-year earnings announcement date to the analysts' long-term growth forecasts made for the same firms during the three -month period beginning eight months prior to the current-year earnings announcement date. In this study, the period for collecting analysts' long-term growth forecasts has been revised from AB-97's one month period to a three-month period. This change was made, because this study uses Detail IBES forecasts rather than the Summary IBES forecasts used by AB-97, and a three-month interval is required to more consistently retrieve least one long-term forecast for the +1, -11, +4 and -11 timeframes. (Note: "LTG+4" takes the place of AB-97's "LTG+5.")

Table 1 provides the formula for each dependent variable and indicates the Compustat and IBES items used in each formula.

Table 1
Dependent Variables

| | |
|---|---|
| One-Year-Ahead Earnings (CEPS1)<br><br>Exactly as defined in AB-97 table 1. | (ADJ_EPS_Tplus1 - EPS_T) / prcc_f_Tminus1 where<br><br>ADJ_EPS_Tplus1 = (ajex_T / ajex_Tplus1) * EPS_Tplus1 and prcc_f_Tminus1 is the Compustat item "prcc_f" for the closing stock price for the prior (t-1) year<br><br>EPS_Tplus1 is Compustat item "epspx" for the one-year future (t +1) year<br><br>EPS_T is Compustat item "epspx" for the current (t) year<br><br>ajex_T and ajex_Tplus1 are Compustat item "ajex" for the current year and next future year respectively |
| Long-Term Growth in Earnings (CEPSL)<br><br>Exactly as defined in AB-97 table 1. | Geometric Mean Growth Rate = (((ADJ_EPS_Tplus5 / EPS_T) ^ 0.2) - 1) where<br><br>EPS_Tplus5 is Compustat item "epspx" for the future-year future (t +5) year<br><br>EPS_T is Compustat item "epspx" for the current (t) year |
| One-Year-Ahead Forecast Revision ( $FY1^{+1}$) and ( $FY1^{+5}$ )<br><br>As defined in AB-97 table 1, except the one-month average of the Detail IBES forecasts is used instead of the Summary IBES forecast. | $FY1^{+1} = [F_{t+1}^{+1} - EPS_t] - [F_{t+1}^{-11} - F_t^{-11}]$ and then divide this expression by prcc_f_Tminus1.<br><br>$F_t^{+1}$ is the forecast of earnings issued in month +1 relative to the year t earnings announcement and t is the current year.<br><br>$FY1^{+5} = [F_{t+1}^{+5} - EPS_t] - [F_{t+1}^{-7} - F_t^{-7}]$ Where $F_t^{+5}$ is the forecast of earnings issued in month +5 relative to the year t earnings announcement and t is the current year. |
| Long-Term Growth Forecast Revision<br><br>( $LTG^{+1}$ ) and ( $LTG^{+4}$ )<br><br>As defined in AB-97 table 1, except a three-month average of the Detail IBES forecasts is used instead of the Summary IBES forecast taken from one month. | $LTG^{+1} = F_{ltg}^{+1} - F_{ltg}^{-11}$<br><br>where $F_{ltg}^{+1}$ is the average of analysts' detail forecast for long-term growth made during the 90-days beginning one month after the current-year earnings announcement date, and $F_{ltg}^{-11}$ is the average of analysts' detail forecast for long-term growth made during the 90-days beginning eleven months before the current-year earnings announcement date<br><br>$LTG^{+4} = F_{ltg}^{+4} - F_{ltg}^{-8}$<br><br>where $F_{ltg}^{+4}$ is the average of analysts' detail forecast for long-term growth made during the 90-days beginning four months after the current-year earnings announcement date, and $F_{ltg}^{-8}$ is the average of analysts' detail forecast for long-term growth made during the 90-days beginning eight months before the current-year earnings announcement date. |

*4.1.6 More on Experimental CEPSL Introduced in This Study*

In replicating AB-97's long-term growth results reported in their table 2, it appeared that AB-97 did not allow for either the numerator (ADJ_EPS_Tplus5) or denominator (EPS_T) to be negative. If true, this restriction is understandable; because at least some software applications will not process the fifth root of a negative number. For example, 2007 Microsoft Access Modules with Visual Basic (used for data processing in this study) will not allow the computation of the fifth root of a negative number. This restriction is important, because some firms will have a net loss in either the current year or in the five-years-ahead year, and these firms are excluded when using Conventional CEPSL. In this study, Microsoft Excel was used to circumvent this problem. Microsoft Excel is able to compute the geometric mean growth rate expression for CEPSL, when either current-year EPS or the adjusted five-hear-ahead EPS are negative, when there is an odd number of future years. After downloading the selected Compustat data into a Microsoft Access Table, the table data was then exported to a Microsoft Excel spreadsheet. Excel formulas were then defined to compute Experimental CEPSL (the "CEPSL" column), as shown in figure 1. With all of the firms' Experimental CEPSL values computed, the Excel spreadsheet was then imported into a new Access Table. Figure 1 contains actual EPS values for 1989 and 1994 for the seven companies listed. These seven examples illustrate all of the possible combinations of different signs for 1989 and 1994 EPS values in the CEPSL computation, as well as increases or decreases in EPS from 1989 to 1994 when both years' EPS values have the same sign.

| Company Name | 1989 EPS | Adjusted 1994 EPS | CEPSL with bad sign | CEPSL with correct sign but "-1" | CEPSL | Check |
|---|---|---|---|---|---|---|
| ESSAR STEEL ALGOMA INC | -0.13 | 4.85 | -3.062337208 | 3.062337208 | 3.062337208 | 4.85 |
| ENERGY FUTURE HOLDINGS CORP | 4.44 | 2.4 | -0.115769168 | -0.115769168 | -0.115769168 | 2.4 |
| TNP ENTERPRISES INC | 1.9 | -1.7 | -1.978000471 | -1.978000471 | -1.978000471 | -1.7 |
| BUFFETS HOLDINGS INC | 0.59 | 2.13 | 0.292723127 | 0.292723127 | 0.292723127 | 2.13 |
| STREAMLOGIC CORP | -4.31 | -2.03 | -0.139791453 | 0.139791453 | 0.139791453 | -2.03 |
| BIOJECT MEDICAL TECHNOLOGIES | -0.32 | -0.43 | 0.06087373 | -0.06087373 | -0.06087373 | -0.43 |
| AUTODIE CORP | 1.05 | 0 | -1 | -1 | 0 | 0 |

Figure 1
Examples of Experimental Long-Term Growth ("Experimental CEPSL") Computations

The "CEPSL" column in figure 1 is Experimental CEPSL. In figure 1, if Conventional CEPSL were used, then only two of the companies, "ENERGY FUTURE HOLDINGS CORP" and "BUFFETS HOLDINGS INC." would be studied, because only these two firms have a positive EPS in both 1989 and 1994. For these two firms, the Conventional CEPSL is the same as the Experimental CEPSL.

The computation of Experimental CEPSL (the "CEPSL" column in figure 1) is now explained in detail. Using the row of data for "ESSAR STEEL ALGOMA INC" (row 2 in the spreadsheet), the formula in the cell for "CEPSL with bad sign" is "=(((C2 / B2) ^ 0.2) - 1)", where C2 is the "Adjusted 1994 EPS" value and B2 is the "1989 EPS". Note that this value for "ESSAR STEEL ALGOMA INC" is -3.062337208, which is the wrong sign, because EPS clearly increased from 1989 (-0.13) to 1994 (4.85). The formula in the cells in the column titled "CEPSL with correct sign but -1" is "=IF(B2<0,-1*D2,D2)", where D2 is "CEPSL with bad sign". If either EPS value is zero, the CEPSL calculation collapses to "-1", as is shown in the last row for "AUTODIE CORP". The formula in rows under "CEPSL" have the formula "=IF(ABS(E2)=1,0,E2)" to change all of the "-1" values that may exist in "CEPSL with correct sign but -1" to zero. Finally, the "Check" column has the formula:

"=(((((1+D2)*B2)*(1+D2)*(1+D2)*(1+D2)*(1+D2))))", which checks that, when "1989 EPS" is increased at an annual growth rate equal to "CEPSL" for five consecutive years, the result equals the "Adjusted 1994 EPS" value.

*4.1.7 AB-97 Fundamental Signals*

Table 2 describes the AB-97 variables used in this dissertation study. The specifications are identical to those provided in AB-97. However, note that GM or gross margin in this study allows for negative GM values, and computes the change in GM correctly, even when current and/or prior GM is a negative value. Negative GM can occur whenever sales are less than the cost of the goods sold.

Table 2
AB-97 Fundamental Signals

| | |
|---|---|
| CHGEPS | **CHGEPS** (CHGEPS (t)) is Change in earnings per share (EPS) for the current year<br><br>CHGEPS = (ADJ_EPS (t) – EPS (t-1)) / prcc_f (t-1)<br><br>EPS (t-1) = "epspx" for the prior year<br>ADJ_EPS (t) = (ajex (t-1) / ajex (t)) * EPS<br>EPS (t) = "epspx" for the current year<br><br>"epspx" = Compustat item for undiluted earnings from operations per share<br>"ajex" = Compustat item for adjustment factor for prior year stock splits and stock dividends<br>"prcc_f" = Compustat item for price per share at close of the annual fiscal year |
| INV | **INV** = DELTA_INV (t) – DELTA_SALES (t) where<br><br>DELTA_SALES (t) = (SALES (t) - ((SALES (t-2) + SALES (t-1)) / 2)) / ((SALES (t-2) + SALES (t-1)) / 2) SALES (t) = "sale" for the current period<br><br>DELTA_INV (t) = (INV (t) - ((INV (t-2) + INV (t-1)) / 2)) / ((INV (t-2) + INV (t-1)) / 2) When finished goods inventory is nonzero or not missing, then INV (t) = finished goods inventory. Otherwise, INV (t) = total inventory (also true for INV_Tminus1, and INV_Tminus1):<br><br>"invfg" = Compustat item for finished goods inventory<br>"invt" = Compustat item for total inventory<br>"sale" = Compustat item for total inventory |

Table 2 -- *Continued*

| | |
|---|---|
| AR | **AR** = DELTA_AR (t) - DELTA_SALES (t)<br><br>DELTA_SALES (t) is as calculated in INV above.<br><br>DELTA_AR (t) = (AR (t) - ((AR (t-2) + AR (t-1)) / 2)) / ((AR (t-2) + AR (t-1)) / 2) *where*<br>AR (t) = Compustat "rect" for the current year |
| CAPX | **CAPX** = DELTA_IND_capx (t) - DELTA_FIRM_capx (t) *where*<br><br>DELTA_FIRM_capx (t) = (FIRM_CAPX (t) - ((FIRM_CAPX (t-2) + FIRM_CAPX (t-1)) / 2)) / ((FIRM_CAPX (t-2) + FIRM_CAPX (t-1)) / 2)<br><br>DELTA_IND_capx_T = (IND_CAPX (t) - ((IND_CAPX (t-2) + IND_CAPX (t-1)) / 2)) / ((IND_CAPX (t-2) + IND_CAPX (t-1)) / 2) *and*<br><br>FIRM_CAPX (t) = a firm's Compustat "capxv" – capital expenditure for property plant equipment - during the current year<br><br>IND_CAPX (t) = Two-Digit SIC Code Industry sum of Compustat "capxv" – capital expenditure for property plant equipment - during the current year |
| GM | **GM** = DELTA_SALES (t) - DELTA_GM (t) *where*<br><br>DELTA_SALES (t) is as calculated in INV above.<br><br>Gross Margin will be negative whenever Sales is less than COGS. Therefore, the following logic was used to obtain the correct sign of the change:<br><br>If GM_T > 0 And (GM_Tminus2 + GM_Tminus1) > 0 Then<br>DELTA_GM_T = (GM_T - ((GM_Tminus2 + GM_Tminus1) / 2)) / ((GM_Tminus2 + GM_Tminus1) / 2)<br><br>If GM_T < 0 And (GM_Tminus2 + GM_Tminus1) < 0 Then<br>DELTA_GM_T = -1 * ((GM_T - ((GM_Tminus2 + GM_Tminus1) / 2)) / ((GM_Tminus2 + GM_Tminus1) / 2))<br><br>If GM_T < 0 And (GM_Tminus2 + GM_Tminus1) > 0 Then<br>DELTA_GM_T = (GM_T - ((GM_Tminus2 + GM_Tminus1) / 2)) / ((GM_Tminus2 + GM_Tminus1) / 2)<br><br>If GM_T > 0 And (GM_Tminus2 + GM_Tminus1) < 0 Then<br>DELTA_GM_T = -1 * ((GM_T - ((GM_Tminus2 + GM_Tminus1) / 2)) / ((GM_Tminus2 + GM_Tminus1) / 2))<br>*and*<br>GM_T = Compustat "sale" – Compustat "cogs" for current year |
| S&A | **S&A** = DELTA_SA (t) - DELTA_SALES (t) *where* DELTA_SALES (t) is as calculated in INV above.<br>DELTA_SA (t) = (SA (t) - ((SA (t-2) + SA (t-1)) / 2)) / ((SA (t-2) + SA (t-1)) / 2)<br><br>SA = Compustat "xsga" General Selling and Administrative Expenses |

Table 2 -- *Continued*

| | |
|---|---|
| ERT | **ERT** = (((ETR (t-1) + ETR (t-2) + ETR (t-3)) / 3) – ETR (t)) * CHGEPS (t)<br><br>*where*<br><br>ETR (t) = "txt" / ("pi" + "am") for the prior year<br>*and*<br>"am" = Compustat item for Amortization of Intangibles<br>"pi" = Compustat item for Pretax Income<br>"txt" = Compustat item for Income Taxes - Total |
| LF | **LF** = ((SALES (t-1) / EMP (t-1)) - (SALES (t) / EMP (t))) / (SALES (t-1) / EMP (t-1))<br><br>*where*<br><br>EMP (t) = Compustat "emp" number of employees for the current period<br>SALES (t) = Compustat item "sale" for total sales for the current period |

Notes:

Except for effective tax rate (ETR), the AB-97 fundamental signals used in this study match exactly the corresponding fundamental signals in LT-93.

AQ (existence of qualified audit report) and EQ (whether or not LIFO was used by a firm) were used in AB-97 but were not used in this study. One reason is because these two items are no longer available in Compustat as listed items to select for download.

AB-97 state, "LT (LT-93) identify 12 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. General earnings quality arguments motivate the inclusion of the *LIFO* dummy variable, *EQ*, and an indicator variable which identifies an auditor qualification, *AQ* LT also include nonaccounting variables believed to provide information about future earnings. For example, a reduction in the effective tax rate *(ETR)* is said to reflect less persistent earnings, boding poorly for future economic performance."

Compustat item names are in small case and enclosed in quotes.

### *4.1.8 Categorizing Firms Based on Inventory Types*

In this study, firms are divided into four groups based on each firm's inventory reported in the Balance Sheet. Manufacturing firms have raw materials (RM), work-in-process (WIP) and finished goods (FG). Wholesale-Retail-Primary-Products firms have zero RM, WIP and FG, but have nonzero Total Inventory ("invt" in Compustat). Firms having zero RM, WIP, FG and Total Inventories are the Service firms. The Manufacturing and Wholesale-Retail-Primary-Products categories are combined to make up the ALL-except-Services category.

The Manufacturing category of firms has been narrowly defined, in order to obtain reasonable assurance that all of the cost of goods sold (cogs) reported by the manufacturing firm is from the sale of the firm's manufactured finished goods. When a firm provides services and/or sells merchandise inventory in addition to selling its manufactured goods, the "cogs" item in Compustat includes a mix of the cost of services provided, such as the cost of merchandise inventory sold plus the cost of the firm's manufactured finished goods sold. Compustat does not have separate sales and cogs items for sale of services, sale of merchandise inventory and sale of manufactured goods. Therefore, a narrower criterion for defining manufacturing firms is necessary; in order to reasonably assume cogs equals the cost of finished goods sold. This equality is required for this study's derivations of Cost of Goods Manufactured and Total Manufacturing Costs.

The four categories of firms used in this research are defined as follows.

1. ALL-except-Services. The only criterion for the "ALL-except-Services" category is that all of the model variables must be nonzero. Except for the Added manufacturing-specific fundamental signals, all of the AB-97 and Added fundamental signals are used in predicting future earnings changes for this category. Because of the AB-97 inventory ("INV") fundamental signal, Service category firms are excluded from the "ALL-except-Services" category, because by definition these firms have zero total

inventories. As OP-89 say about their sample, “The industry composition of the final sample is similar to that on the COMPUSTAT files with the exception that there are very few electric and gas utilities (SIC code 49) and banks, financial, and real estate companies (SIC codes 60-69). These firms typically do not have the attributes identified by the prediction models.” However, zero inventory firms *are* included in this study’s Services category, because the AB-97 INV and CAPX signals are omitted from the models used to study the Services category.

2. Manufacturing. To be selected as a MANUFACTURING firm, all of the following conditions must be met:

- NAICS begins with "31" or "32" or "33"
- WIP > 0 and RM > 0 and FG > 0
- Total Inventory = RM + WIP + FG (within a .005 tolerance for rounding)
- Property Plant and Equipment total, gross (Compustat “ppegt”) > 0
- All model variables must be nonzero, including the manufacturing-specific fundamental signals that use “Cost of Goods Manufactured” and “Total Manufacturing Costs” variables computed in this study

These strict requirements for defining the Manufacturing category are required, because the computation of Total Manufacturing Costs and Cost of Goods Manufactured is possible only when there is reasonable assurance that all of the Cost of Goods Sold (COGS) is based on the sale of Finished Goods inventories. This narrower criterion for defining manufacturing firms provides the best likelihood that cogs is based exclusively on the sale of the firm’s manufactured finished goods.

Specifically, the NAICS code requirement should reasonably preclude the sale of services, and the “total inventory = RM + WIP + FG” requirement should preclude the sale of merchandise inventory. Cost of Goods Manufactured is not an item available in Compustat, but once one knows COGS is only from the sale of FG, it can be computed for manufacturing firms as: ending balance of finished goods (Compustat “invfg”) + cost of goods sold (Compustat “cogs”) – beginning balance of finished goods (Compustat “invfg” for prior year). Total Manufacturing Costs is not an item available in Compustat, but can be computed for manufacturing firms as: ending work-in-process (Compustat invwip) + Cost of Goods Manufactured – beginning work-in-process (Compustat “invwip” for the prior year).

3. Wholesale-Retail-Primary-Products. To be selected as a Wholesale-Retail-Primary-Products firm, all of the following conditions must be met:

- NAICS *does not* begin with "31" or "32" or "33" (the firm is not classified as a manufacturing firm)
- WIP = 0 and RM = 0 and FG = 0
- Total Inventory > 0
- All model variables must be nonzero, which are the same variables used with the ALL-except-Services category

This category includes all of the wholesale, retail and primary products firms that meet the above criteria. Ideally, Wholesale-Retail would be separated from Primary Products, because these are truly separate industries. However, these are combined in this study to represent a third general category that is separate from Manufacturing and Services. The common thread is that all of the Wholesale-Retail-Primary-Products firms have inventory (unlike the Service category) but they do not convert their purchased inventory into finished products (unlike the Manufacturing category).

4. Service. To be selected as a Service firm, all of the following conditions must be met:

- NAICS *does not* begin with "31" or "32" or "33"
- WIP = 0 and RM = 0 and FG = 0 and Total Inventory = 0
- All model variables must be nonzero, which are the same variables used with the ALL-except-Services category, except the AB-97 signals INV and CAPX are excluded from the Service category model.

This category includes all of the service firms (NAICS "5*," "6*," "7*," "8*" and "9*") that meet the above criteria.

### *4.1.9 Fundamental Signals Added in This Study*

Fundamental signals have been either identified or developed using financial and managerial accounting concepts, and these “added” signals have been included along with the AB-97 metric signals in this study’s full models. Table 3 summarizes these Added signals.

Table 3
Added Fundamental Signals Identified or Developed in This Study

| Fundamental Signal Name | Basic Measurement | Applicable Firm Category (*) |
| --- | --- | --- |
| MKTSHR | Sales | All categories |
| CHG_MKTSHR | Sales | All categories |
| MU | Markup | All categories |
| CHG_MU | Markup | All categories |
| FCF | Free Cash Flows | All categories |
| CHG_FCF | Free Cash Flows | All categories |
| CASH | Cash | All categories |
| CHG_CASH | Cash | All categories |
| DEBT_AT | Total Liabilities | All categories |
| CHG_DEBT_AT | Total Liabilities | All categories |
| DESC_INCOME | Discretionary Income | All categories |
| DELTA_TOT_MFG_INV | Total Mfg. Inventory | Manufacturing |
| FG_COMPLETED_PER_AT | Cost of Goods Mfg. | Manufacturing |
| TOT_MFG_COST_PER_AT | Total Mfg. Costs | Manufacturing |
| OPERATING LEVERAGE | Operating Leverage | All categories |
| * ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products, Services | | |

Table 4 provides the definitions for the “Added” fundamental signals listed in table 3. These are the signals that have been identified or developed in this study and added to the AB-97 signals listed in table 2 to complete the "full models" of fundamental signals used in this study.

Table 4
Fundamental Signals Added in This Study

| | |
|---|---|
| MKTSHR<br>Market Share | MKTSHR is the ratio of a studied firm's sales in the current-year to the sum of the sales during the current-year for all of the firms in the studied firm's 4-digit SIC code industry. MKTSHR = SALES (t) / IND_SALE (t), where<br><br>IND_SALE (t) = sum of Compustat item "sale" for all firms within the studied firm's four -digit SIC industry<br><br>SALES (t) = Compustat item "sale"--a firm's net sales for year t |
| CHG_MKTSHR<br>Change in Market Share | CHG_MKTSHR = ((SALES (t) / IND_SALE_SUM (t)) - (SALES (t-1) / IND_SALE_SUM (t-1))) / (SALES (t-1) / IND_SALE_SUM (t-1))<br><br>*Where*<br>SALES (t) is sales for the studied company in the current (reference) year<br><br>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<br><br>SALES (t) = Compustat item "sale" for the studied firm for the current (reference) fiscal year. |
| MU<br>Markup | MU = (SALES (t) – cogs (t)) / cogs (t) *where*<br><br>SALES (t) = Compustat item "sale" for the current year<br>Cogs (t) = Compustat item "cogs" for the current year |
| CHG_MU<br>Change in Markup | CHG_MU = MU(t) – MU(t-1) / MU(t-1) where t is the current year, with MU exactly as previously defined. CHG_MU measures the percent change in average markup from the prior year to the current year.<br><br>MU will be negative whenever sales are less than COGS. Therefore, the following logic was used to obtain the correct sign of the change in MU:<br><br>If MU_T (t-1) > 0 And MU (t) > 0 Then<br>MU_CHG = (R_MU (t) – MU (t-1)) / MU (t-1)<br>If MU (t-1) < 0 And MU (t) < 0 Then<br>MU_CHG = -1 * ((MU (t) – MU (t-1)) / MU (t-1))<br>If MU (t) < 0 And MU (t-1) > 0 Then<br>MU_CHG = (MU (t) – MU (t-1)) / MU (t-1)<br>If MU (t) > 0 And MU (t-1) < 0 Then<br>MU_CHG = -1 * ((MU (t) – MU (t-1)) / MU (t-1) |

Table 4 -- *Continued*

| | |
|---|---|
| FCF<br>Free Cash Flows | FCF = [oancf (t) – capxv (t) – dv (t) ] / at (t) *where*<br><br>oancf is Compustat “oancf “-- Operating Activities Net Cash Flow for the current year<br>capx is Compustat “capxv” -- Capital Expenditures for Property Plant nd Equipment for the current year<br>dv is Compustat “dv” -- Cash Dividends (Cash Flow) for the current year<br>at is Compustat item “at” for total assets |
| CHG_FCF<br>Change in Free Cash Flows | CHG_FCF = [FCF (t) – FCF (t-1)] / FCF (t-1) where t is the current year and FCF is as previously defined.<br><br>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:<br><br>If FCF (t-1) > 0 And FCF (t) > 0 Then<br>CHG_FCF = (FCF (t) – FCF (t-1)) / FCF (t-1)<br>If FCF_Tminus1 < 0 And R_FCF_T < 0 Then<br>CHG_FCF = -1 * [(FCF (t) – FCF (t-1)) / FCF (t-1)]<br>If R_FCF_T < 0 And FCF_Tminus1 > 0 Then<br>CHG_FCF = (FCF (t) – FCF (t-1)) / FCF (t-1)<br>If R_FCF_T > 0 And FCF_Tminus1 < 0 Then<br>CHG_FCF = -1 *[ (FCF (t) – FCF (t-1)) / FCF (t-1)] |
| CASH | CASH = Compustat “ch” (Cash) / Compustat “at” (total assets) for the current (reference) year |
| CHG_CASH<br>Change in Cash | CHG_CASH = CASH (t) – CASH (t-1) / CASH (t-1) where CASH is as previously defined. |
| DEBT_AT<br>Debt-to-total assets | DEBT_AT_T = Compustat “lt” (total liabilities) / Compustat “at” (total assets) for the current year |
| CHG_DEBT_AT<br>Change in Debt-to-total assets | CHG_DEBT_AT = (DEBT_AT (t) - DEBT_AT (t-1)) / DEBT_AT (t-1) *where*<br><br>DEBT_AT (t) = Compustat “lt” (total liabilities) / Compustat “at” (total assets) for the current year t, and<br><br>DEBT_AT (t-1) = Compustat “lt” (total liabilities) / Compustat “at” (total assets) for the prior year |
| DESC_INCOME<br>Discretionary Income | DESC_INCOME = [Compustat “sale” - Compustat “cogs” - (Compustat xsga – Compustat “xrd” – Compustat “xad”) – Compustat “dp” – Compustat “txt” – Compustat “dvt”] / Compustat “sale” *where*<br><br>Compustat “sale” = net sales in the current year<br>Compustat “cogs” = cost of goods sold in the current year<br>Compustat “dp” = depreciation and amortization expensed in the current year<br>Compustat “txt” = income tax in the current year<br>Compustat “dvt” = dividends in the current year |

Table 4 -- *Continued*

| | |
|---|---|
| DELTA_TOT_ MFG_INV<br>Change in total manufacturing inventories<br><br>(Applies to Manufacturing firms only) | DELTA_TOT_MFG_INV = {TOT_MFG_INV (t) - [ TOT_MFG_INV (t-1) + TOT_MFG_INV (t-2) ] / 2} } / {[ TOT_MFG_INV (t-1) + TOT_MFG_INV (t-2) ] / 2} where t is the current year and TOT_MFG_INV (t) = invrm (t) + invwip (t) + invfg (t)<br><br>*where*<br><br>invrm = Compustat item for raw materials inventory<br>invwip = Compustat item for work-in-process inventory<br>invfg = Compustat item for finished goods inventory |
| FG_COMPLETED _PER_AT<br><br>Cost of Goods Manufactured to total assets<br><br>(Applies to Manufacturing firms only) | FG_COMPLETED_PER_AT is the ratio of a manufacturing firm's cost of goods manufactured to the firm's total assets. This ratio is computed as: FG_COMPLETED (t) / at (t) *where*<br><br>FG_COMPLETED (t) = invfg (t) + cogs (t) – invfg (t-1) *and*<br><br>invfg = Compustat item for finished goods inventory<br>cogs = Compustat item for Cost of Goods Sold<br>at = Compustat item for total assets<br><br>Assumes all COGS results from sale of finished goods. |
| TOT_MFG_ COST_PER_AT<br><br>Total manufacturing costs to total assets<br><br>(Applies to Manufacturing firms only) | TOT_MFG_COST_PER_AT is the ratio of a firm's total manufacturing costs to the firm's total assets. This ratio is computed as:<br><br>TOT_MFG_COST / at (t)<br><br>*where*<br><br>TOT_MFG_COST_T = invwip (t) + FG_COMPLETED (t) – WIP (t-1)<br><br>*where*<br><br>FG_COMPLETED is as defined in FG_COMPLETED_PER_AT<br>invwip = Compustat item for work-in-process inventory |
| OPERATING_ LEVERAGE | OPERATING_LEVERAGE = {Compustat "ib" (t) + Compustat "xsga" (t) + Compustat "dp" (t) + [Compustat "dpvieb" (t) – Compustat "dpvieb" (t -1) – (Compustat "dp" (t) – Compustat "am"(t))]} / Compustat "ib" (t) where t = reference year and Compustat items are<br><br>"ib" = income before extraordinary items<br>"xsga" = selling and administrative expenses<br>"dp" = depreciation and amortization expense<br>"dpvieb" = ending balance of accumulated depreciation<br>"am" = amortization expense<br><br>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 all non-manufacturing firms. |

### *4.1.10 Results Obtained from Replicating AB-97*

AB-97 table 2 was replicated, in order to obtain a better understanding of the AB-97 model and methodology. AB-97 table 2 shows the significance and direction of the fundamental signals' relationship to next-year EPS change and to long-term (five-year) growth. AB-97 provides detailed information about the construction of the variables in their model, but there are some details that AB-97 does not state. For example, AB-97 is silent on how they matched the financial statement information (data in Compustat) to the analysts' forecasts (data in IBES).

In order to replicate the AB-97 study's table 2, computer programs were developed to process the data downloaded from Compustat and I/B/E/S. The definitions for the dependent variables and the independent variables provided by AB-97 in their table 1 (which match the definitions given in this study's table 1 and table 2) were used in developing the fundamental signals' formulas that were coded in the replication computer programs. Once the data was processed, it was input into SPSS statistical analysis software and linear regressions were executed for each year from 1983 to 1990. The AB-97 condition was followed that required a firm must have at least one analyst's next-year earnings forecast made one month after the current-year (reference year) earnings announcement date. The replication results are summarized in table 5, where the results reported in the AB-97 study's table 2 are shown in the top-half of the table for comparison, and the results obtained from the replication are shown bottom-half of the table.

Table 5
Replication of AB-97 CEPS1 Results

| **AB-97 Results** | **CHGEPS** | **INV** | **AR** | **CAPX** | **GM** | **S&A** | **ETR** | **LF** |
|---|---|---|---|---|---|---|---|---|
| **Avg. beta** | -0.224 | -0.017 | 0.009 | 0.005 | -0.031 | -0.010 | -0.594 | -0.026 |
| **#Positive** | 0 | 0 | 7 | 8 | 2 | 4 | 1 | 0 |
| **#Positive Significant** | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| **#Negative** | 8 | 8 | 1 | 0 | 6 | 4 | 7 | 8 |
| **#Negative Significant** | 7 | 4 | 0 | 0 | 3 | 2 | 7 | 3 |
| | | | | | | | | |
| **Replication Results** | **CHGEPS** | **INV** | **AR** | **CAPX** | **GM** | **S&A** | **ETR** | **LF** |
| **Avg. beta** | -0.235 | -0.018 | 0.000 | 0.007 | -0.004 | -0.014 | -0.340 | 0.020 |
| **#Positive** | 0 | 0 | 4 | 8 | 3 | 3 | 1 | 3 |
| **#Positive Significant** | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 1 |
| **#Negative** | 8 | 8 | 4 | 0 | 5 | 5 | 7 | 5 |
| **#Negative Significant** | 7 | 1 | 2 | 0 | 0 | 2 | 6 | 0 |

For the replication shown in table 5, a total of 4,117 firm-years were processed for 1983-1990. AB-97 reports that 4,180 firm-years were used in their study–a difference of only 63 firm-years. For 1983-1990, AB-97 report that they achieved an average adjusted R-square of .07 when one-year-ahead earnings changes are regressed on current-year earnings changes. This same .07 (.069 rounded) was obtained in my replication of this same AB-97's analysis. AB-97 reported that they achieved an average adjusted R-square of .16 when one-year-ahead earnings changes are regressed on current-year earnings changes and their fundamental signals. I obtained an average adjusted R-square of .11 in my replication of this same AB-97 analysis. The .05 difference in R-square may be due to the following reasons:

1. AQ and EQ were not included in the replication, because these items are no longer available in Compustat as items that can be selected for download. Since AB-97 report EQ was significant in four of the eight years studied, this difference may contribute to the difference in adjusted R-square.

2. AB-97 does not specify how they matched Compustat records to I/B/E/S records. Compustat records were matched to I/B/E/S records using the following logic:

   {[(first ten characters of Compustat “conm” = first ten characters of I/B/E/S “cname”) or (Compustat “tic” = I/B/E/S “ticker”)] and [first eight characters of Compustat “cusip” = first eight characters of I/B/E/S “cusip”] and [Compustat “datadate” = I/B/E/S “fpedats”]} where “comn” and “cname” are the company name, and “fpedats” and “datadate” are the ending date of the firm’s fiscal year. Since this match logic provided replication results that were comparable to the AB-97 table 2 results, this Compustat-to-IBES matching logic was used throughout this study.

3. AB-97 did not specify how to deal with negative values for some of the Compustat items making up the fundamental signals. It was assumed how negative values should be handled, as is described in this study’s table 2.

The results from replicating AB-97 long-term growth (CEPSL) results are shown in table 6 below.

Table 6
Replication of AB-97 CEPSL Results

| AB-97 Results | CHGEPS | INV | AR | CAPX | GM | S&A | ETR | LF |
|---|---|---|---|---|---|---|---|---|
| Avg. beta | -0.366 | 0.004 | -0.029 | 0.008 | 0.029 | 0.091 | -1.362 | -0.069 |
| #Positive | 1 | 3 | 1 | 4 | 3 | 3 | 0 | 1 |
| #Positive Significant | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 |
| #Negative | 4 | 2 | 4 | 1 | 2 | 2 | 5 | 4 |
| #Negative Significant | 2 | 0 | 1 | 0 | 1 | 0 | 3 | 2 |
| | | | | | | | | |
| **Replication Results** | **CHGEPS** | **INV** | **AR** | **CAPX** | **GM** | **S&A** | **ETR** | **LF** |
| Avg. beta | -0.351 | -0.011 | -0.037 | 0.016 | 0.077 | -0.068 | -0.221 | 0.007 |
| #Positive | 1 | 2 | 2 | 5 | 5 | 1 | 2 | 2 |
| #Positive Significant | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| #Negative | 4 | 3 | 3 | 0 | 0 | 4 | 3 | 3 |
| #Negative Significant | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 0 |

In table 6, the count of observations was 1,509, whereas AB-97 says the CEPSL regression has 1,619 observations between 1983 and 1987. The same reasons for differences noted in table 5 may also be the cause of difference in table 6.

As discussed previously in the section titled Dependent Variables, it appears that AB-97 did not include firms with a net loss in either the current EPS or the five-year future EPS, when calculating the geometric mean growth rate. It is believed that this is probably the case, because the results shown in table 6 were achieved by including firms with both the current EPS and the five-year EPS having only positive values. Using the "Experimental" CEPSL developed in this study that allows for negative values in either the adjusted five-years-ahead EPS or the current year EPS, the following replication results for Experimental CEPSL were obtained:

Table 7
Replication of AB-97 CEPSL Results Using Experimental CEPSL

| **AB-97 Results** | **CHGEPS** | **INV** | **AR** | **CAPX** | **GM** | **S&A** | **ETR** | **LF** |
|---|---|---|---|---|---|---|---|---|
| **Avg. beta** | -0.366 | 0.004 | -0.029 | 0.008 | 0.029 | 0.091 | -1.362 | -0.069 |
| **#Positive** | 1 | 3 | 1 | 4 | 3 | 3 | 0 | 1 |
| **#Positive Significant** | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 |
| **#Negative** | 4 | 2 | 4 | 1 | 2 | 2 | 5 | 4 |
| **#Negative Significant** | 2 | 0 | 1 | 0 | 1 | 0 | 3 | 2 |
| | | | | | | | | |
| **Replication Results** | **CHGEPS** | **INV** | **AR** | **CAPX** | **GM** | **S&A** | **ETR** | **LF** |
| **Avg. beta** | -0.978 | -0.118 | -0.070 | 0.079 | 0.778 | 0.268 | 0.358 | 0.123 |
| **#Positive** | 2 | 1 | 1 | 5 | 5 | 4 | 3 | 4 |
| **#Positive Significant** | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 1 |
| **#Negative** | 3 | 4 | 4 | 0 | 0 | 1 | 2 | 1 |
| **#Negative Significant** | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |

Average adjusted R-square when using the computation for "Experimental" CEPSL increases to .052, more than doubling the average adjusted R-square (.020) with the ABA-97's CEPSL. This increase in R-square is achieved even when the total number of observations is increased from 1,509 (table 6) to 1,888 (table 7). As shown in table 7, the count of observations is 1,888, whereas AB-97 note, "the CEPSL regression has 1,619 observations between 1983 and 1987." Table 7 was replicated exactly as was table 6, except that in table 7, calculation of CEPSL were used that allowed for a net loss in the current year EPS and/or the five-year future EPS. The larger differences in table 7 results as compared to AB-97's table 2 results for long-term growth, leads one to believe AB-97 did not allow for negative EPS in their computation of geometric mean growth rate. Both Conventional CEPSL and Experimental CEPSL are used in this study to evaluate the fundamental signals' relationship to long-term growth.

#### *4.1.11 Analysts' Efficient Use of the Fundamental Signals Revised AB-97 Methodology*

Objective 3 of this research is to follow the AB-97 methodology to study how efficiently security analysts have used the studied fundamental signals in making their one-year EPS forecast revisions, and in making their long-term growth forecast revisions. This study uses the methodology used by AB-97 to obtain their table 3 results for analysts' efficient use of the signals, except with the following revisions:

1. IBES Detail forecast data is used, rather than the IBES Summary forecast data used by AB-97. An average of analysts' individual Detail forecasts is computed for both 1-year and long-term growth Detail forecasts.

2. A 90-day period is used to capture long-term Detail forecasts for computing an average of the long-term forecasts. In contrast, AB-97 used a one-month Summary long-term forecast issued at the statistical period date (IBES "STATPER") during the month. A 90-day period makes it more likely that at least one long-term Detail forecast will be captured. (For computing an average of analysts' one-year-ahead EPS forecasts made during a month, this study uses the same 1-month period for gathering one-year-ahead Detail forecasts as was used by AB-97 for obtaining the Summary forecast.)

3. The *same* firms and fundamental signals are used for both the regression with the forecast revision dependent variable (DV) and the regression with the future earnings change DV. The firms used in both regressions are determined by

requiring not only that all of the fundamental signals exist (are nonzero), but also that both the forecast revision DV and the future earning change DV exist (are nonzero). For example, the set of firms is determined for the year studied that have a nonzero "one-year-ahead EPS change" (CEPS1) DV *and that also have* an "analysts' one-year-ahead forecast revision made 1-month after the studied year's earnings announcement date" (FY1+1) DV. First, all firms are excluded where the firm's CEPS1 or any of the firm's fundamental signals has a univariate standardized t value greater than +3 or less than -3. Then, for the remaining firms, the Mahalanobis Distance is computed for the multivariate independent variables (fundamental signals) taken together, and firms are excluded that have a Chi-square probability less than or equal to .001. (See section *4.1.4 Removing the Extreme Values from the Fundamental Signals*) The firms that remain are the group of firms that are used in both the CEPS1 and FY1+1 regressions, where first CEPS1 is regressed on the fundamental signals using these firms, and then FY1+1 is regressed on these same fundamental signals using these same firms. (In addition, these same firms are used to determine the actual mean forecast error percent, computed as the mean of all the firms' forecast errors, where a firm's error = absolute value [(firm average forecast earnings – firm actual earnings) / firm actual earnings]. CEPS1 is first regressed on the fundamental signals, using this set of firms, and then FY1+1 is regressed on the same fundamental signals using exactly the same firms as used in the first regression. With each DV having been regressed using the same signals and sample of firms, the adjusted R-square from the FY1+1 regression can be symmetrically compared to the adjusted R-square from the CEPS1 regression. The ratio of the FY1+1 adjusted R-square to the CEPS1 adjusted R-square measures the analysts' percent utilization of the fundamental signals in making their forecast revisions. For example, if the adjusted R-squares happen to be equal, this is an indication that the fundamental signals explain the analysts' forecast revisions (FY1+1) as well as they predict the future earnings changes (CEPS1), and, hence, the analysts have 100% used the fundamental signals in making their one-year-ahead forecast revisions.

In contrast, AB-97 first regress CEPS1 on all of the firms that have an analysts EPS forecast made one month following the earnings announcement, *regardless of whether or not FY1+1 exists.* They then regress FY1+1 on the set of firms for which FY1+1 does exist, and then compare the size and significance of each of the IV regression coefficient estimates from the CEPS1 regression to the corresponding coefficients from the FY1+1 regression. Even if an analyst's forecasts exists *after* the earnings announcement date, FY1+1is not computable, if no analysts' forecasts exist for the period *before* the earnings announcement date. As such, AB-97 regress FY1+1 on a subset of the firms used in their CEPS1 regression. My research indicates that changing the mix of firms used in these regressions affects not only the adjusted R-square, but also the coefficient estimates. Regressing CEPS1 and FY1+1 on the same set of firms allows for a more direct, "apples-to-apples" comparison of the two regressions' results.

This study also identifies the number of years out of the 18 years studied that each signal was significant in the CEPS1 regression (alpha = .05) but was not significant in the FY1+1 regression. The nonzero counts are reported for each signal, thereby indicating specific fundamental signals that the analysts might have use more efficiently. In addition to the "CEPS1-to-FY1+1" analysis just discussed, this study performs the same analyses for "CEPS1-to-FY1+5," "CEPSL-to-LTG+1" and "CEPSL-to-LTG+4."

4. Also reported is the security analysts' actual mean error percent and standard deviation of the average actual error percent. This information is not reported by AB-97. For each firm, the actual error in forecasting next-year EPS is computed as the difference between the analysts' average IBES Detail forecasts made in the 1-month period (also for the 5-month period) following the current-year announcement date minus the firm's actual EPS ("ACTUAL" reported in IBES). The actual error percent for the "+1" period for forecasting "Conventional" long-term growth is computed as the difference between the analysts' average IBES Detail forecasts made in the 3-month period following 1-month after the current-year announcement date minus the firm's CEPSL value computed as defined in AB-97. Similarly, the actual error percent for the "+4" period for forecasting "Conventional" long-term growth is computed as the difference between the analysts' average IBES Detail forecasts made in the 3-month period following 4-months after the current-year announcement date minus the firm's CEPSL value computed as defined in AB-97.

Following AB-97, neither the Experimental CEPSL nor the manufacturing-specific fundamental signals are used in the Objective 3 study of security analysts' efficient use of the fundamental signals.

# CHAPTER 5

# RESULTS

## 5.1 Results from Regressing Future Earnings DVs on the Fundamental Signals

The following twelve tables report the results from regressing next-year EPS change (CEPS1) and the long-term growth dependent variables (both Conventional CEPSL and Experimental CEPSL) on the studied fundamental signals for each firm Category for each year during 1991-2008 for CEPS1 and for each year during 1991-2004 for Conventional and Experimental CEPSL. The twelve tables are as follows.

Table 8: ALL-except-Services for CEPS1
Table 9: ALL-except-Services for Conventional CEPSL
Table 10: ALL-except-Services for Experimental CEPSL

Table 11: Manufacturing for CEPS1
Table 12: Manufacturing for Conventional CEPSL
Table 13: Manufacturing for Experimental CEPSL

Table 14: Wholesale-Retail-Primary-Products for CEPS1
Table 15: Wholesale-Retail-Primary-Products Conventional CEPSL
Table 16: Wholesale-Retail-Primary-Products Experimental CEPSL

Table 17: Services for CEPS1
Table 18: Services for Conventional CEPSL
Table 19: Services for Experimental CEPSL

Following these twelve tables, the results for each fundamental signal is discussed. Within the discussion for each fundamental signal, a figure is provided that summarizes the results taken directly from the twelve tables above that pertain specifically to the discussed fundamental signal.

Table 8
ALL-except-Services
Dependent Variable = One-Year-Ahead EPS Change (CEPS1)
Averages 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) | -0.155 | 0.224 | 8 | 1 | 15 | 7 | 3 | 1 |
| CHGEPS | -0.240 | 0.075 | 14 | 1 | 15 | 13 | 3 | 1 |
| INV | -0.016 | 0.577 | 0 | 1 | 11 | 0 | 7 | 0 |
| AR | -0.026 | 0.542 | 1 | 1 | 12 | 1 | 6 | 0 |
| GM | 0.071 | 0.439 | 2 | 1 | 10 | 1 | 8 | 1 |
| SA | 0.020 | 0.425 | 4 | 0 | 11 | 3 | 7 | 1 |
| ETR | 0.288 | 0.197 | 9 | 2 | 11 | 6 | 7 | 3 |
| LF | 0.080 | 0.423 | 3 | 1 | 10 | 2 | 8 | 1 |
| CAPX | 0.023 | 0.369 | 2 | 1 | 3 | 0 | 15 | 2 |
| MKTSHR | -0.019 | 0.444 | 1 | 1 | 14 | 1 | 4 | 0 |
| CHG_MKTSHR | -0.001 | 0.380 | 4 | 2 | 10 | 3 | 8 | 1 |
| MU | -0.052 | 0.645 | 1 | 0 | 10 | 1 | 8 | 0 |
| CHG_MU | -0.044 | 0.367 | 4 | 0 | 6 | 2 | 12 | 2 |
| FCF | 0.117 | 0.412 | 2 | 2 | 7 | 0 | 11 | 2 |
| CHG_FCF | 0.001 | 0.707 | 0 | 0 | 3 | 0 | 15 | 0 |
| CASH | 0.457 | 0.306 | 6 | 1 | 3 | 0 | 15 | 6 |
| CHG_CASH | -0.201 | 0.443 | 2 | 1 | 11 | 2 | 7 | 0 |
| DEBT_AT | 0.417 | 0.071 | 13 | 3 | 2 | 1 | 16 | 12 |
| CHG_DEBT_AT | 0.271 | 0.108 | 11 | 1 | 2 | 1 | 16 | 10 |
| DISCRETIONARY INCOME | -0.079 | 0.307 | 5 | 1 | 16 | 5 | 2 | 0 |
| OPERATING LEVERAGE | -0.006 | 0.491 | 2 | 1 | 12 | 2 | 6 | 0 |
| "Full Model" Average Adjusted R-Square and Average Number of Firms Studied Each Year | | | | | | | | |
| Avg. Adj. R2: | 0.073 | | | | | | | |
| Avg. # of Firms per Year: | 1,734 | | | | | | | |

Table 9
ALL-except-Services
Dependent Variable = “Conventional” Long-Term Growth (CEPSL)
Averages 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) | 0.039 | 0.206 | 6 | 1 | 4 | 1 | 10 | 5 |
| CHGEPS | -0.127 | 0.168 | 4 | 2 | 11 | 4 | 3 | 0 |
| INV | -0.011 | 0.410 | 1 | 1 | 9 | 1 | 5 | 0 |
| AR | 0.009 | 0.411 | 0 | 3 | 7 | 0 | 7 | 0 |
| GM | 0.085 | 0.239 | 6 | 1 | 4 | 1 | 10 | 5 |
| SA | 0.005 | 0.401 | 4 | 0 | 6 | 2 | 8 | 2 |
| ETR | -0.128 | 0.308 | 3 | 0 | 11 | 3 | 3 | 0 |
| LF | 0.017 | 0.417 | 2 | 0 | 7 | 0 | 7 | 2 |
| CAPX | 0.007 | 0.467 | 1 | 2 | 2 | 0 | 12 | 1 |
| MKTSHR | -0.036 | 0.421 | 2 | 2 | 12 | 2 | 2 | 0 |
| CHG_MKTSHR | -0.016 | 0.442 | 3 | 0 | 9 | 2 | 5 | 1 |
| MU | -0.003 | 0.401 | 2 | 2 | 9 | 1 | 5 | 1 |
| CHG_MU | 0.047 | 0.406 | 2 | 1 | 6 | 0 | 8 | 2 |
| FCF | 0.023 | 0.525 | 2 | 0 | 6 | 1 | 8 | 1 |
| CHG_FCF | 0.000 | 0.494 | 0 | 0 | 7 | 0 | 7 | 0 |
| CASH | 0.045 | 0.378 | 4 | 0 | 5 | 1 | 9 | 3 |
| CHG_CASH | 0.034 | 0.459 | 1 | 0 | 4 | 1 | 10 | 0 |
| DEBT_AT | -0.011 | 0.553 | 1 | 0 | 7 | 1 | 7 | 0 |
| CHG_DEBT_AT | 0.053 | 0.254 | 3 | 0 | 1 | 0 | 13 | 3 |
| DISCRETIONARY _INCOME | 0.026 | 0.387 | 2 | 1 | 6 | 1 | 8 | 1 |
| OPERATING LEVERAGE | 0.008 | 0.000 | 14 | 0 | 0 | 0 | 14 | 14 |

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

| | |
|---|---|
| Avg. Adj. R2: | 0.140 |
| Avg. # of Firms per Year: | 785 |

Table 10
ALL-except-Services
Dependent Variable = "Experimental" Long-Term Growth (EXP_CEPSL)
Averages 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) | -0.087 | 0.211 | 7 | 0 | 9 | 5 | 5 | 2 |
| CHGEPS | -0.253 | 0.242 | 8 | 0 | 13 | 8 | 1 | 0 |
| INV | -0.040 | 0.478 | 2 | 1 | 12 | 2 | 2 | 0 |
| AR | -0.100 | 0.346 | 3 | 1 | 12 | 3 | 2 | 0 |
| GM | 0.368 | 0.113 | 9 | 1 | 0 | 0 | 14 | 9 |
| SA | 0.262 | 0.223 | 7 | 1 | 1 | 0 | 13 | 7 |
| ETR | 0.081 | 0.457 | 1 | 1 | 4 | 1 | 10 | 0 |
| LF | -0.051 | 0.281 | 6 | 2 | 9 | 3 | 5 | 3 |
| CAPX | 0.082 | 0.088 | 8 | 1 | 0 | 0 | 14 | 8 |
| MKTSHR | 0.101 | 0.459 | 0 | 2 | 6 | 0 | 8 | 0 |
| CHG_MKTSHR | -0.309 | 0.106 | 9 | 2 | 14 | 9 | 0 | 0 |
| MU | 0.070 | 0.247 | 7 | 0 | 3 | 0 | 11 | 7 |
| CHG_MU | 0.004 | 0.229 | 6 | 2 | 6 | 3 | 8 | 3 |
| FCF | -0.401 | 0.362 | 4 | 1 | 10 | 4 | 4 | 0 |
| CHG_FCF | 0.000 | 0.525 | 0 | 1 | 8 | 0 | 6 | 0 |
| CASH | -0.140 | 0.422 | 2 | 3 | 8 | 2 | 6 | 0 |
| CHG_CASH | -0.074 | 0.642 | 1 | 0 | 9 | 1 | 5 | 0 |
| DEBT_AT | 0.406 | 0.041 | 10 | 0 | 0 | 0 | 14 | 10 |
| CHG_DEBT_AT | 0.366 | 0.071 | 11 | 0 | 0 | 0 | 14 | 11 |
| DISCRETIONARY INCOME | -1.022 | 0.114 | 10 | 1 | 13 | 10 | 1 | 0 |
| OPERATING LEVERAGE | -0.017 | 0.000 | 14 | 0 | 14 | 14 | 0 | 0 |
| "Full Model" Average Adjusted R-Square and Average Number of Firms Studied Each Year | | | | | | | | |
| Avg. Adj. R2: | 0.172 | | | | | | | |
| Avg. # of Firms per Year: | 1,341 | | | | | | | |

Table 11
Manufacturing
Dependent Variable = One-Year-Ahead EPS Change (CEPS1)
Averages 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) | -0.180 | 0.305 | 6 | 0 | 15 | 5 | 3 | 1 |
| CHGEPS | -0.101 | 0.015 | 16 | 1 | 16 | 15 | 2 | 1 |
| INV | 0.009 | 0.460 | 1 | 1 | 11 | 1 | 7 | 0 |
| AR | 0.112 | 0.399 | 1 | 2 | 11 | 1 | 7 | 0 |
| GM | 0.058 | 0.452 | 1 | 1 | 7 | 0 | 11 | 1 |
| SA | -0.106 | 0.393 | 5 | 1 | 12 | 3 | 6 | 2 |
| LF | 0.002 | 0.485 | 0 | 3 | 10 | 0 | 8 | 0 |
| ETR | -0.167 | 0.306 | 5 | 1 | 15 | 5 | 3 | 0 |
| CAPX | 0.009 | 0.408 | 1 | 1 | 3 | 0 | 15 | 1 |
| MKTSHR | 0.016 | 0.601 | 0 | 3 | 10 | 0 | 8 | 0 |
| CHG_MKTSHR | -0.001 | 0.503 | 0 | 1 | 9 | 0 | 9 | 0 |
| MU | -0.004 | 0.533 | 3 | 1 | 6 | 0 | 12 | 3 |
| CHG_MU | 0.004 | 0.351 | 6 | 1 | 4 | 1 | 14 | 5 |
| FCF | 0.199 | 0.503 | 1 | 0 | 7 | 0 | 11 | 1 |
| CHG_FCF | 0.001 | 0.550 | 1 | 0 | 5 | 0 | 13 | 1 |
| CASH | 0.325 | 0.535 | 0 | 2 | 5 | 0 | 13 | 0 |
| CHG_CASH | -0.193 | 0.588 | 2 | 0 | 8 | 2 | 10 | 0 |
| DEBT_AT | 0.611 | 0.174 | 8 | 1 | 6 | 0 | 12 | 8 |
| CHG_DEBT_AT | 0.027 | 0.295 | 4 | 2 | 2 | 0 | 16 | 4 |
| DESC INCOME | -0.175 | 0.405 | 5 | 0 | 15 | 4 | 3 | 1 |
| DELTA TOT MFG INV | -0.100 | 0.503 | 1 | 0 | 15 | 1 | 3 | 0 |
| FG COMPLETED PER AT | -0.037 | 0.463 | 2 | 1 | 7 | 0 | 11 | 2 |
| TOT MFG COST PER AT | -0.059 | 0.495 | 2 | 1 | 11 | 2 | 7 | 0 |
| OPERATING LEVERAGE | -0.002 | 0.428 | 3 | 1 | 13 | 1 | 5 | 2 |
| "Full Model" Average Adjusted R-Square and Average Number of Firms Studied Each Year | | | | | | | | |
| Avg. Adj. R2: | 0.115 | | | | | | | |
| Avg. # of Firms per Year: | 610 | | | | | | | |

Table 12
Manufacturing
Dependent Variable = “Conventional” Long-Term Growth (CEPSL)
Averages 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) | 0.016 | 0.263 | 7 | 1 | 7 | 3 | 7 | 4 |
| CHGEPS | -0.127 | 0.514 | 2 | 0 | 13 | 1 | 1 | 1 |
| INV | -0.017 | 0.427 | 0 | 0 | 8 | 0 | 6 | 0 |
| AR | 0.003 | 0.389 | 1 | 1 | 7 | 0 | 7 | 1 |
| GM | 0.105 | 0.479 | 2 | 1 | 4 | 0 | 10 | 2 |
| SA | 0.033 | 0.337 | 1 | 3 | 6 | 0 | 8 | 1 |
| LF | 0.014 | 0.624 | 0 | 0 | 5 | 0 | 9 | 0 |
| ETR | 0.001 | 0.345 | 4 | 1 | 8 | 3 | 6 | 1 |
| CAPX | 0.003 | 0.329 | 1 | 2 | 6 | 0 | 8 | 1 |
| MKTSHR | -0.038 | 0.301 | 0 | 3 | 8 | 0 | 6 | 0 |
| CHG_MKTSHR | -0.013 | 0.518 | 1 | 2 | 10 | 1 | 4 | 0 |
| MU | -0.003 | 0.350 | 4 | 0 | 8 | 2 | 6 | 2 |
| CHG_MU | 0.091 | 0.447 | 3 | 0 | 5 | 0 | 9 | 3 |
| FCF | 0.021 | 0.376 | 3 | 1 | 8 | 1 | 6 | 2 |
| CHG_FCF | 0.000 | 0.594 | 0 | 0 | 9 | 0 | 5 | 0 |
| CASH | 0.012 | 0.482 | 1 | 1 | 6 | 1 | 8 | 0 |
| CHG_CASH | 0.027 | 0.658 | 0 | 0 | 4 | 0 | 10 | 0 |
| DEBT_AT | -0.017 | 0.489 | 1 | 1 | 9 | 0 | 5 | 1 |
| CHG_DEBT_AT | 0.079 | 0.235 | 4 | 3 | 3 | 0 | 11 | 4 |
| DESC INCOME | 0.216 | 0.401 | 4 | 0 | 4 | 1 | 10 | 3 |
| DELTA TOT MFG INV | -0.049 | 0.418 | 2 | 1 | 9 | 2 | 5 | 0 |
| FG COMPLETED PER AT | 0.354 | 0.478 | 0 | 1 | 4 | 0 | 10 | 0 |
| TOT MFG COST PER AT | -0.366 | 0.478 | 0 | 2 | 9 | 0 | 5 | 0 |
| OPERATING LEVERAGE | 0.009 | 0.001 | 14 | 0 | 0 | 0 | 14 | 14 |

| “Full Model” Average Adjusted R-Square and Average Number of Firms Studied Each Year | |
|---|---|
| Avg. Adj. R2: | 0.183 |
| Avg. # of Firms per Year: | 261 |

Table 13
Manufacturing
Dependent Variable = "Experimental" Long-Term Growth (EXP_CEPSL)
Averages 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) | -0.033 | 0.266 | 3 | 5 | 7 | 2 | 7 | 1 |
| CHGEPS | -0.651 | 0.265 | 6 | 1 | 12 | 6 | 2 | 0 |
| INV | 0.084 | 0.391 | 2 | 1 | 5 | 0 | 9 | 2 |
| AR | -0.194 | 0.436 | 3 | 0 | 12 | 3 | 2 | 0 |
| GM | 0.511 | 0.358 | 3 | 1 | 3 | 0 | 11 | 3 |
| SA | 0.314 | 0.369 | 4 | 0 | 2 | 0 | 12 | 4 |
| LF | -0.035 | 0.473 | 3 | 0 | 7 | 2 | 7 | 1 |
| ETR | 0.168 | 0.384 | 2 | 2 | 7 | 1 | 7 | 1 |
| CAPX | 0.081 | 0.291 | 3 | 2 | 2 | 0 | 12 | 3 |
| MKTSHR | 0.126 | 0.601 | 0 | 0 | 5 | 0 | 9 | 0 |
| CHG_MKTSHR | -0.140 | 0.528 | 2 | 1 | 7 | 2 | 7 | 0 |
| MU | 0.174 | 0.280 | 7 | 0 | 2 | 1 | 12 | 6 |
| CHG_MU | -0.064 | 0.418 | 3 | 0 | 9 | 2 | 5 | 1 |
| FCF | -0.742 | 0.379 | 4 | 1 | 9 | 4 | 5 | 0 |
| CHG_FCF | 0.001 | 0.663 | 0 | 0 | 5 | 0 | 9 | 0 |
| CASH | -0.103 | 0.460 | 2 | 1 | 8 | 1 | 6 | 1 |
| CHG_CASH | 0.232 | 0.563 | 1 | 0 | 5 | 0 | 9 | 1 |
| DEBT_AT | 0.276 | 0.258 | 3 | 2 | 2 | 1 | 12 | 2 |
| CHG_DEBT_AT | 0.459 | 0.131 | 6 | 2 | 0 | 0 | 14 | 6 |
| DESC INCOME | -1.083 | 0.303 | 6 | 0 | 11 | 6 | 3 | 0 |
| DELTA TOT MFG INV | -0.452 | 0.068 | 8 | 3 | 14 | 8 | 0 | 0 |
| FG COMPLETED PER AT | 0.889 | 0.552 | 0 | 1 | 6 | 0 | 8 | 0 |
| TOT MFG COST PER AT | -0.898 | 0.559 | 0 | 0 | 8 | 0 | 6 | 0 |
| OPERATING LEVERAGE | -0.022 | 0.000 | 14 | 0 | 14 | 14 | 0 | 0 |
| "Full Model" Average Adjusted R-Square and Average Number of Firms Studied Each Year | | | | | | | | |
| Avg. Adj. R2: | 0.217 | | | | | | | |
| Avg. # of Firms per Year: | 467 | | | | | | | |

Table 14
Wholesale, Retail, and Primary Products
Dependent Variable = One-Year-Ahead EPS Change (CEPS1)
Averages 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) | -0.061 | 0.530 | 1 | 0 | 12 | 1 | 6 | 0 |
| CHGEPS | -0.451 | 0.024 | 14 | 3 | 17 | 13 | 1 | 1 |
| INV | -0.008 | 0.461 | 2 | 0 | 12 | 2 | 6 | 0 |
| AR | 0.002 | 0.498 | 3 | 0 | 13 | 2 | 5 | 1 |
| GM | 0.086 | 0.385 | 3 | 3 | 8 | 2 | 10 | 1 |
| SA | -0.161 | 0.368 | 3 | 2 | 13 | 3 | 5 | 0 |
| ETR | -0.318 | 0.167 | 8 | 2 | 12 | 7 | 6 | 1 |
| LF | 0.000 | 0.523 | 2 | 0 | 9 | 2 | 9 | 0 |
| CAPX | 0.010 | 0.479 | 2 | 0 | 3 | 0 | 15 | 2 |
| MKTSHR | 0.103 | 0.489 | 0 | 2 | 10 | 0 | 8 | 0 |
| CHG_MKTSHR | -0.069 | 0.567 | 3 | 1 | 12 | 3 | 6 | 0 |
| MU | 0.036 | 0.576 | 2 | 0 | 6 | 1 | 12 | 1 |
| CHG_MU | 0.324 | 0.280 | 6 | 1 | 7 | 1 | 11 | 5 |
| FCF | -0.061 | 0.423 | 2 | 1 | 7 | 0 | 11 | 2 |
| CHG_FCF | 0.001 | 0.692 | 0 | 0 | 7 | 0 | 11 | 0 |
| CASH | 0.024 | 0.460 | 1 | 1 | 4 | 1 | 14 | 0 |
| CHG_CASH | 0.082 | 0.578 | 0 | 1 | 8 | 0 | 10 | 0 |
| DEBT_AT | 0.096 | 0.407 | 3 | 1 | 5 | 0 | 13 | 3 |
| CHG_DEBT_AT | 0.143 | 0.360 | 3 | 2 | 2 | 0 | 16 | 3 |
| DISCRETIONARY INCOME | -0.333 | 0.429 | 2 | 2 | 11 | 2 | 7 | 0 |
| OPERATING LEVERAGE | 0.000 | 0.515 | 3 | 0 | 10 | 3 | 8 | 0 |

| "Full Model" Average Adjusted R-Square and Average Number of Firms Studied Each Year | |
|---|---|
| Avg. Adj. R2: | 0.152 |
| Avg. # of Firms per Year: | 475 |

Table 15
Wholesale, Retail, and Primary Products
Dependent Variable = "Conventional" Long-Term Growth (CEPSL)
Averages 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) | 0.061 | 0.303 | 0 | 4 | 2 | 0 | 12 | 0 |
| CHGEPS | -0.242 | 0.329 | 5 | 0 | 12 | 5 | 2 | 0 |
| INV | -0.014 | 0.487 | 1 | 1 | 8 | 1 | 6 | 0 |
| AR | 0.004 | 0.624 | 1 | 0 | 9 | 0 | 5 | 1 |
| GM | 0.101 | 0.300 | 3 | 2 | 7 | 0 | 7 | 3 |
| SA | 0.018 | 0.349 | 2 | 1 | 6 | 1 | 8 | 1 |
| ETR | -0.029 | 0.542 | 0 | 0 | 7 | 0 | 7 | 0 |
| LF | 0.017 | 0.367 | 3 | 0 | 7 | 0 | 7 | 3 |
| CAPX | 0.007 | 0.408 | 2 | 1 | 7 | 1 | 7 | 1 |
| MKTSHR | -0.005 | 0.611 | 0 | 0 | 8 | 0 | 6 | 0 |
| CHG_MKTSHR | -0.005 | 0.341 | 0 | 2 | 7 | 0 | 7 | 0 |
| MU | 0.001 | 0.417 | 0 | 2 | 5 | 0 | 9 | 0 |
| CHG_MU | 0.067 | 0.370 | 3 | 1 | 5 | 1 | 9 | 2 |
| FCF | -0.076 | 0.485 | 1 | 0 | 7 | 1 | 7 | 0 |
| CHG_FCF | 0.001 | 0.487 | 0 | 0 | 2 | 0 | 12 | 0 |
| CASH | 0.091 | 0.496 | 2 | 0 | 5 | 0 | 9 | 2 |
| CHG_CASH | 0.113 | 0.490 | 0 | 1 | 7 | 0 | 7 | 0 |
| DEBT_AT | -0.012 | 0.531 | 1 | 0 | 7 | 1 | 7 | 0 |
| CHG_DEBT_AT | 0.048 | 0.556 | 0 | 1 | 4 | 0 | 10 | 0 |
| DISCRETIONARY INCOME | 0.028 | 0.445 | 1 | 1 | 5 | 0 | 9 | 1 |
| OPERATING LEVERAGE | 0.006 | 0.007 | 14 | 0 | 0 | 0 | 14 | 14 |
| "Full Model" Average Adjusted R-Square and Average Number of Firms Studied Each Year | | | | | | | | |
| Avg. Adj. R2: | 0.106 | | | | | | | |
| Avg. # of Firms per Year: | 214 | | | | | | | |

Table 16
Wholesale, Retail, and Primary Products
Dependent Variable = "Experimental" Long-Term Growth (EXP_CEPSL)
Averages 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) | -0.035 | 0.352 | 1 | 0 | 8 | 1 | 6 | 0 |
| CHGEPS | -0.421 | 0.302 | 6 | 0 | 10 | 6 | 4 | 0 |
| INV | -0.024 | 0.457 | 0 | 0 | 9 | 0 | 5 | 0 |
| AR | -0.071 | 0.448 | 2 | 1 | 9 | 2 | 5 | 0 |
| GM | 0.425 | 0.388 | 5 | 0 | 3 | 0 | 11 | 5 |
| SA | 0.337 | 0.316 | 4 | 0 | 0 | 0 | 14 | 4 |
| ETR | -0.308 | 0.484 | 1 | 0 | 7 | 1 | 7 | 0 |
| LF | -0.130 | 0.341 | 2 | 0 | 8 | 1 | 6 | 1 |
| CAPX | 0.103 | 0.165 | 5 | 3 | 1 | 0 | 13 | 5 |
| MKTSHR | 0.279 | 0.612 | 0 | 0 | 3 | 0 | 11 | 0 |
| CHG_MKTSHR | -0.321 | 0.277 | 4 | 0 | 12 | 4 | 2 | 0 |
| MU | 0.047 | 0.428 | 1 | 2 | 2 | 0 | 12 | 1 |
| CHG_MU | 0.145 | 0.383 | 2 | 1 | 4 | 0 | 10 | 2 |
| FCF | -0.343 | 0.505 | 0 | 2 | 9 | 0 | 5 | 0 |
| CHG_FCF | -0.001 | 0.587 | 1 | 0 | 9 | 0 | 5 | 1 |
| CASH | 0.056 | 0.485 | 0 | 1 | 7 | 0 | 7 | 0 |
| CHG_CASH | 0.199 | 0.571 | 1 | 0 | 7 | 0 | 7 | 1 |
| DEBT_AT | 0.288 | 0.375 | 2 | 2 | 2 | 0 | 12 | 2 |
| CHG_DEBT_AT | 0.446 | 0.281 | 5 | 0 | 2 | 0 | 12 | 5 |
| DISCRETIONARY INCOME | -1.101 | 0.282 | 5 | 2 | 13 | 5 | 1 | 0 |
| OPERATING LEVERAGE | -0.016 | 0.005 | 13 | 1 | 14 | 13 | 0 | 0 |

| "Full Model" Average Adjusted R-Square and Average Number of Firms Studied Each Year | |
|---|---|
| Avg. Adj. R2: | 0.167 |
| Avg. # of Firms per Year: | 352 |

Table 17
Services
Dependent Variable = One-Year-Ahead EPS Change (CEPS1)
Averages 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) | -0.153 | 0.272 | 5 | 2 | 14 | 5 | 4 | 0 |
| CHGEPS | -0.383 | 0.047 | 14 | 1 | 17 | 14 | 1 | 0 |
| AR | -0.053 | 0.562 | 1 | 0 | 12 | 1 | 6 | 0 |
| GM | 0.000 | 0.588 | 2 | 0 | 10 | 1 | 8 | 1 |
| ETR | 0.232 | 0.323 | 3 | 3 | 9 | 1 | 9 | 2 |
| LF | -0.012 | 0.483 | 1 | 0 | 10 | 1 | 8 | 0 |
| SA | -0.083 | 0.516 | 2 | 1 | 12 | 2 | 6 | 0 |
| MKTSHR | -0.277 | 0.576 | 1 | 1 | 13 | 1 | 5 | 0 |
| CHG_MKTSHR | -0.020 | 0.451 | 2 | 1 | 13 | 2 | 5 | 0 |
| MU | 0.001 | 0.649 | 0 | 0 | 7 | 0 | 11 | 0 |
| CHG_MU | 0.013 | 0.566 | 3 | 0 | 11 | 1 | 7 | 2 |
| FCF | 0.120 | 0.357 | 3 | 1 | 6 | 1 | 12 | 2 |
| CHG_FCF | 0.001 | 0.534 | 0 | 0 | 8 | 0 | 10 | 0 |
| CASH | 0.242 | 0.354 | 3 | 1 | 4 | 0 | 14 | 3 |
| CHG_CASH | -0.113 | 0.441 | 1 | 1 | 14 | 1 | 4 | 0 |
| DEBT_AT | 0.278 | 0.172 | 9 | 2 | 2 | 0 | 16 | 9 |
| CHG_DEBT_AT | 0.116 | 0.402 | 3 | 0 | 4 | 0 | 14 | 3 |
| DISCRETIONARY INCOME | -0.081 | 0.372 | 5 | 3 | 12 | 4 | 6 | 1 |
| OPERATING LEVERAGE | 0.000 | 0.564 | 1 | 0 | 9 | 1 | 9 | 0 |
| "Full Model" Average Adjusted R-Square and Average Number of Firms Studied Each Year | | | | | | | | |
| Avg. Adj. R2: | 0.181 | | | | | | | |
| Avg. # of Firms per Year: | 347 | | | | | | | |

Table 18
Services
Dependent Variable = “Conventional” Long-Term Growth (CEPSL)
Averages 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) | 0.037 | 0.327 | 4 | 0 | 6 | 0 | 8 | 4 |
| CHGEPS | 0.027 | 0.430 | 3 | 2 | 7 | 1 | 7 | 2 |
| AR | -0.004 | 0.454 | 0 | 0 | 7 | 0 | 7 | 0 |
| GM | 0.083 | 0.387 | 0 | 2 | 4 | 0 | 10 | 0 |
| ETR | -0.855 | 0.485 | 2 | 0 | 9 | 2 | 5 | 0 |
| LF | 0.091 | 0.438 | 1 | 0 | 3 | 0 | 11 | 1 |
| SA | 0.014 | 0.382 | 2 | 1 | 6 | 0 | 8 | 2 |
| MKTSHR | 0.173 | 0.566 | 0 | 1 | 3 | 0 | 11 | 0 |
| CHG_MKTSHR | 0.055 | 0.557 | 1 | 0 | 4 | 0 | 10 | 1 |
| MU | -0.005 | 0.393 | 0 | 1 | 9 | 0 | 5 | 0 |
| CHG_MU | 0.082 | 0.454 | 3 | 0 | 5 | 0 | 9 | 3 |
| FCF | -0.188 | 0.364 | 3 | 2 | 9 | 2 | 5 | 1 |
| CHG_FCF | 0.000 | 0.468 | 1 | 0 | 7 | 0 | 7 | 1 |
| CASH | 0.048 | 0.543 | 0 | 0 | 6 | 0 | 8 | 0 |
| CHG_CASH | -0.099 | 0.452 | 1 | 1 | 8 | 1 | 6 | 0 |
| DEBT_AT | -0.007 | 0.512 | 1 | 2 | 7 | 1 | 7 | 0 |
| CHG_DEBT_AT | -0.028 | 0.392 | 0 | 1 | 8 | 0 | 6 | 0 |
| DISCRETIONARY INCOME | 0.142 | 0.272 | 4 | 2 | 5 | 2 | 9 | 2 |
| OPERATING LEVERAGE | 0.012 | 0.095 | 10 | 0 | 0 | 0 | 14 | 10 |

| “Full Model” Average Adjusted R-Square and Average Number of Firms Studied Each Year | |
|---|---|
| Avg. Adj. R2: | 0.156 |
| Avg. # of Firms per Year: | 107 |

Table 19
Services
Dependent Variable = "Experimental" Long-Term Growth (CEPSL)
Averages 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) | -0.079 | 0.319 | 3 | 0 | 8 | 1 | 6 | 2 |
| CHGEPS | -0.061 | 0.575 | 0 | 0 | 11 | 0 | 3 | 0 |
| AR | -0.149 | 0.465 | 2 | 1 | 8 | 2 | 6 | 0 |
| GM | 0.204 | 0.381 | 0 | 0 | 2 | 0 | 12 | 0 |
| ETR | -0.461 | 0.382 | 1 | 0 | 9 | 1 | 5 | 0 |
| LF | 0.111 | 0.395 | 1 | 1 | 8 | 0 | 6 | 1 |
| SA | 0.223 | 0.375 | 1 | 3 | 2 | 0 | 12 | 1 |
| MKTSHR | 0.247 | 0.535 | 0 | 1 | 7 | 0 | 7 | 0 |
| CHG_MKTSHR | -0.311 | 0.406 | 4 | 0 | 11 | 4 | 3 | 0 |
| MU | 0.010 | 0.443 | 0 | 1 | 5 | 0 | 9 | 0 |
| CHG_MU | -0.035 | 0.562 | 0 | 0 | 8 | 0 | 6 | 0 |
| FCF | -0.519 | 0.521 | 2 | 0 | 10 | 2 | 4 | 0 |
| CHG_FCF | 0.002 | 0.489 | 1 | 0 | 7 | 0 | 7 | 1 |
| CASH | -0.079 | 0.409 | 1 | 0 | 9 | 0 | 5 | 1 |
| CHG_CASH | 0.152 | 0.441 | 2 | 1 | 7 | 0 | 7 | 2 |
| DEBT_AT | 0.403 | 0.393 | 3 | 1 | 4 | 0 | 10 | 3 |
| CHG_DEBT_AT | 0.190 | 0.409 | 0 | 3 | 3 | 0 | 11 | 0 |
| DISCRETIONARY INCOME | -0.316 | 0.466 | 3 | 0 | 12 | 3 | 2 | 0 |
| OPERATING LEVERAGE | -0.025 | 0.016 | 12 | 1 | 14 | 12 | 0 | 0 |
| "Full Model" Average Adjusted R-Square and Average Number of Firms Studied Each Year | | | | | | | | |
| Avg. Adj. R2: | 0.165 | | | | | | | |
| Avg. # of Firms per Year: | 214 | | | | | | | |

## 5.2. Discussion of Results for the AB-97 Fundamental Signals

Following is an analysis of the results for each of the fundamental signals. The results from using the AB-97 signals are first analyzed. Then, the results from using the Added Signals are discussed. Each signal has three figures that summarize the results for that signal in predicting (1) next-year EPS change, (2) Conventional CEPSL and (3) Experimental CEPSL. The results displayed in figure summaries come directly from applicable tables 8 through 19, and for the AB-97 signals, from table 2 in AB-97. The results shown for “With Analysts’ Forecast 1991-2008” in the CEPS1 figures are taken from table 31, and the results shown for “With Analysts’ Forecast 1991-2004” in the Conventional CEPSL figures are taken from table 32. Tables 31 and 32 show the results, when the AB-97 condition is applied requiring the existence of at least one analyst’s forecast. For each Added signal, the discussion includes:

- The accounting concept(s) that guided the identification or creation of the signal
- A definition of the fundamental signal, including a review of the formula to compute the signal, that is also given in table 4
- A discussion of the hypothesized expected results
- A discussion of the regression results shown in applicable tables 8 through 19 and summarized in the signal’s figure is compared to the hypothesized results

CAPX is used by both LT-93 and AB-97. As shown in table 2, CAPX is $\Delta IndustryCAPX - \Delta FirmCAPX$ where industry CAPX is based on the studied firm’s 2-digit SIC code. Figure 2 summarizes the findings for the CAPX signal.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1990 | 0.005 | 8 (1) | 0 (0) |
| With Analysts’ Forecast 1991-2008 | 0.006 | 13 (3) | 5 (1) |
| ALL-except-Services 1991-2008 | 0.023 | 15 (2) | 3 (0) |
| Wholesale, Retail, and Primary Products 1990-2008 | 0.010 | 15 (2) | 3 (0) |
| Manufacturing 1990-2008 | 0.009 | 15 (1) | 3 (0) |

Figure 2
CAPX –> One-Year EPS Change (CEPS1)

Figure 2 indicates this study's results for CAPX in predicting next-year earnings change during 1991-2008 generally agree with and continue the AB-97's results for 1983-1990. The fewer number of years in which CAPX was a significant predictor of next-year earnings suggests capital expenditures' effect on future earnings generally takes longer than one year. Also, the signs of the beta coefficients for 1991-2008 are mostly positive, and thus generally agree with AB-97's results 1983-1990. As AB-97 note, "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 (LT-93), 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 the 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 hypotheses." Although relatively weak in the near-term, the *a priori* expectation was that CAPX would be "good news" for future earnings growth and that the CAPX coefficient would be negative when CAPX was used to predict long-term growth. Hence, increased CAPX would be "good news" in the long-term, as the long-term effects of the capital expenditures were realized.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1987 | 0.008 | 4 (0) | 1 (0) |
| With Analysts' Forecast 1991-2004 | 0.006 | 8 (1) | 6 (0) |
| ALL-except-Services 1991-2004 | 0.082 | 14 (8) | 0 (0) |
| Wholesale, Retail and Primary Products 1991-2004 | 0.103 | 13 (5) | 1 (0) |
| Manufacturing 1991-2004 | 0.081 | 12 (3) | 2 (0) |

Figure 3
CAPX –> Long-Term Growth (Experimental CEPSL used for 1991-2004)

As shown in Figure 3, this study's "With Analysts' Forecast 1991 -2004" results are comparable to the "AB-97 1983 – 1987" results. When conditioned on the requirement that the studied firms must be followed by at least one security analyst, it is likely that smaller and, hence, generally higher risk firms are excluded from the study. The results shown in the last three rows of figure 3 were obtained without conditioning on the requirement that the firms be followed by analysts. For the "All-except-Services" firms, CAPX was significant (alpha = .05) and *positive* in predicting Experimental Long-Term Growth in 8 of 14 years between 1991 and 2004, and (not shown in Figure 3) marginally significant (alpha = .10) in one additional year. An increase in CAPX relative to the industry average CAPX was expected to be good news for long-term growth and vice versa. But, the results with the Experimental CEPSL appear to be consistent with increased CAPX being "bad news" when more risky firms are included.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1987 | 0.008 | 4 (0) | 1 (0) |
| With Analysts' Forecast 1991-2004 | 0.006 | 8 (1) | 6 (0) |
| ALL-except-Services 1990-2004 | 0.007 | 12 (1) | 2 (0) |
| Wholesale, Retail, and Primary Products 1990-2004 | 0.007 | 7 (1) | 7 (1) |
| Manufacturing 1990-2004 | 0.003 | 8 (1) | 6 (0) |

Figure 4
CAPX –> Long-Term Growth (Conventional CEPSL used for 1991-2004)

AB-97's table 2 results show CAPX was not a significant predictor of Conventional CEPSL (not significant in any year during 1983-1987), and this study's results for 1991-2004, displayed in figure 4, also show CAPX is not a strong predictor of Conventional CEPSL (significant in only one of fourteen years during 1991-2004 for "All-except-Services" firms). The CAPX signal's weaker relationship to Conventional CEPSL vis-à-vis Experimental CEPSL is perhaps the result of the Conventional CEPSL not being able to evaluate firms with negative five-years-ahead earnings, that is, with a loss in the five-years-ahead year. When the long-term losses are included, both the negative and the positive future earnings are studied, as is done with CEPS1. Thus, the Experimental CEPSL is able to indicate information about the CAPX signal that is not provided using the Conventional CEPSL.

The results shown in figure 4 for CAPX for "Manufacturing" and "Wholesale, Retail, and Primary Products" generally follow the finding discussed above for the "All but Services" category of firms. The CAPX signal was not used for the "Service" category of firms, because many Service firms had a zero CAPX.

AR is $\Delta AR - \Delta Sales$. AB-97 expected the AR signal coefficient to be negative in predicting next-year earnings change, but, as depicted in figure 5, their study unexpectedly showed it to be positive.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1990 | 0.009 | 7 (0) | 1 (0) |
| With Analysts' Forecast 1991-2008 | 0.002 | 14 (0) | 4 (2) |
| ALL-except-Services 1991-2008 | -0.026 | 6 (0) | 12 (1) |
| Wholesale, Retail, and Primary Products 1991-2008 | 0.002 | 5 (1) | 13 (2) |
| Manufacturing 1991-2008 | 0.112 | 7 (0) | 11 (1) |
| Services 1991-2008 | -0.053 | 6 (0) | 12 (1) |

Figure 5
AR –> One-Year EPS Change (CEPS1)

When conditioned by requiring at least one analyst forecast for next-year earnings exist one month after the current year's earnings announcement date, as required in AB-97, this study also found the AR coefficient to be generally positive (positive in 14 of 18 years studied). However, without the analyst's forecast requirement, this study's results for AR in predicting next-year earnings change during 1991-2008 found a greater number of years where the AR coefficient was negative. As shown in figure 5, for the ALL-except-Services; Wholesale-Retail-Primary-Products; Manufacturing and Services categories, there were twelve, thirteen, eleven, and twelve years respectively out of the eighteen years studied where the AR coefficient was negative. Regarding the significance of the AR signal, for the ALL-except-Services category, the lower significance (only one year significant at alpha = .05 out of eighteen years studied during 1991-2008) generally agrees with AB-97 results (not significant in any of the eight years studied during 1983-1990).

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1987 | -0.029 | 1 (0) | 4 (1) |
| With Analysts' Forecast 1991-2004 | 0.011 | 8 (1) | 6 (0) |
| ALL-except-Services 1991-2004 | 0.009 | 7 (0) | 7 (0) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.004 | 5 (1) | 9 (0) |
| Manufacturing 1991-2004 | 0.003 | 7 (1) | 7 (0) |
| Services 1991-2004 | -0.004 | 7 (0) | 7 (0) |

Figure 6
AR –> Long-Term Growth (Conventional CEPSL used for 1991-2004)

In predicting long-term growth, figure 6 shows AB-97's AR coefficient had an average value of -0.029 and was negative in four of the five years studied during 1983-1987 with one of the negative years also significant at alpha = .05. For 1991-2004 in predicting Conventional CEPSL, this study found the average AR coefficient for the ALL-except-Services, Wholesale-Retail-Primary-Products, Manufacturing and Services categories to be 0.009, 0.004, 0.003 and -0.004 respectively, and the number of negative AR coefficients for the ALL, Non-Manufacturing, Manufacturing and Services categories to be 7, 9, 7 and 7 respectively, a generally mixed result.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1987 | -0.029 | 1 (0) | 4 (1) |
| ALL-except-Services 1991-2004 | -0.100 | 2 (0) | 12 (3) |
| Wholesale, Retail, and Primary Products 1991-2004 | -0.071 | 5 (0) | 9 (2) |
| Manufacturing 1991-2004 | -0.194 | 2 (0) | 12 (3) |
| Services 1991-2004 | -0.149 | 6 (0) | 8 (2) |

Figure 7
AR –> Long-Term Growth (Experimental CEPSL Used for 1991-2004)

As shown in figure 7, this study's results for predicting Experimental CEPSL more closely matched the AB-97 results. The majority of the yearly coefficients were negative, and several of the negative yearly coefficients were significant. For example, the ALL-except-Services category in predicting Experimental CEPSL has twelve yearly AR coefficients negative and three of these twelve significant at alpha =.05, with one addition year having a negative coefficient that was marginally significant at alpha = .10. Again, the Conventional CEPSL allows for only positive EPS values in the geometric mean growth rate formula, and therefore excludes firms with a negative EPS (loss) in the five-years-ahead year. The Experimental CEPSL DV allows for both negative and positive EPS in the calculation of CEPSL. Therefore, the effects of disproportionate changes in AR in relation to sales are studied for both the negative and positive EPS cases. When AR increases and sales decrease, this is "bad news" for future earnings, and a positive relationship should exist between AR signal and future earnings. Likewise, an AR decrease combined with a sales increase should be "good news" for future earnings, and a negative relationship should exist between the AR signal and the future earnings.

The INV signal is defined as $\Delta Inventory - \Delta Sales$. AB-97 states, "An increase in finished goods inventory that outstrips sales demand is predicted to indicate bad news for earnings and vice versa." In some situations, management may be able to improve profits by keeping excess inventory. Stockpiling excess inventory when the demand is expected to increase, the cost of the inventory is expected to rise, and the risk of spoilage and obsolescence is low may be "good news" for future earnings. In addition, purchasing larger quantities may provide order-quantity discounts. For manufacturing companies, having excess inventory ("safety stock") for certain items that have long manufacturing or purchase lead-times may prevent shortages of these items that could temporarily stop production. However, a firm's ability to manage its inventory levels to match expected demand should improve the firm's earnings performance. Many manufacturing firms have implemented Enterprise Resource Planning (ERP) systems that plan purchasing and production levels in accordance with forecast demand, and thereby help to avoid the costs of carrying excess inventory, such as excess storage costs, shrinkage and obsolescence.

When predicting next-year earnings CEPS1, AB-97 report in their table 2 that the INV signal coefficient had an average value of -0.017 and was negative in all eight years studied between 1983 and 1990, with four of the eight coefficients being significant. This study found similar results for 1991-2008. As shown in figure 8, the average coefficients for all of the firm categories except Manufacturing were negative, and each of the categories had either eleven or twelve out of eighteen years where the coefficient was negative. For all categories, all of the significant yearly coefficients were negative.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1990 | -0.017 | 0 (0) | 8 (4) |
| With Analysts' Forecast 1991-2008 | -0.007 | 6 (0) | 12 (3) |
| ALL-except-Services 1991-2008 | -0.016 | 7 (0) | 11 (0) |
| Wholesale, Retail, and Primary Products 1991-2008 | -0.008 | 6 (0) | 12 (2) |
| Manufacturing 1991-2008 | 0.009 | 7 (0) | 11 (1) |

Figure 8
INV –> One-Year EPS Change (CEPS1)

In predicting long-term growth, AB-97 found that the INV signal had an average coefficient of .004 and was positive in three years and negative in two years, with none of the yearly INV coefficients significant during 1983-1987. As figure 9 shows, when using the Conventional CEPSL and conditioning on the requirement that the firm have at least one analyst's forecast, this studies results for 1991-2004 generally correspond to the AB-87 results, with the majority of the yearly coefficients being positive, although the 1991-2004 average coefficient is negative (-0.006). However, when the requirement for the Analysts' forecast is dropped, each category shows more of the yearly coefficients are negative than positive, as well as the average coefficient being negative.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1987 | 0.004 | 3 (0) | 2 (0) |
| With Analysts' Forecast 1991-2004 | -0.006 | 8 (0) | 6 (0) |
| ALL-except-Services 1991-2004 | -0.011 | 5 (0) | 9 (1) |
| Wholesale, Retail, and Primary Products 1991-2004 | -0.014 | 6 (0) | 8 (1) |
| Manufacturing 1991-2004 | -0.017 | 6 (0) | 8 (0) |

Figure 9
INV –> Long-Term Growth (Conventional CEPSL Used for 1991-2004)

Figure 10 indicates that, when predicting long-term growth measured by Experimental CEPSL, the sign of the direction of the relationship may vary by category. For the "ALL-except-Services" category of firms, the average value of the INV coefficient was a negative -0.040 and the INV coefficient was negative in twelve of the fourteen years studied, with two of the twelve negative coefficients significant at alpha = .05, and an additional one of the twelve marginally significant at alpha = .10.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1987 | 0.004 | 3 (0) | 2 (0) |
| ALL-except-Services 1991-2004 | -0.040 | 2 (0) | 12 (2) |
| Wholesale, Retail, and Primary Products 1991-2004 | -0.024 | 5 (0) | 9 (0) |
| Manufacturing 1991-2004 | 0.084 | 9 (2) | 5 (0) |

Figure 10
INV –> Long-Term Growth (Experimental CEPSL Used for 1991-2004)

Similarly, for Wholesale, Retail, and Primary Products, the average coefficient was negative, and nine of fourteen yearly coefficients were negative. In contrast, for Manufacturing, the average coefficient was a positive 0.084 and the yearly coefficients were positive nine out of fourteen years, with two of these years being significant. The positive average coefficient (0.084) for manufacturing firms indicates that an increase in finished goods inventory that outstrips sales demand is “bad news” for future earnings. This result may be due, at least in part, to manufacturing firms’ having to use absorption costing, whereby current-year manufacturing costs are absorbed into the value of unfinished work-in-process and unsold finished goods and are not expensed as COGS until the period when the finished goods are sold. As such, absorption costing benefits the current-year earnings at the expense of the future years’ earnings.

The INV signal defined in LT-93/AB-97 uses only finished inventory and not raw materials or work-in-process inventories, when studying manufacturing firms. According to the INV definition, finished goods inventory is used when nonzero;

otherwise, total inventory is used. But, since finished goods inventory is typically nonzero for manufacturing firms, raw materials and work-in-process inventories are generally are not used in the INV signal.   This study examines a manufacturing-specific Added fundamental signal, "DELTA_TOT_MFG_INV" that evaluates the change in total manufacturing inventory (raw materials plus work-in-process plus finished goods).  The results for this Added signal are reported and compared to the INV results in the discussion on DELTA_TOT_MFG_INV.

Figure 11 summarizes the findings for AB-97 and this study for the General Selling and Administrative signal, S&A ( $\Delta xsga - \Delta sales$ ) in predicting next-years earning change (data copied from AB-97 table 2 and this study's tables 8 through 19).

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1990 | -0.010 | 4 (0) | 4 (2) |
| With Analysts' Forecast 1991-2008 | -0.025 | 7 (1) | 11 (3) |
| ALL-except-Services 1991-2008 | 0.020 | 7 (1) | 11 (3) |
| Wholesale, Retail, and Primary Products 1991-2008 | -0.161 | 5 (0) | 13 (3) |
| Manufacturing 1991-2008 | -0.106 | 6 (2) | 12 (3) |
| Services 1991-2008 | -0.083 | 6 (0) | 12 (2) |

Figure 11
S&A –> One->Year EPS Change (CEPS1)

The evidence for 1991-2008 generally agrees with AB-97 findings for 1983-1990.  In every category for 1991-2008, there are between eleven and thirteen years out of eighteen studied where the yearly coefficient is negative, and either two or three of these negative yearly coefficients are significant. These findings correspond with the four-of-eight negative coefficients found by AB-97 for 1983-1990, with two of these four significant.

For 1991-2008, the “ALL-except-Services” category had a positive average coefficient (0.020) and Manufacturing firms had six-of-eighteen years studied where the yearly coefficient was positive, with two of these six significant. AB-97 found the average coefficient for 1983-1990 was not significant, and the S&A signal was “informative in only the bad news partition.” As discussed in this dissertation’s section on Operating Leverage, S&A costs are generally considered to be fixed. How well a firm manages its fixed costs can have a multiplying effect on earnings, either negatively when sales decrease or positively when sales increase. This multiplying effect is intended to be measured by Operating Leverage.

The lack of any significantly positive yearly coefficient for Services and Wholesale-Retail-Primary-Products may indicate the flexibility these firms have in managing their fixed S&A costs vis-à-vis Manufacturing firms. AB-97 table 6 does not report S&A by industry.

Figure 12 summarizes the findings for AB-97 and this study for the S&A signal in predicting long-term growth, where the Conventional CEPSL dependent variable is used in this study for 1991-2004 (data copied from AB-97 table 2 and this study’s tables 8 through 19).

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1987 | 0.091 | 3 (2) | 2 (0) |
| With Analysts' Forecast 1991-2004 | -0.041 | 6 (0) | 8 (2) |
| ALL-except-Services 1991-2004 | 0.005 | 8 (2) | 6 (2) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.018 | 8 (1) | 6 (1) |
| Manufacturing 1991-2004 | 0.033 | 8 (1) | 6 (0) |
| Services 1991-2004 | 0.014 | 8 (2) | 6 (0) |

Figure 12
S&A –> Long-Term Growth (Conventional CEPSL Used for 1991-2004)

Except for the "With Analysts' Forecast," the results for 1991-2004 appear to generally agree with the AB-97 1983-1987 results. It may be that firms not followed by analysts' have more risk (for example, are smaller firms), and hence have a more positive S&A coefficient in predicting Conventional S&A. For firms with more inherent risk (not followed by analysts), increases in selling and administrative costs disproportionate to sales may be worse news than for firms followed by analysts.

Figure 13 summarizes the findings for AB-97 and this study for the S&A signal in predicting long-term growth, where the Experimental CEPSL variable was the dependent variable. The AB-97 results are for 1983-1987, and the results from this study are for 1991-2004 (data copied from AB-97 table 2 and this study's tables 8 through 19).

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1987 | 0.091 | 3 (2) | 2 (0) |
| ALL-except-Services 1991-2004 | 0.262 | 13 (7) | 1 (0) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.337 | 14 (4) | 0 (0) |
| Manufacturing 1991-2004 | 0.314 | 12 (4) | 2 (0) |
| Services 1990-2004 | 0.223 | 12 (1) | 2 (0) |

Figure 13
S&A –> Long-Term Growth (Experimental CEPSL Used for 1991-2004)

The evidence shown in figure 13 for 1991-2004 using the Experimental CEPSL is more definite vis-à-vis using the Conventional CEPSL that increases in S&A expenses disproportionate to sales in the current year are *bad news* for long-term growth. In every category, the number of negative yearly coefficients is two or less, with none of the negative yearly coefficients being significant, while there are twelve or more positive yearly coefficients in every category, with all significant yearly coefficients being positive. The evidence for Services is less strong than for Manufacturing and Wholesale-Retail-Primary-Products, where only one-of-fourteen yearly coefficients is significant while four-of- fourteen are significant for both Manufacturing and Wholesale-Retail-Primary-Products. Assuming general selling and administrative expenses are approximately fixed costs (refer to the discussion of Operating Leverage in this dissertation), the evidence is that Services may have more flexibility in managing their fixed GS&A costs than do either Manufacturing or Wholesale-Retail-Primary-Products. Hence, non-Service firms may have more risk associated with their fixed GS&A while Service firms have less risk in their GS&A. This risk variance may be related to the ease of changing levels of GS&A in labor-intensive Service firms vis-à-vis capital-intensive non-Service firms in the face of changing macroeconomic and/or industry-specific conditions. These results correspond to this study's finding for the Operating Leverage signal, which uses GS&A in its proxy and is also more significant in predicting long-term growth than in predicting next-year earnings changes.

Figure 14 summarizes the findings for AB-97 and this study for the Gross Margin signal, GM ( $\Delta Sales - \Delta GM$ ), in predicting next-years earning change (data copied from AB-97 table 2 and this study's tables 8 through 19).

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1990 | -0.031 | 2 (0) | 6 (3) |
| With Analysts' Forecast 1991-2008 | 0.016 | 11 (3) | 7 (2) |
| ALL-except-Services 1991-2008 | 0.071 | 8 (1) | 10 (1) |
| Wholesale, Retail, and Primary Products 1991-2008 | 0.086 | 10 (1) | 8 (2) |
| Manufacturing 1991-2008 | 0.058 | 11 (1) | 7 (0) |
| Services 1991-2008 | 0.000 | 8 (1) | 10 (1) |

Figure 14
GM –>One-Year EPS Change (CEPS1)

The GM signal equals "change in sales" less "change in GM" in the current year. AB-97 comment on the GM signal's mixed results by industry sector, saying, "The evidence in table 6 pertaining to the GM signal is also mixed. As predicted, the signal is most informative about future changes in the wholesale/retail sector, but the coefficients for the remaining sectors are all insignificant." Figure 14 shows the results for 1991-2008 for All-except-Services and Services are both an eight-positive/ten-negative split for the eighteen-yearly coefficients, with one significant negative balanced by one significant positive coefficient. These 1991-2008 results appear to generally correspond with the AB-97 findings regarding the negative "good news" of the GM signal coefficient in predicting next-year earnings change. As with AB-97 Wholesale/Retail industry sector results, this study's 1991-2008 results for Wholesale, Retail, and Primary Products have the GM signal being most informative about next-year earnings change, but even here, only three of the eighteen yearly coefficients are significant. The indecisive nature of the GM signal may stem from gross margin being a directly related function of sales, thereby softening the disproportionate differences between "change in sales" and "change in gross margin." Even when the markup on goods sold decreases, a large enough increase in sales can overcome the loss in markup and provide an increase in gross margin.

Figure 15 summarizes the findings for AB-97 and this study for the GM signal in predicting long-term growth, where the Conventional CEPSL dependent variable is used in this study for 1991-2004 (data copied from AB-97 table 2 and this study's tables 8 through 19).

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1987 | 0.029 | 3 (1) | 2 (1) |
| With Analysts' Forecast 1991-2004 | 0.099 | 8 (1) | 6 (1) |
| ALL-except-Services 1991-2004 | 0.085 | 10 (5) | 4 (1) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.101 | 7 (3) | 7 (0) |
| Manufacturing 1991-2004 | 0.105 | 10 (2) | 4 (0) |
| Services 1991-2004 | 0.083 | 10 (0) | 4 (0) |

Figure 15
GM –> Long-Term Growth (Conventional CEPSL Used for 1991-2004)

AB-97 results for 1983-1987 show the GM signal was indecisive in predicting long-term growth, with the average positive coefficient (0.029) insignificant and three positive/one significant yearly coefficients approximately balanced by two negative/one significant yearly coefficients. When conditioning with the AB-97 requirement that the firms studied must have at least one analyst's forecast one month after the current-year earnings announcement, this study's results for 1991-2004 closely correspond to the AB-97 results for 1983-1987, with the average positive coefficient (0.099) and eight positive/one significant yearly coefficients approximately balanced by six negative/one significant yearly coefficients. However, when the condition for the firm to be followed by analysts is dropped, the GM signal becomes more predominantly positive and significant. For example, for the All-except-Services category of firms, figure 15 shows ten of the fourteen yearly coefficients were positive, and five of these ten were significant. The evidence suggests an increase in sales accompanied by a decrease in gross margin in the current-year can actually be bad news (positive GM coefficient) for long-term growth measured by the Conventional CEPSL signal. This adverse effect appears to be less for Wholesale-Retail-Primary Products firms (seven positive and seven negative coefficients) than it is for Manufacturing and Services firms (ten positive and four negative coefficients). These findings generally follow the AB-97 explanation, "In principal, the GM signal should be informative for all sectors, and most informative for firms operating at thin margins. The prediction is based on the assumption that margin changes have a nontransitory component. The sector with the lowest average profit margins in our sample is wholesale/retail (food stores, durable and nondurable wholesale, and department stores). The sector with the highest margins over our sample period is primary products (chemicals, textiles, apparel, and paper products). The average margin of the manufacturing sector lies between these two."

Figure 16 summarizes the findings for AB-97 and this study for the GM signal in predicting long-term growth, where the Experimental CEPSL dependent variable was used by AB-97 for 1983-1987 and was used in this study for 1991-2004 (data copied from AB-97 table 2 and this study's tables 8 through 19). The results summarized in figure 16 provide more definitive evidence that an increase in sales accompanied by a decrease in gross margin in the current-year can actually be bad news (positive GM coefficient) for long-term growth measured by the long-term growth Experimental CEPSL signal, and vice versa.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1987 | 0.029 | 3 (1) | 2 (1) |
| ALL-except-Services 1991-2004 | 0.368 | 14 (9) | 0 (0) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.425 | 11 (5) | 3 (0) |
| Manufacturing 1991-2004 | 0.511 | 11 (3) | 3 (0) |
| Services 1990-2004 | 0.204 | 12 (0) | 2 (0) |

Figure 16
GM –> Long-Term Growth (Experimental CEPSL Used for 1991-2004)

For example, the “All-except-Services” firms had the GM signal positive in all fourteen of the years studied between 1991 and 2004, and nine of these fourteen yearly coefficients were significant at alpha = .05. For all of the categories shown in Figure 16, a total of eighteen positive yearly coefficients are significant at alpha = .05, but only one negative yearly coefficient was positive at alpha = .05. Once again, the Experimental CEPSL dependent variable provides a better lens by including the “bad news” firms who experience a loss in the five-years-ahead year.

Figure 17 summarizes the findings for AB-97 and this study for the Labor Force signal, LF, in predicting next-years earning change (CEPS1) by AB-97 for 1983-1990 (data copied from AB-97 table 2) and by this study for 1991-2008 (data copied from this study’s tables 8 through 19). The results from this study with the signal LF predicting next-year earnings change for firms that are followed by at least one analyst correspond closely with the results that AB-97 obtained.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1990 | -0.026 | 0 (0) | 8 (3) |
| With Analysts' Forecast 1991-2008 | -0.019 | 6 (0) | 12 (3) |
| ALL-except-Services 1991-2008 | 0.080 | 8 (1) | 10 (2) |
| Wholesale, Retail, and Primary Products 1991-2008 | 0.000 | 9 (0) | 9 (2) |
| Manufacturing 1991-2008 | 0.002 | 8 (0) | 10 (0) |
| Services 1991-2008 | -0.012 | 8 (0) | 10 (1) |

Figure 17
LF –> One-Year EPS Change (CEPS1)

The average coefficient obtained by this study for "With Analysts' Forecast 1991-2008" category (-0.019) corresponds to the average coefficient AB-97 obtained for 1983-1990 (-0.026). Also, the counts of negative (positive) and significant yearly coefficients are fairly comparable, with AB-97 1983-1990 having zero positive (zero significant) and eight negative (three significant), as compared to With Analysts' Forecasts 1991-2008 having six positive (zero significant) and twelve negative (three significant). However, as shown in figure 17, with conditioning on the existence of at least one analyst's forecast eliminated, the number of negative (significant) and positive (significant) yearly coefficients becomes more balanced, and the effect of the LF signal appears less pronounced. For example, the All-except-Services category for 1991-2008 has eight positive (two significant) and ten negative (three positive) yearly coefficients, indicating a less definitive relationship.

Figure 18 summarizes the findings for AB-97 and this study for the LF signal in predicting long-term growth, where the Conventional CEPSL dependent variable is used in this study for 1991-2004 (data copied from AB-97 table 2 and this study's tables 8 through 19).

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1987 | -0.069 | 1 (0) | 4 (2) |
| With Analysts' Forecast 1991-2004 | 0.003 | 7 (0) | 7 (0) |
| ALL-except-Services 1991-2004 | 0.017 | 7 (2) | 7 (0) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.017 | 7 (3) | 7 (0) |
| Manufacturing 1991-2004 | 0.014 | 9 (0) | 5 (0) |
| Services 1991-2004 | -0.012 | 8 (0) | 10 (1) |

Figure 18
LF –> Long-Term Growth (Conventional CEPSL Used for 1991-2004)

Somewhat surprisingly, except for Services, none of the other categories of firms had a negative average LF coefficient for 1991-2004 when predicting Conventional LF. For example, figure 18 shows the "All-except-Services" category of firms had a positive average LF coefficient (0.017) and a balanced seven positive and seven negative yearly coefficients, with two of the positive seven being significant but none of the seven negative being significant. Services did somewhat agree with the AB-97 findings, in that the average coefficient was negative (-0.012), but the split between the sign of the yearly coefficients was not as pronounced, with eight positive and ten negative with only one of the ten negative being significant and none of the eight positive being significant. Similarly, more positive “bad news” coefficients were observed when replicating the AB-97 table 2 results for predicting next-year earnings change, where an average LF coefficient of .020 was obtained, with three positive (one significant) and five negative (zero significant) yearly coefficients, as compaired to AB-97’s -0.26 average coefficient with zero positive and eight negative (three significant) yearly coefficients. (The definition of LF in this analyses was checked and rechecked, and it matches the definition of LF AB-97 given in table 1.)

Figure 19 summarizes the findings for AB-97 and this study for the LF signal in predicting long-term growth, where the Experimental CEPSL dependent variable is used in this study for 1991-2004 (data copied from AB-97 table 2 and this study’s tables 8 through 19).

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1987 | -0.069 | 1 (0) | 4 (2) |
| ALL-except-Services 1991-2004 | -0.051 | 5 (3) | 9 (3) |
| Wholesale, Retail, and Primary Products 1991-2004 | -0.130 | 6 (1) | 8 (1) |
| Manufacturing 1991-2004 | -0.035 | 7 (1) | 7 (2) |
| Services 1990-2004 | 0.111 | 6 (1) | 8 (0) |

Figure 19
LF –> Long-Term Growth (Experimental CEPSL Used for 1991-2004)

Figure 19 shows this study's results for 1991-2004 using the Experimental CEPSL dependent variable obtained average LF coefficients for all of the categories except Services that resemble the average coefficient reported by AB-97 for LF. For example, the "All-except-Services" category of firms had an average LF coefficient of -0.051 for 1991-2004 that is close to the -0.069 average reported by AB-97 in their table 2. But, the 1991-2004 results using the Experimental CEPSL are more balanced than the AB-97 results with respect to the counts of negative versus positive yearly LF coefficients, and also with respect to the counts of negative significant versus positive significant yearly coefficients. For example, the "All-except-Services" firms for 1991-2004 had five positive (three significant) and nine negative (three significant) yearly LF coefficients as compared to the AB-97 results for 1983-1987 of one positive (zero significant) and four negative (two significant).

AB-97 states that results "indicate a strong negative association between both the ETR and LF signals and long-term earnings growth, possibly because these signals capture unidentified risk factors or structural changes." However, the results for 1991-2004 obtained in this study using both the Conventional and the Experimental CEPSL do not appear to provide the strong negative association between LF and long-term growth reported by AB-97. For 1991-2004, the Services category has a positive average LF coefficient (0.111), no significant negative yearly coefficient, and one significant positive yearly coefficient. In contrast, the Manufacturing category has a negative average LF coefficient (-0.035), one significant positive yearly coefficients, and two significant negative yearly coefficients. This evidence suggests that a reduction in labor force may sometimes be good news for Manufacturing firms but bad news for Service firms, when predicting long-term growth. But, again, it is believed that the 1991-2004 results are too mixed to support a generally applicable statement about LF signal's relation to long-term growth.

Figure 20 summarizes the findings for AB-97 and this study for the Effective Tax Rate signal, ETR, in predicting next-years earning change (data copied from AB-97 table 2 and this study's tables 8 through 19).

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1990 | -0.594 | 1 (0) | 7 (7) |
| With Analysts' Forecast 1991-2008 | -0.279 | 1 (0) | 17 (6) |
| ALL-except-Services 1991-2008 | 0.288 | 7 (3) | 11 (6) |
| Wholesale, Retail, and Primary Products 1991-2008 | -0.318 | 6 (1) | 12 (7) |
| Manufacturing 1991-2008 | -0.167 | 3 (0) | 15 (5) |
| Services 1991-2008 | 0.232 | 9 (2) | 9 (1) |

Figure 20
ETR –> One-Year EPS Change (CEPS1)

Figure 20 shows that the AB-97 1983-1990 results for ETR in predicting next-year earnings change are similar to this study's results for 1991-2008 for the "With Analysts' Forecast" category, which matches the AB-97 requirement that the firms they study must be followed by at least one security analyst. As AB-97 states, "To be included in this analysis, we require an analyst forecast pertaining to the respective earnings change horizon one month after an earnings announcement for the reference year. Because firms followed by analysts' may differ systematically from those not followed, this restriction facilitates comparisons with tests of relations between the fundamental signals and forecast revisions/errors." Hence, the results reported in AB-97 table 2 and in this study's "With Analysts' Forecast" category may vary systematically from the other categories shown in figure 20, where the requirement for an analyst's forecast is removed. This difference is evident for the "All-except-Services" category shown in figure 20, where the eighteen-year average ETR coefficient is positive 0.288 as compared to the "With Analysts' Forecast" category average coefficient of negative -0.279 for the same eighteen -year period.

This difference notwithstanding, the "All-except-Services" category for 1991-2008 is similar to the AB-97 1983-1990 and "With Analysts' Forecast" category for 1991-2008 in that the majority (eleven of eighteen) of the yearly coefficients are negative, and the majority of the negative yearly coefficients are significant (six of eleven). The Manufacturing and Wholesale-Retail-Primary-Products categories have similar results, in that 1991-2008 average ETR coefficient is negative, and all but one of the significant yearly coefficients are negative. Except for the Services category, the 1991-2008 results are as expected, with the average coefficient generally negative. As AB-97 say, "a reduction in the effective tax rate (ETR) is said to reflect less persistent earnings, boding poorly for future economic performance." (When the ETR signal has a negative regression coefficient estimate, this situation is interpreted as "good news" for future earnings. LT-93 and AB-97 obtain the negative relationship by subtracting the current year ETR from the three-year average of the prior three years' ETR, as show in AB-97 table 1.)

AB-97 did not include the Service category firms in their study, because the requirement for a nonzero INV signal excludes many of these firms. As defined in this study, Service firms have zero inventory balances. As shown in figure 20, the results for the Services category are considerably different than the other categories, with the eighteen-year average coefficient positive (0.232) with nine-of-eighteen yearly ETR coefficients being positive and two of these nine also significant, while the other nine-of-eighteen are negative with only one of these nine being significant. Contrary to expectations, it appears that a decrease in current-year ETR is more likely to be associated with an increase in future next-year earnings. It may be that Service companies have more flexibility than the other categories of firms to manage their costs in response to changes in the macro economy and/or industry, and therefore are able to more quickly recover from a year where income declined and the effective tax rate decreased. In comparison, Manufacturing firms are likely to be more capital-intensive than Service firms and not have as much flexibility vis-à-vis Manufacturing firms to change their cost structure in relation to changing external economic conditions.

Figure 21 summarizes the findings for AB-97 and this study for the ETR signal in predicting long-term growth, where the Conventional CEPSL dependent variable is used in this study for 1991-2004 and in the AB-97 study for 1983-1987. Figure 22 summarizes the findings for AB-97 and this study for the ETR signal in predicting long-term growth, where the Experimental CEPSL dependent variable is used in this study for 1991-2004 and in the AB-97 study for 1983-1987.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1987 | -1.362 | 0 (0) | 5 (3) |
| With Analysts' Forecast 1991-2004 | 0.160 | 7 (2) | 7 (0) |
| ALL-except-Services 1991-2004 | -0.128 | 3 (0) | 11 (3) |
| Wholesale, Retail, and Primary Products 1991-2004 | -0.029 | 7 (0) | 7 (0) |
| Manufacturing 1991-2004 | 0.001 | 6 (1) | 8 (3) |
| Services 1991-2004 | -0.855 | 5 (0) | 9 (2) |

Figure 21
ETR –> Long-Term Growth (Conventional CEPSL Used for 1991-2004)

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| AB-97 1983-1987 | -1.362 | 0 (0) | 5 (3) |
| ALL-except-Services 1991-2004 | 0.081 | 10 (0) | 4 (1) |
| Wholesale, Retail, and Primary Products 1991-2004 | -0.308 | 7 (0) | 7 (1) |
| Manufacturing 1991-2004 | 0.168 | 7 (1) | 7 (1) |
| Services 1990-2004 | -0.461 | 5 (0) | 9 (1) |

Figure 22
ETR –> Long-Term Growth (Experimental CEPSL Used for 1991-2004)

In summary, the results in both figures 21 and 22 show the relationship between ETR and long-term growth for 1991-2004 was not as strong as the relationship between ETR and next-year earnings change shown in figure 20. The findings indicate that there was the expected negative relationship between ETR and long-term growth, but that the number of significant yearly ETR coefficients is considerably less for long-term growth (for both Experimental and Conventional CEPSL) than it is for next-year earnings.

## 5.3 Discussion of Results for the Added Fundamental Signals

The market share signal, MKTSHR, is based on the FASB Concept Statement No. 6 definition of Revenue as a key element of financial reporting. MKTSHR is defined simply as the ratio of a studied firm's sales in the current-year to the sum of the sales during the current-year for all of the firms in the studied firm's four-digit SIC code industry. This signal seeks to determine how a firm's current-year market share may affect its next-year earnings change and future growth. The expectation is that firms with a larger share of the industry market should be in a better position to increased long-term growth and vice versa. A larger share of the industry market should provide a firm with more survival capability in the event of a macroeconomic or industry downturn, and so the firm's size of market share should be inversely related to the firm's risk. However, regarding next-year earnings change, the results are expected to be mixed. For example, a firm with a smaller market share may have better management and/or more efficient cost structure and thus be able to increase its future market share and profits.

Figure 23 summarizes the results for market share, MKTSHR, predicting next-years earning change (data copied from this study's tables 8 through 19).

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2008 | -0.019 | 4 (0) | 14 (1) |
| Wholesale, Retail, and Primary Products 1991-2008 | 0.103 | 8 (0) | 10 (0) |
| Manufacturing 1991-2008 | 0.016 | 8 (0) | 10 (0) |
| Services 1991-2008 | -0.277 | 5 (0) | 13 (1) |

Figure 23
MKTSHR –> One-Year EPS Change (CEPS1)

As expected, the MKTSHR signal's relationship to next-year earnings change is not is not strong or definitive. As figure 23 shows, only two of all the yearly MKTSHR coefficients for all firm Categories were significant. The positive average coefficients for Manufacturing (0.016) and Wholesale-Retail-Primary-Products (0.103) are consistent with the notion that, for more capital intensive firms, a larger market share is good news for next-year earnings. For Service firms with less capital intensity, a larger market share may be bad news for next-year earnings.

Figure 24 summarizes this study's results for the Market Share fundamental signal, MKTSHR, in predicting long-term growth using the Conventional CEPSL dependent variable for 1991 through 2004 (data copied from this study's tables 8 through 19).

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | -0.036 | 2 (0) | 12 (2) |
| Wholesale, Retail, and Primary Products 1991-2004 | -0.005 | 6 (0) | 8 (0) |
| Manufacturing 1991-2004 | -0.038 | 6 (0) | 8 (0) |
| Services 1991-2004 | 0.173 | 11 (0) | 3 (0) |

Figure 24
MKTSHR –> Long-Term Growth (Conventional CEPSL Used for 1991-2004)

Using the Conventional CEPSL dependent variable, figure 24 shows that, as was the case in predicting next year's earnings, MKTSHR is not a significant predictor of long-term growth. For all four of the Categories of firms studied, only two yearly coefficients were significant (two of the twelve negative yearly coefficients for the ALL-except-Services category). Except for the ALL-except-Services Category, the sign of the average coefficients shown in figure 24 is opposite from what is shown in figure 23. For example, Service firms' current market share is inversely related to next-year's earnings but is directly related to long-term growth, and vice-versa for non-Service firms. Although not a strong association, there is a generally direct relationship between Service firms' share of the current market and these firms' future growth (positive average coefficient equal 0.173 and eleven-of-fourteen yearly coefficients positive), whereas the same relationship is an inverse one for non-Service firms (all non-Service firm Categories have negative average coefficient and the majority of the yearly coefficients are negative).

Figure 25 summarizes this study for the Market Share signal, MKTSHR, in predicting next-years earning change using the Experimental CEPSL dependent variable (data copied from this study's tables 8 through 19).

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | 0.101 | 8 (0) | 6 (0) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.279 | 11 (0) | 3 (0) |
| Manufacturing 1991-2004 | 0.126 | 9 (0) | 5 (0) |
| Services 1991-2004 | 0.247 | 7 (0) | 7 (0) |

Figure 25
MKTSHR –> Long-Term Growth (Experimental CEPSL Used for 1991-2004)

Using Experimental CEPSL as the dependent variable, the association of the current-market share to long-term growth continues to show the general lack of significance in MKTSHR predicting long-term growth. As shown in figure 25, none of the yearly MKTSHR coefficients were significant in any Category. Although not strong, there is a generally direct relationship between current-year Market Share and long-term growth for all categories, with the average coefficient positive for all categories. This direct relationship is greater in the Manufacturing (nine-of-fourteen yearly coefficients positive) and Wholesale-Retail-Primary-Products (eleven-of-fourteen yearly coefficients positive) than it is for Services (a balanced seven positive and seven negative yearly coefficients). When a firm's market share is small, its long term growth is expected to decrease. The coefficient is positive in both the case with “large-market share/increased long-term growth” and the case with “small-market share/decreased long-term growth.” The Experimental CEPSL includes the “small-market share/decreased long-term growth” cases where firms experience a five-years-ahead annual loss, and thereby provides more consistently positive coefficient estimates than obtained using the Conventional CEPSL dependent variable.

The change in market share signal, CHG_MKTSHR, is based on the FASB Concept Statement No. 6 that defines Revenue as a key element. CHG_MKTSHR is defined as the percent change in market share from the prior year. Stated as a formula, CHG_MKTSHR = [MKTSHR (t) – MKTSHR (t-1)] / MKTSHR (t-1), where t = the current year. MKTSHR (t) is computed exactly as it was for the MKTSHR signal, that is, it is the ratio of a studied firm’s current-year sales to the sum of the current-year sales for all of the firms in the studied firm’s four-digit SIC code industry. The CHG_MKTSHR signal seeks to determine how a firm’s current-year change in market share may affect its next-year earnings change and future growth. The expectation is that an increase in market share is good news for both next-year earnings and long-term growth, and vice versa.

A firm’ ability to increase its market share within its industry during the current year should be a significant “good news” signal for the firm’s future sales, and hence, future earnings. A positive coefficient estimate for CHG-MKTSHR should indicate the firm’s internal ability to increase its sales relative to the competing firms within the industry. Similarly, a firms’ decrease in market share within its industry should be “bad news” for its future sales, and hence future earnings. Therefore, it is expected that

CHG_MKTSHR will have a positive coefficient estimate in predicting both next-year earnings change and long-term growth.

Figure 26 summarizes the results for change in market share, CHG_MKTSHR, predicting next-years earning change (data copied from this study's tables 8 through 19).

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2008 | -0.001 | 8 (1) | 10 (3) |
| Wholesale, Retail, and Primary Products 1991-2008 | -0.069 | 6 (0) | 12 (3) |
| Manufacturing 1991-2008 | -0.001 | 9 (0) | 9 (0) |
| Services 1991-2008 | -0.020 | 5 (0) | 13 (2) |

Figure 26
CHG-MKTSHR –> One-Year EPS Change (CEPS1)

Figure 26 shows the unexpected results that yearly coefficients for CHG_MKTSHR in predicting CEPS1 are generally more negative than positive for all categories except Manufacturing. The unexpected results may be explained by the market share ratio being affected by both changes in the industry total sales and changes in the studied firm's sales. Not only may a firm's sales increase or decrease, but also the total sales of the firm's industry may increase or decrease.  Hence, CHG_MKTSHR may be negative, even though a firm's sales increase, when the increase in industry sales outpace the increase in the firm's sales.  Likewise, CHG_MKTSHR may be positive, even though a firm's sales decrease, when the percent decrease in industry sales exceeds the percent decrease in the firm's sales. For Manufacturing, the signal is not significant and is mixed, with balanced nine negative and nine positive yearly coefficients, none of which are significant. The evidence suggests Market share is not a significant predictor of next-year earnings for manufacturing firms.

Figure 27 summarizes the results for the Market Share signal, CHG-MKTSHR, in predicting long-term growth using the Conventional CEPSL dependent variable (data copied from this study's tables 8 through 19).

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | -0.016 | 5 (1) | 9 (2) |
| Wholesale, Retail, and Primary Products 1991-2004 | -0.005 | 7 (0) | 7 (0) |
| Manufacturing 1991-2004 | -0.013 | 4 (0) | 10 (1) |
| Services 1991-2004 | 0.055 | 10 (1) | 4 (0) |

Figure 27
CHG-MKTSHR –> Long-Term Growth (Conventional CEPSL Used for 1991-2004)

Figure 27 indicates that the CHG-MKTSHR signal is generally mixed and not strongly significant, when predicting Conventional long-term growth (CEPSL). For Wholesale-Retail-Primary-Products, CHG_MKTSHR is not significant in any year, and there is a balanced seven positive and seven negative yearly coefficients. The yearly coefficients for All-except-Services are significant in only three of eighteen years studied, with one of these positive and the other two negative. Evidently, CHG_MKTSHR has a mixed and generally non-significant association with

Conventional CEPSL. For Services, the expected positive relationship is indicated, although the relationship is, again, not strongly significant.

Figure 28 shows that the significance of the relationship between CHG_MKTSHR and long-term growth increases substantially for all categories except Manufacturing, when Experimental CEPSL is used in place of Conventional CEPSL. For ALL-except-Services, the yearly CHG_MKTSHR coefficients were negative in all fourteen years studied and were significant in nine of the fourteen years studied. All of the significant yearly coefficients are negative and, hence, inversely related to Experimental CEPSL. The relationship is more significant using Experimental CEPSL as opposed to Conventional CEPSL, likely because the cases are included where long-term decline included a loss in the five-years-ahead year.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | -0.309 | 0 (0) | 14 (9) |
| Wholesale, Retail, and Primary Products 1991-2004 | -0.321 | 2 (0) | 12 (4) |
| Manufacturing 1991-2004 | -0.140 | 7 (0) | 7 (2) |
| Services 1991-2004 | -0.311 | 3 (0) | 11 (4) |

Figure 28
CHG-MKTSHR –> Long-Term Growth (Experimental CEPSL Used for 1991-2004)

CHG-MKTSHR can be expressed as {Firm-Sales (t) – [Firm-Sales (t-1) * (Industry-Sales (t) / Industry-Sales (t-1)] } / [Firm-Sales (t-1) * (Industry-Sales (t) / Industry-

Sales (t-1)], which is mathematically equivalent to the formula given earlier, namely [MKTSHR (t) – MKTSHR (t-1)] / MKTSHR (t-1), where t = the current year and MKTSHR (t) = Firm-Sales (t) / Industry-Sales (t). The second version of the formula expresses CHG-MKTSHR as the percent change in the firm's sales from the prior year, where prior-year sales has been adjusted for the change in industry sales.

The markup signal, MU, is based on the fundamental concepts of sales revenues and cost-of-goods-sold (COGS). MU equals [Sales (t) – COGS (t)] / COGS (t) where t is the current year. MU measures the average markup that a firm designates for the goods and/or services it sells. Markup is different than Gross Profit (Gross Margin), which is determined by both the volume of sales as well as the markup on the items sold. MU should be positively related to future earnings and long-term growth. A larger markup should indicate a stronger demand for a firm's products and/or services. Also, the size of the markup may indicate the flexibility that a firm has in reducing its price in the face of declining demand and still being able to remain profitable. Conversely, thin margins may indicate more risk for the both the next-year earnings and the long-term growth of the firm. Hence it is expected that large (small) MU values are directly related to increased (decrease) next-year earnings and long-term growth, and hence the regression coefficient estimate for MU will be positive. Since MU is a point-in-time measurement, it does not provide any information about change in markup that is needed to form a more definite prediction about next-year's earnings (see CHG_MU signal that is discussed next). Hence, the coefficients for MU in predicting CEPS1 are expected to be less significant than in predicting long-term growth, where risk become a more important factor in the prediction.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2008 | -0.052 | 8 (0) | 10 (1) |
| Wholesale, Retail, and Primary Products 1991-2008 | 0.036 | 12 (1) | 6 (1) |
| Manufacturing 1991-2008 | -0.004 | 12 (3) | 6 (0) |
| Services 1991-2008 | 0.001 | 11 (0) | 7 (0) |

Figure 29
MU –> One-Year EPS Change (CEPS1)

Figure 29 shows Manufacturing, Wholesale-Retail-and-Primary-Products and Services have the expected positive relationship between MU and next-year earnings change for the majority of the eighteen years studied. For Manufacturing, Wholesale-Retail-and-Primary-Products and Services, the yearly MU coefficients are positive in twelve-of-eighteen, twelve-of-eighteen, and eleven-of-eighteen years respectively during 1991-2008. MU for the ALL-but-Services Category has a marginally negative relationship to next-year-services. There can be instances where lowering the markup can lead to increased future earnings, such as the case where a firm lowers it price in order to capture more of the market from its competitors. Also, a firm could raise its markup so high that future sales and earnings are decreased.

Figure 30 shows the Wholesale-Retail-Primary-Products Category agrees with expectations, indicating a positive, direct relationship between the size of MU and long-term growth using Conventional CEPSL, with a positive average coefficient (0.001) and nine-of-fourteen years having a negative yearly coefficient. The other Categories indicate a marginally negative relationship when Conventional CEPSL is used as the dependent variable.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | -0.003 | 5 (1) | 9 (1) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.001 | 9 (0) | 5 (0) |
| Manufacturing 1991-2004 | -0.003 | 6 (2) | 8 (2) |
| Services 1991-2004 | -0.005 | 5 (0) | 9 (0) |

Figure 30
MU –> Long-Term Growth (Conventional CEPSL Used for 1991-2004)

Figure 31 shows the results when MU predicts Experimental CEPSL rather than Conventional CEPSL. In this case, the expected positive relationship of MU to long-term growth is much more vivid. For example, the ALL-except-Services category has an average coefficient of 0.070 and the yearly coefficients are positive in eleven of the fourteen years studied for 1991-2004, with seven of the eleven positive yearly coefficients significant at alpha = .05. Manufacturing has an average coefficient of 0.174 and the yearly coefficients are positive in twelve of the fourteen years studied, with six of the twelve positive yearly coefficients significant at alpha = .05. Wholesale-Retail-Primary-Products has a positive average coefficient of 0.047 and the yearly coefficients are positive in twelve of the fourteen years studied for 1991-2004 with one of the twelve significant at alpha = .05. The Service category has a positive average coefficient of .010 and the yearly coefficients are positive nine of the fourteen years studied. By allowing the "currently thin profit margin / long-term decline to an eventual net loss in the out year" firms to be included in the sample, the Experimental CEPSL provides a much clear lens to view the MU-to-long-term growth relationship.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | 0.070 | 11 (7) | 3 (0) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.047 | 12 (1) | 2 (0) |
| Manufacturing 1991-2004 | 0.174 | 12 (6) | 2 (1) |
| Services 1991-2004 | 0.010 | 9 (0) | 5 (0) |

Figure 31
MU –> Long-Term Growth (Experimental CEPSL Used for 1991-2004)

The change in markup signal, CHG_MU, equals MU(t) – MU(t-1) / MU(t-1) where t is the current year and MU is as it has been previously defined, that is, MU equals [Sales (t) – COGS (t)] / COGS (t). CHG_MU measures the percent change in average markup from the prior year to the current year. An increase in markup in the current year from the prior year should be good news for next-year earnings and long-term growth. The larger markup means higher profit margins, and may also indicate the firm's confidence in the value of the products it sells. Increased markup may also indicate strong demand for the firm's products that allows the firm to raise prices with little fear of losing customers (Starbucks' recent price increase for their cup of coffee is a good example.) A firm may also reduce its cost of goods and/or services sold through cost efficiency measures, and thereby achieve an increase in markup without raising prices. On the other hand, a decrease in markup should generally be bad news for future earnings. For example, demand for the firms goods and/or services may have declined and the firm has reduced its prices to stimulate demand and increase sales. Another bad news scenario would be when a firm needs cash to meet its short-term obligations, and reduces its prices to generate more sales in order to obtain the needed cash. As cost efficiencies may increase the profit margins, so also may cost inefficiencies increase the cost of goods and/or services sold and thereby decrease the markup without changing the sales prices.

Figure 32 displays the results obtained when change in markup (CHG_MU) is used in the multivariate regression to predict next-year EPS change (CEPS1). The expectation is that the regression coefficient for CHG_MU will be positive and significant when predicting next-year earnings change. Figure 32 shows that, as expected, the results for 1991-2008 do indicate a generally positive relationship between CHG_MU and next-year earnings change for all categories. The average coefficient for ALL-except-Services is negative (-0.044), but twelve of the eighteen yearly coefficients for CHG_MU were positive, and two of these twelve were significant. The strongest positive relationship is found in the Manufacturing and Wholesale-Retail-Primary-Products categories. Manufacturing has a positive (.004) average coefficient and fourteen of eighteen yearly coefficients positive, with five of these fourteen significant at alpha = .05 and (not shown) one additional positive coefficient significant at alpha =.10.  Wholesale-Retail-Primary-Products has a positive (.324) average coefficient and eleven of eighteen yearly coefficients positive, with five of these eleven significant at alpha = .05 and (not shown) one additional positive coefficient significant at alpha =.10.  For Services, the average coefficient is positive (0.013), the results are more mixed in that there are more negative (eleven) than positive (seven) yearly coefficients.

One possible explanation for the Services group's mixed results may be that the category includes firms in the regulated banking and insurance industries.  For example, regulations may mandate a price decrease that lowers the markup, even when demand for the services provided is strong and an increase in future earnings is expected.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2008 | -0.044 | 12 (2) | 6 (2) |
| Wholesale, Retail, and Primary Products 1991-2008 | 0.324 | 11 (5) | 7 (1) |
| Manufacturing 1991-2008 | 0.004 | 14 (5) | 4 (1) |
| Services 1991-2008 | 0.013 | 7 (2) | 11 (1) |

Figure 32
CHG-MU –> One-Year EPS Change (CEPS1)

The *a priori* expectation was that CHG_MU would be directly (positively) related to long-term growth.  Figure 33 shows the expected positive relationship between CHG_MU and long-term growth is supported by the 1991-2004 evidence for all categories, when Conventional CEPSL is predicted.  In every category, the average coefficient is positive, and the majority (eight or nine) of the fourteen yearly coefficients is positive, with all but one of the significant yearly coefficient being positive.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | 0.047 | 8 (2) | 6 (0) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.067 | 9 (2) | 5 (1) |
| Manufacturing 1991-2004 | 0.091 | 9 (3) | 5 (0) |
| Services 1991-2004 | 0.082 | 9 (3) | 5 (0) |

Figure 33
CHG-MU –> Long-Term Growth (Conventional CEPSL Used for 1991-2004)

Figure 34 shows the results for 1991-2004 when CHG_MU predicts Experimental CEPSL instead of Conventional CEPSL. As expected, the All-except-Services category has a positive average coefficient (.004), and the majority (eight of fourteen) of the yearly coefficients is positive. More convincingly, the Wholesale-Retail-Primary-Products category has a positive average coefficient (0.145) with ten of fourteen yearly coefficients positive and the two significant yearly coefficients also positive. However, the results for Manufacturing are unexpectedly negative with a negative average coefficient (-0.064) and nine of fourteen yearly coefficients being negative. One possible explanation for the negative association between markup change and future earnings for Manufacturing may be that manufacturing firms typically have fixed manufacturing costs, such as the depreciation on manufacturing machinery that should be allocated to the cost of goods sold, in accordance with Absorption costing. This allocation may set a floor for the cost of goods sold, so long as the firm remains a going concern and is not forced into bankruptcy liquidation. Hence, a future earnings decline could occur without the possibility of further reduction in markup. Another possible explanation may be that manufacturing companies typically establish close supplier-buyer partnerships with both their customers and their suppliers and enter into long-term purchasing and selling agreements. Such agreements may fix the selling price of a manufacture's goods sold to the firm's primary customers, thereby precluding markup reductions when earnings began to decline. The Service category has a balance of six positive and 8 negative yearly coefficients, with none of these coefficients significant. Again, regulations controlling many Service category firms may have dampened the relationship between CHG_MU and long-term growth.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | 0.004 | 8 (3) | 6 (3) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.145 | 10 (2) | 4 (0) |
| Manufacturing 1991-2004 | -0.064 | 5 (1) | 9 (2) |
| Services 1991-2004 | -0.035 | 6 (0) | 8 (0) |

Figure 34
CHG-MU –> Long-Term Growth (Experimental CEPSL Used for 1991-2004)

The Free Cash Flow ("FCF") signal is taken directly from KWK. The only change made to the KWK definition is to size the ratio by the firm's current-year total assets. As such, FCF = (Net Cash Flow from Operating Activities – Capital Expenditures for Property Plant and Equipment – Dividends) / Total Assets for the current year. FCF is expected to be positively related to next-year earnings change, since more free cash should provide more flexibility to take advantage of investment opportunities, such as R&D, and also should mean more cash is available to meet current obligations. However, the subtraction of expenditures for Property Plant and Equipment (PP&E) assets may actually be counter to increased long-term growth, especially for manufacturing companies. A firm's investment in PP&E is viewed as good news for long-term growth (see the CAPX signal previously discussed). Hence, setting the PP&E current-year investment to a negative value in the FCF signal may cause FCF to have an inverse relationship to long-term growth.

Figure 35 displays the summary results from regressing the dependent variable next-year EPS change (CEPS1) on FCF and the other independent variable signals. The *a priori* expectation was that FCF would be directly (positively) related to CEPS1. Figure 35 shows that, as expected, for 1991-2008 the FCF signal was generally positively related to next-year earnings change. For ALL-except-Services, the eighteen-year average coefficient is a positive 0.117 and the yearly coefficients are positive in eleven of eighteen years, with the only two significant yearly coefficients being positive. A similar relationship is found for the Manufacturing, Services and Wholesale-Retail-Primary-Products categories. Although Wholesale-Retail-Primary-

Products had a negative average coefficient, the majority of yearly coefficients were positive and none of the negative yearly coefficients were significant. This evidence indicates that the FCF signal is generally relevant to next-year earnings change in the manner expected and taught in Principles of Accounting textbooks, and appears to affirm the FASB decision to require the Cash Flow Statement, beginning is 1988.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2008 | 0.117 | 11 (2) | 7 (0) |
| Wholesale, Retail, and Primary Products 1991-2008 | -0.061 | 11 (2) | 7 (0) |
| Manufacturing 1991-2008 | 0.199 | 11 (1) | 7 (0) |
| Services 1991-2008 | 0.120 | 12 (2) | 6 (1) |

Figure 35
FCF –> One-Year EPS Change (CEPS1)

Figure 36 shows FCF in predicting the long-term growth Conventional CEPSL.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | 0.023 | 8 (1) | 6 (1) |
| Wholesale, Retail, and Primary Products 1991-2004 | -0.076 | 7 (0) | 7 (1) |
| Manufacturing 1991-2004 | 0.021 | 6 (2) | 8 (1) |
| Services 1991-2004 | -0.188 | 5 (1) | 9 (2) |

Figure 36
FCF –> Long-Term Growth (Conventional CEPSL Used for 1991-2004)

For the Wholesale-Retail-Primary-Products Category, there an even balance between seven positive and seven negative yearly coefficients, and All-except-Services is generally balanced with an equal number of significant positive and negative coefficients. For Manufacturing and Services, there are more negative than positive yearly coefficients, but these Categories are also generally mixed and not definitive.

Figure 37 summarizes the 1991-2004 results for FCF in predicting long-term growth using the Experimental CEPSL dependent variable. With this variable, the expected inverse (negative) relationship of FCF to long-term growth is more pronounced. For all firm categories, the majority of the fourteen yearly FCF coefficients are negative, and all of the significant yearly coefficients are negative. The inverse relationship is especially strong for the manufacturing category, with an average FCF coefficient of -.0742 and nine-of-fourteen yearly coefficients negative, with four of these nine coefficients also significant at alpha = .05. For Wholesale-Retail-Primary-Products and Services categories, the majority of the yearly coefficients are negative, but none of the Wholesale-Retail-Primary-Services coefficients are significant and only two of the Services coefficients are significant. Thus, the evidence supports the expectation that FCF is inversely related to long-term growth; especially for more capital intensive firms such as manufacturing firms, owing to the subtraction of current-year investment in PP&E in the computation of FCF. Again, the Experimental CEPSL demonstrates its ability to sharpen the view of the effects of a fundamental signal on long-term growth, by including firms with a net loss in the current year and/or the five-years-ahead year. The change in free cash flows signal is simply the percent change in

FCF in the current year from the prior year. Hence, CHG_FCF = [FCF (t) – FCF (t-1)] / FCF (t-1) where t is the current year and FCF is as previously defined.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | -0.401 | 4 (0) | 10 (4) |
| Wholesale, Retail, and Primary Products 1991-2004 | -0.343 | 5 (0) | 9 (0) |
| Manufacturing 1991-2004 | -0.742 | 5 (0) | 9 (4) |
| Services 1991-2004 | -0.519 | 4 (0) | 10 (2) |

Figure 37
FCF –> Long-Term Growth (Experimental CEPSL Used for 1991-2004)

FCF should mirror the results of FCF, with CHG_FCF being directly related to next year's earnings change and inversely related to long-term growth. Figure 38 shows that, as expected, CHG_FCF is generally positively related to change in next-year earnings, although the relationship is generally not strong (significant).

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2008 | 0.001 | 15 (0) | 3 (0) |
| Wholesale, Retail, and Primary Products 1991-2008 | 0.001 | 11 (0) | 7 (0) |
| Manufacturing 1991-2008 | 0.001 | 13 (1) | 5 (0) |
| Services 1991-2008 | 0.001 | 10 (0) | 8 (0) |

Figure 38
CHG-FCF –> One-Year EPS Change (CEPS1)

Figure 39 shows the 1991-2004 results for CHG_EPS when predicting Conventional long-term growth (CEPSL,) and indicates that CHG_FCF is not a significant predictor for this dependent variable. The All-except-Services and Services Categories are balanced with seven positive and seven negative yearly coefficients. The Manufacturing category has nine negative versus five positive yearly coefficients, indicating the expected inverse relationship between “minus the current-year PP&E investment” in the computation of the FCF and CHG_FCF signals and more capital-intensive firms’ long-term growth. Hence, for manufacturing firms, the evidence indicates increased spending on PP&E in the current year is good news for long-term growth, and vice versa. For Wholesale-Retail-Primary-Products (twelve positive coefficients), investment in PP&E may not be as important to long-term growth, and hence, there is a positive relationship in most years studied between CHG_FCF and long-term growth.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | 0.000 | 7 (0) | 7 (0) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.001 | 12 (0) | 2 (0) |
| Manufacturing 1991-2004 | 0.000 | 5 (0) | 9 (0) |
| Services 1991-2004 | 0.000 | 7 (1) | 7 (0) |

Figure 39
CHG-FCF –> Long-Term Growth (Conventional CEPSL used for 1991-2004)

Figure 40 shows the 1991-2004 results for CHG_FCF when predicting Experimental long-term growth (CEPSL). For Manufacturing, figure 40 shows the CHG_FCF relationship switched from a generally negative relationship (9 negative yearly coefficients) when predicting Conventional CEPSL to a generally positive relationship (nine positive yearly coefficients) when predicting Experimental CEPSL. This evidence is consistent with manufacturing firms' reduction in the current-year PP&E investment being associated with a long-term decline to a negative EPS (net loss) in the five-years-ahead year. For "Wholesale-Retail-Primary-Products," the CHG_FCF relationship switched from generally positive (twelve-of-fourteen positive yearly coefficients) when predicting Conventional CEPSL to generally negative (nine-of-fourteen negative yearly coefficients) when predicting Experimental CEPSL. These relationships notwithstanding, only one yearly CHG_FCF coefficient was significant during 1991-2004 in predicting either Conventional or Experimental CEPSL for "Wholesale-Retail-Primary-Products." In general, CHG_FCF was weak and indecisive in predicting long-term growth for any category.

Figure 41 displays results when the cash ("CASH") added fundamental signal is used to predict next-year EPS change (CEPS1). CASH is simply the ratio of a firm's cash balance to the firm's total assets, with these two amounts taken from the firm's Balance Sheet for the current (reference) year. Cash is the most liquid asset, and firms with larger amounts of cash on hand should have more flexibility to react to unplanned expenses and take advantage of unforeseen opportunities.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | 0.000 | 6 (0) | 8 (0) |
| Wholesale, Retail, and Primary Products 1991-2004 | -0.001 | 5 (1) | 9 (0) |
| Manufacturing 1991-2004 | 0.001 | 9 (0) | 5 (0) |
| Services 1991-2004 | 0.002 | 7 (1) | 7 (0) |

Figure 40
CHG-FCF –> Long-Term Growth (Experimental CEPSL Used for 1991-2004)

The existence of excess cash may not only affect what a firm is capable of doing, but also how fast the firm in able to do it. The existence of excess cash can also reduce a firm's risk by ensuring the firm's ability to meet its short-term obligations and by enabling the firm to react quickly to adverse events, such as being able to rapidly repair factory machinery that has unexpectedly broken down and stopped production. Excess cash may make it possible for the firm to make short-term outlays that improve profitability in the near term. For example, more cash may enable a firm to hire more temporary labor in order to take advantage of a short-term spike in demand for the firm's goods and/or services. Also, excess cash may allow a firm to make investments that affect long-term growth, such as investments in tangible assets. For example, excess cash may allow a firm to purchase new machinery for the factory, or invest in expenses that are essentially unrecorded intangible assets, such as expenditures on research and development and/or advertising expenses. An example of a profitable firm that has kept a large amount of cash on hand is Microsoft Corporation.

Figure 41 summarizes the 1991-2008 finding for CASH in predicting next-year earnings change and generally supports the expectation that CASH is positively related to next year's earnings. For example, the evidence for the ALL-except-Services category shows CASH was a significant predictor of next-year earnings during 1991-2008, where the average coefficient for CASH was 0.457, and fifteen of eighteen yearly coefficients were positive, with 6 of these 15 significant at alpha = .05 and one addition yearly coefficient (not shown) significant at alpha = .10. Figure 41 shows the expected positive relationship generally holds for the other three categories of firms.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2008 | 0.457 | 15 (6) | 3 (0) |
| Wholesale, Retail, and Primary Products 1991-2008 | 0.024 | 14 (0) | 4 (1) |
| Manufacturing 1991-2008 | 0.325 | 13 (0) | 5 (0) |
| Services 1991-2008 | 0.242 | 14 (3) | 4 (0) |

Figure 41
CASH –> One-Year EPS Change (CEPS1)

Figure 42 shows that CASH was generally directly (positively) related to long-term growth measured with the Conventional CEPSL dependent variable during 1991-2004, where the average coefficient was positive and the majority of the yearly coefficients were positive for all four categories. However, the relationship of CASH to long-term growth measured with Conventional CEPSL is only moderately significant, with four-of-fourteen coefficients significant for the ALL-except-Services.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | 0.045 | 9 (3) | 5 (1) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.091 | 9 (2) | 5 (0) |
| Manufacturing 1991-2004 | 0.012 | 8 (0) | 6 (1) |
| Services 1991-2004 | 0.048 | 8 (0) | 6 (0) |

Figure 42
CASH –> Long-Term Growth (Conventional CEPSL Used for 1991-2004)

Figure 43 summarizes the results for CASH when predicting long-term growth as measured by Experimental CEPSL. In general, these results are mixed and not significant. Overall, the evidence indicates CASH is positively and significantly related to next-year performance, but like CHG_FCF, it generally is less strongly related to long-term growth.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | -0.140 | 6 (0) | 8 (2) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.056 | 7 (0) | 7 (0) |
| Manufacturing 1991-2004 | -0.103 | 6 (1) | 8 (1) |
| Services 1991-2004 | -0.079 | 5 (1) | 9 (0) |

Figure 43
CASH –> Long-Term Growth (Experimental CEPSL Used for 1991-2004)

The change in cash signal ("CHG_CASH") is computed as the [cash(t) – cash(t-1)] / cash(t-1), where t is the current year. An increase in cash may be good news for next-year earnings and long-term growth, because an increase in cash might indicate increase operating revenues. However, it may be that a company failed to spend its cash on assets or expenses that would have improved next-year earnings and/or long-term growth. Hence, this signal likely will have mixed results. (The author suggests deleting this signal before submitting this dissertation for publication, due to the good news/bad news duality of this signal.)

Figure 44 shows that for All-except-Services and Services, an increase in cash is bad news for next-year earnings. Manufacturing and Wholesale-Retail-Primary-Products are mixed, with each having ten negative and eight positive yearly coefficients.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2008 | -0.201 | 7 (0) | 11 (2) |
| Wholesale, Retail, and Primary Products 1991-2008 | 0.082 | 10 (0) | 8 (0) |
| Manufacturing 1991-2008 | -0.193 | 10 (0) | 8 (2) |
| Services 1991-2008 | -0.113 | 4 (0) | 14 (1) |

Figure 44
CHG_CASH –> One-Year EPS Change (CEPS1)

Figure 45 shows the results when predicting Conventional CEPSL with CHG_CASH. For all four categories of firms using the Conventional CEPSL, CHG_CASH is generally an insignificant and mixed predictor, with no more than one yearly coefficient significant for any category during the fourteen years studied.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | 0.034 | 10 (0) | 4 (1) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.113 | 7 (0) | 7 (0) |
| Manufacturing 1991-2004 | 0.027 | 10 (0) | 4 (0) |
| Services 1991-2004 | -0.099 | 6 (0) | 8 (1) |

Figure 45
CHG_CASH –> Long-Term Growth (Conventional CEPSL Used for 1991-2004)

Figure 46 shows the results for predicting Experimental long-term growth (CEPSL) with CHG_CASH. As it was with Conventional CEPSL, the CHG_CASH signal is a generally indecisive and insignificant predictor of Experimental CEPSL. For all four categories of firms using the Experimental CEPSL, CHG_CASH is generally an insignificant and mixed predictor. Except for Services, none of the categories of firms have more than one yearly coefficient significant for any category during the fourteen years studied. Services category has two of fourteen yearly coefficients significant at alpha = .05, but the signal is mixed, because there is an even number of seven positive and seven negative yearly coefficients. For the Wholesale-Retail-Primary-Products category, CHG_CASH is evenly balance between seven negative and seven positive coefficients, with only one-or-fourteen coefficients significant.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | -0.074 | 5 (0) | 9 (1) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.199 | 7 (1) | 7 (0) |
| Manufacturing 1991-2004 | 0.232 | 9 (1) | 5 (0) |
| Services 1991-2004 | 0.152 | 7 (2) | 7 (0) |

Figure 46
CHG_CASH –> Long-Term Growth (Experimental CEPSL Used for 1991-2004)

The Debt-to-Total Assets ("DEBT_AT") signal is simply the total liabilities of the firm for the current year divided by the total assets of the firm for the current year. This signal is defined in KWK on page 686 as a solvency ratio. KWK state, "Solvency ratios measure the ability of the enterprise to survive over a long period of time" and "The debt-to-total-assets ratio measures the percentage of total financing provided by creditors" and "The higher the percentage of debt to total assets, the greater the risk that the company may be able to meet its maturing obligations. The lower the ratio, the more equity 'buffer' is available to creditors if the company becomes insolvent." Given the KWK statements, one might expect that DEBT_AT is inversely related to next-year earnings. However, figure 47 shows that, for every firm Category, DEBT_AT was positively related to next-year EPS change for the majority of the eighteen years studied during 1991-2008, and that a substantial number of the positive yearly coefficients were also significant.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2008 | 0.417 | 16 (12) | 2 (1) |
| Wholesale, Retail, and Primary Products 1991-2008 | 0.096 | 13 (3) | 5 (0) |
| Manufacturing 1991-2008 | 0.611 | 12 (8) | 6 (0) |
| Services 1991-2008 | 0.278 | 16 (9) | 2 (0) |

Figure 47
DEBT_AT –> One-Year EPS Change (CEPS1)

As shown in figure 47, for the ALL-except-Services Category, the yearly DEBT_ AT coefficients were positive in sixteen years, and twelve of these sixteen were significant at alpha = .05 and (not shown) an additional three of the sixteen were significant at alpha = .10. Figure 47 shows similar results were obtained for Manufacturing, Services, and Wholesale-Retail-Primary-Products. But, if higher Debt-to-Total-Assets indicate higher risk of insolvency, then why did this study find such a definitively positive and substantially significant relationship between Debt-to-Total-Assets and next-year earnings change? The 1991-2008 evidence summarized in figure 47 indicates that a higher (lower) percentage of total financing provided by creditors is generally good news (bad news) for next-year earnings. One reason for the direct relationship may simply be that greater financing enabled firms to spend more money on income-producing assets and expenses that increased next-year's earnings. Another possible explanation may be that creditors evaluate the debtor firms' prospects for generating positive future cash flows before agreeing to lend money to the firms. To the extent that creditors are generally right in their assessments about the financial health and favorable future outlook for the firms to whom they lend money, then the amount of debt may be a directly related to the debtor firms' future earnings.

Figure 48 shows the results when DEBT_AT predicts long-term growth measured by the Conventional CEPSL dependent variable. Note that there is generally much less significance in the relationship between DEBT_AT and Conventional CEPSL as compared to the relationship between DEBT_AT and next-years EPS change shown in figure 47. None of the four Categories of firms shown in figure 48 have more than one yearly DBET_AT coefficient that is significant at alpha = .05. In addition, DEBT_AT is indefinite regarding the direction of its relationship to Conventional CEPSL. For all four Categories except Manufacturing, the number of positive and negative yearly coefficients is exactly balanced at seven negative and seven positive years for the fourteen-years studied. Although Manufacturing shows some tendency towards a negative relationship, the one yearly coefficient that is significant is positive.

Recall that the Conventional CEPSL allows only positive EPS values to be used in the computation of long-term growth. To be included in the study, a firm must have a non-zero Conventional CEPSL. Hence the Conventional CEPSL shows the results for just the firms that survived five years into the future and that had a positive EPS in the current year and in the five-years-ahead future year.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | -0.011 | 7 (0) | 7 (1) |
| Wholesale, Retail, and Primary Products 1991-2004 | -0.012 | 7 (0) | 7 (1) |
| Manufacturing 1991-2004 | -0.017 | 5 (1) | 9 (0) |
| Services 1991-2004 | -0.007 | 7 (0) | 7 (1) |

Figure 48
DEBT_AT –> Long-Term Growth (Conventional CEPSL Used for 1991-2004)

Figure 49 shows the results when DEBT_AT predicts long-term growth measured by the Experimental CEPSL dependent variable. Here the relationship is clearly positive and generally significant. For the ALL-except Services Category, the yearly DEBT_AT coefficient was positive for every year during 1991-2004, and ten of the fourteen positive yearly coefficients were significant at alpha = .05. The other three firm categories shown in figure 49 also indicate a generally positive relationship, with either two or three of the positive yearly coefficients significant at alpha = .05. By including the firms with a loss in either the current or five-years-ahead year, the positive relationship between a firm's debt and it long-term growth is more vividly shown with Experimental CEPSL vis-à-vis Conventional CEPSL. The evidence provided by using

Experimental CEPSL indicates a generally positive relationship between less current-year total debt and long-term decline.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | 0.406 | 14 (10) | 0 (0) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.288 | 12 (2) | 2 (0) |
| Manufacturing 1991-2004 | 0.276 | 12 (2) | 2 (1) |
| Services 1991-2004 | 0.403 | 10 (3) | 4 (0) |

Figure 49
DEBT_AT –> Long-Term Growth (Experimental CEPSL Used for 1991-2004)

The Change in Debt-to-Total Assets ("CHG_DEBT_AT") signal is the percent change in DEBT_AT in the current year from the prior year. Specifically, CHG_DEBT_AT = [DEBT_AT (t) – DEBT_AT (t-1)] / DEBT_AT (t-1) where t is the current year and DEBT_AT is, as previously defined, the total liabilities of the firm divided by the total assets of the firm. Given the results for DEBT_AT, the expectation is that CHG_DEBT_AT is positively related to next-year earnings change and long-term growth.

Figure 50 shows that, for every firm category, CHG_DEBT_AT was positively related to next-year EPS change for the majority of the eighteen years studied during 1991-2008. Several of the positive yearly coefficients were also significant, while just one of the negative coefficients was significant. For example, the ALL-except-Services category had sixteen positive yearly CHG_DEBT_ AT coefficients, and ten of these sixteen were significant at alpha = .05. Figure 50 shows similar results were obtained for Manufacturing, Services, and Wholesale-Retail-Primary-Products.

The OP-1989 study evaluated the ability of “debt-equity ratio” and the “percent change in the debt-equity ratio” to predict future stock returns (OP-1989 table 3). OP-1989 eventually dropped the “debt-equity ratio” from their study, but reported for 1973-1983 the percent change in the “debt-equity ratio” had a maximum-likelihood estimate of positive 0.1514 that was significant (p-value = 0.007). The OP-1989 results appear to generally correspond to this study’s results for CHG_DEBT_AT, notwithstanding that the OP-1989 predictions involved future returns, not accounting earnings, and OP-1989 sized “change in debt” by total equity, not total assets.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2008 | 0.271 | 16 (10) | 2 (1) |
| Wholesale, Retail, and Primary Products 1991-2008 | 0.143 | 16 (3) | 2 (0) |
| Manufacturing 1991-2008 | 0.027 | 16 (4) | 2 (0) |
| Services 1991-2008 | 0.116 | 14 (3) | 4 (0) |

Figure 50
CHG_DEBT_AT –> One-Year EPS Change (CEPS1)

Figure 51 shows the results when CHG_DEBT_AT predicts long-term growth measured by the Conventional CEPSL dependent variable. A definite positive relationship between CHG_DEBT_AT and Conventional CEPSL is shown to exist for all categories except Services. The Services category is mixed, with six positive and eight negative yearly coefficients, with none of the Service yearly coefficients significant. In contrast, the Manufacturing category had eleven positive yearly coefficients with four of these eleven significant. These results are consistent with the notion that service firms are more labor intensive and have less need for capital assets in order to be profitable. Hence, Service firms do not benefit as greatly as manufacturing firms do from borrowing money that is invested in capital assets. Manufacturing firms are more capital intensive, and borrowing funds that are invested in capital assets that have higher returns on investments than the prevailing interest rate is good news for future earnings.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | 0.053 | 13 (3) | 1 (0) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.048 | 10 (0) | 4 (0) |
| Manufacturing 1991-2004 | 0.079 | 11 (4) | 3 (0) |
| Services 1991-2004 | -0.028 | 6 (0) | 8 (0) |

Figure 51
CHG_DEBT_AT –> Long-Term Growth (Conventional CEPSL used for 1991-2004)

Figure 52 shows the results when CHG_DEBT_AT predicts long-term growth measured by the Experimental CEPSL dependent variable. As with DEBT_AT, the relationship with Experimental CEPSL is more positive and generally significant than with Conventional CEPSL. For the ALL-except Services Category, the yearly CHG_DEBT_AT coefficient was positive for every year during 1991-2004, and eleven of the fourteen positive yearly coefficients were significant at alpha = .05. The other three firm categories shown in figure 52 also indicate a generally positive relationship, with each having eleven or more of the fourteen yearly coefficients being positive.

Figure 52 shows that none of the Services category's yearly coefficients are significant. Similar to Conventional CEPSL, these results support the notion that service firms are more labor intensive and have less need for capital assets in order to be profitable. Hence, service firms do not benefit as greatly as manufacturing firms do from increasing their current-year borrowing of money that is ostensibly invested in capital assets, nor do they suffer as much from not borrowing and investing in capital assets. In contrast, manufacturing firms that increase (decrease) current-year borrowing and presumably invest the borrowed funds in income-producing assets experience increased (decreased) long-term growth.

Again, by including the firms who incurred a loss five years into the future, the Experimental CEPSL shows more vividly vis-à-vis the Conventional CEPSL the positive relationship between a firm's change in current-year debt and its long-term growth. Including firms with a five-year future loss adds the cases where decreased borrowing was associated with decreased long-term growth. The evidence provided by using Experimental CEPSL indicates a generally positive relationship between decreasing change in current-year debt and decreasing long-term growth.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | 0.366 | 14 (11) | 0 (0) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.446 | 12 (5) | 2 (0) |
| Manufacturing 1991-2004 | 0.459 | 14 (6) | 0 (0) |
| Services 1991-2004 | 0.190 | 11 (0) | 3 (0) |

Figure 52
CHG_DEBT_AT –> Long-Term Growth (Experimental CEPSL Used for 1991-2004)

A signal for Discretionary Income ("DESC_INCOME") is developed to attempt to measure a firm's residual income available to the firm to spend in enhancing its growth and performance, after deducting nondiscretionary costs and expenses, such as income taxes and depreciation. The cost of research and development and advertising expense were added back, because these expenses were considered to be generally discretionary. The measure is expressed as a percent of the firm's sales. As such, DESC_INCOME = (Sales - COGS - General Selling and Administrative expenses + Research and Development expenses + Advertising expenses – depreciation and amortization expense – income tax expense - dividends) / Sales, where all amounts except dividends are taken from the current-year Income Statement. The intuition behind this signal is that gross profit (sales less COGS) less operating expenses (General Selling and Administrative, depreciation and amortization expenses) less dividends, with research and development and advertising expenses added back, estimates a firm's residual income that can be invested at the discretion of management to improve future performance. The *a priori* expectation is that DESC_INCOME will be positively related to a firm's next-year earnings and long-term growth. However, investments in tangible capital (PP&E) assets, as well as in current-year expenses that may be considered intangible assets, such as research and development and advertising, may take longer than the next-year to begin to substantially increase future cash flows. In the next-year following the investments in tangible assets, the depreciation expense may even exceed the return on the investment, especially if the assets are depreciated at an accelerated rate. Hence, the expectation is stronger about the DESC_INCOME signal's positive effect on long-term growth, and less strong regarding this signal's positive effect on next-year earnings change.

Figure 53 summarizes the results when predicting next-year EPS change with DESC_INCOME. For all categories, the majority of the yearly coefficients are shown to be negative, and for all the categories combined, a total of fifteen negative yearly coefficients are also significant, whereas only two are positive and significant. For Manufacturing, fifteen of eighteen yearly coefficients are negative with 4 of these fifteen significant, whereas a fewer number of negative yearly coefficients (eleven) and significant negative coefficients (two) was found for Wholesale-Retail-Primary-

Products. Figure 53 data is consistent with the hypothesis that firms with more discretionary income generally do not reap the benefits in the next-year, and may have an associated decline in EPS in the next year.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2008 | -0.079 | 2 (0) | 16 (5) |
| Wholesale, Retail, and Primary Products 1991-2008 | -0.333 | 7 (0) | 11 (2) |
| Manufacturing 1991-2008 | -0.175 | 3 (1) | 15 (4) |
| Services 1991-2008 | -0.081 | 6 (1) | 12 (4) |

Figure 53
DESC_INCOME –> One-Year EPS Change (CEPS1)

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | 0.026 | 8 (1) | 6 (1) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.028 | 9 (1) | 5 (0) |
| Manufacturing 1991-2004 | 0.216 | 10 (3) | 4 (1) |
| Services 1991-2004 | 0.142 | 9 (2) | 5 (2) |

Figure 54
DESC_INCOME –> Long-Term Growth (Conventional CEPSL used for 1991-2004)

As expected, Figure 54 shows DESC_INCOME had a generally positive relationship to long-term growth measured with Conventional CEPSL. Also, as expected, the strongest positive relationship was in the manufacturing category, where ten of fourteen yearly coefficients were positive and three of these ten were significant.

Figure 55 shows DESC_INCOME relationship to long-term growth measured with Experimental CEPSL. The results were unexpected. For all categories, there was a definite majority of negative and, in many years, significant yearly DESC_INCOME coefficients. Figure 55 results indicate more (less) current-year discretionary income is associated with less (more) growth in the long-term. The majority of the coefficients are negative and many of these significant. The only difference between the Conventional CEPSL study and the Experimental CEPSL study was the Experimental CEPSL inclusion of negative EPS in either the current year or the five-years-ahead year.

| | Average Coefficient | Count f POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | -1.022 | 1 (0) | 13 (10) |
| Wholesale, Retail, and Primary Products 1991-2004 | -1.101 | 1 (0) | 13 (5) |
| Manufacturing 1991-2004 | -1.083 | 3 (0) | 11 (6) |
| Services 1991-2004 | -0.316 | 2 (0) | 12 (3) |

Figure 55
DESC_INCOME –> Long-Term Growth (Experimental CEPSL used for 1991-2004)

## 5.4 Operating Leverage

Operating Leverage is a measure of how sensitive net income is to a given percentage change in sales. This measure is described in many managerial accounting textbooks and articles. For example, Operating Leverage is defined and discussed in KWK. Operating Leverage is computed by dividing a firm's contribution margin by its operating income**.** Contribution Margin is not reported in either the Financial Statements or in Compustat. Other managerial accounting variables are also not reported in Compustat, including: direct materials used in manufacturing, direct labor used in manufacturing, manufacturing overhead costs, contribution margin, and total fixed (variable) costs. The challenge is to develop a proxy for Operating Leverage using just the data available in Compustat. The proxy for Operating Leverage developed in this study is one way this study attempts to use managerial/cost accounting concepts in fundamental financial analysis.

The basic idea for developing a proxy for Operating Leverage that uses only the data available in Compustat is based on the CVP Income Statement. KWK among others define the general format of a firm's "cost volume profit" or CVP version of its income statement as follows:

Sales
<u>(Total Variable Costs)</u>
Contribution Margin
<u>(Total Fixed Costs)</u>
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 is available in Compustat, but Total Fixed Costs is not. To estimate Total Fixed Costs, the following statement in LT-93 is used: "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 for an estimate of Total Fixed Costs. One might think that depreciation and amortization expenses are included as a part of Compustat "xsga," but "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" - operating income after depreciation - for any number of firms for any year and verifying that oiadp = sale – cogs - xsga – dp in every case.) Hence, a 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 the proxy for Total Fixed Costs. But, for manufacturing firms, we also require an estimate for Total Manufacturing Fixed Costs, because these costs are not included in "xsga" and "dp." In accordance with Generally Accepted Accounting Principles, manufacturing corporations are required to follow Absorption Costing and allocate their manufacturing overhead to the cost of the goods that they produce, rather than report these costs as period expenses in the Income Statement. Absorption Costing follows the Matching Principle by matching the COGS with the sales revenues from the sale of the goods. (The year in which goods are sold is not always the year in which the goods were produced.) The variable costs (e.g., Direct materials and Direct Labor) are included in the cost of WIP along with an allocation to WIP of the total manufacturing overhead, based on a predetermined allocation rate. As such, any unfinished WIP inventory or unsold FG inventory remaining at year-end contain a portion of the fixed manufacturing costs included in the allocated manufacturing overhead.

Clearly then, with just the Income Statement and Balance Sheet information, there is no way of knowing the Manufacturing Overhead or the Fixed Manufacturing Costs. This lack of information is not due to a failing of Compustat to capture available financial statement information. Rather, it is due to GAAP not requiring that manufacturing corporations report their Total Manufacturing Costs and its components: Direct Materials, Direct Labor and Manufacturing Overhead. If manufacturing firms were required to report these amounts, we would have the actual amount for Manufacturing Overhead, which can be used to estimate the Total Fixed Manufacturing Costs. Lacking this information, one must seek a proxy for Manufacturing Overhead. It can be argued that depreciation on the property plant and equipment ("PP&E") used in manufacturing accounts for a significant portion of total manufacturing overhead costs. The Compustat item "am" is the amortization expense component of "dp." Thus, "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 PP&E. The depreciation of the manufacturing PP&E should be allocated along with other manufacturing overhead to WIP and FG and expensed in the Income Statement as part of COGS only when the finished goods are sold. Total depreciation of all the firm's PP&E should equals "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. A reasonable approximation of the total depreciation expense charged on all PP&E in the current year is the increase in "dpvieb" adjusted for the depreciation expense associate with the PP&E retired in the current year (Compustat item "dpvir"). However, Compustat no longer has the item "dpvir" for the depreciation on retirements. (The author received an email from WRDS Support on 2/28/2011, wherein WRDS quoted Compustat Support as saying, "The item DPVIR was discontinued as of January 21, 1997. This item was collected from Schedule VI to the 10-K which was no longer required to be filed back in the mid-90's. As a result, companies no longer reported an amount that could be looked at as the portion of Accum. Depreciation associated with sales/disposals of PP&E which is why our collection stopped. Since companies do not report it anymore, there really is not any alternative item to replicate it.") 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 to be equal to "dpvieb" (t) – "dpvieb" (t-1), and Manufacturing Depreciation equal to "dpvieb" (t) – "dpvieb" (t-1) –

(“dp” – “am”). Hence, the final formula for the Operating Leverage proxy is as follows:

OPERATING_LEVERAGE =

{ib (t) + xsga (t) + dp (t) + [dpvieb (t) – dpvieb (t -1) – (dp (t) – am (t))]} / ib (t) where the variables are the Compustat item names previously described and t is the current year.

In the OPERATING LEVERAGE proxy, the expression {dpvieb (t) – dpvieb (t -1) – [dp (t) – am (t)]} estimates the depreciation of just the manufacturing PP&E, which is a component of manufacturing overhead. Any firm that is not a Manufacturing firm as defined in this study has this expression set to zero. Also, in the unlikely event this expression computes to less than zero, it is set to zero.

Manufacturing depreciation is certainly not all of the fixed manufacturing costs (fixed in relation to the volume of goods manufactured), which also include such costs as factory supervisory salaries, cost of insuring the factory, and factory janitorial services. But neither these items nor total manufacturing overhead are reported as separate items in the Financial Statements or in Compustat. Although manufacturing overhead may contain some variable costs that are impractical to track directly to the cost of goods manufactured (for example, “allocated” materials such as glue and fasteners), the majority of the allocated manufacturing overhead costs are fixed costs in relation to the volume of finished goods produced. And, depreciation of the manufacturing PP&E is likely a significant portion of the total manufacturing overhead costs.  Thus, the expression [dpvieb (t) – dpvieb (t -1) – (dp (t) – am (t))] is offered as a proxy for Manufacturing Overhead and, hence, for Total Fixed Manufacturing costs.

## 5.5 Expectations and Results for Operating Leverage

"Operating Leverage refers to the extent to which a company's net income reacts to a given change in sales.  Companies that have higher fixed costs relative to variable costs have higher operating leverage.  When a company's sales revenue is increasing, high operating leverage is a good thing, because it means that profits will increase rapidly.  But, when sales are declining, too much operating leverage can have devastating consequences.  When used carefully, operating leverage can add considerably to a company's profitability.  However, increased reliance on fixed costs increases a company's risk" [KWK, pages 966-967].  For the "Conventional" long-term growth DV that studies only companies who are profitable in both the current year and in the five-years-ahead year, the expectation is that the Operating Leverage signal will be positively related to long-term growth.  The relationship should be strong, because a firm that has been profitable in both the near and long term should indicate the firm has managed the risk of its fixed assets well and a positive relationship between its growth and its Operating Leverage exists.  For the "Experimental" long-term growth DV, firms with either a net income or a net loss in the long-term are considered, and the higher risk associated with a larger portion of fixed assets (and, hence, a larger Operating Leverage) should allow for a negative relationship between the Operating Leverage signal and long-term growth.

Similar to Experimental CEPSL, CEPS1 allows for negative EPS in both the current year and the one-year-ahead year. Hence, a negative relationship between operating leverage and CEPS1 is possible, consistent with high operating leverage intensifying a next-year net loss as a result of a decline in sales Figure 56 summarizes the 1991-2008 results for the four firm categories, when OPERATING LEVERAGE is used to predict next-year EPS change. The mixed results for Services (nine negative and nine positive yearly coefficients, with all but one of the eighteen yearly coefficients insignificant) may be due to service firms generally having less fixed costs, and hence having a relatively lower degree of operating leverage. For the other categories, there is a tendency towards a negative relationship (twelve of eighteen coefficients negative for the ALL-except-Services) category, supporting the general conclusion that the OPERATING LEVERAGE signal coefficient is generally negative and marginally informative about next-year earnings change for non-services firms.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2008 | -0.006 | 6 (0) | 12 (2) |
| Wholesale, Retail, and Primary Products 1991-2008 | 0.000 | 8 (0) | 10 (3) |
| Manufacturing 1991-2008 | -0.002 | 5 (2) | 13 (1) |
| Services 1991-2008 | 0.000 | 9 (0) | 9 (1) |

Figure 56
Operating Leverage –> One-Year EPS Change (CEPS1)

However, in predicting long-term growth using either Conventional CEPSL or Experimental CEPSL, OPERATING LEVERAGE appears to be a significant and decisive signal. Figure 57 shows OPERATING LEVERAGE was positive and significant at alpha = .05 in every year between 1991 and 2004 in predicting Conventional CEPSL for every category of firms except Services. For Services, all fourteen yearly coefficients were positive with ten of these fourteen significant.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | 0.008 | 14 (14) | 0 (0) |
| Wholesale, Retail, and Primary Products 1991-2004 | 0.006 | 14 (14) | 0 (0) |
| Manufacturing 1991-2004 | 0.009 | 14 (14) | 0 (0) |
| Services 1991-2004 | 0.012 | 14 (10) | 0 (0) |

Figure 57
Operating Leverage –> Long-Term Growth (Conventional CEPSL Used for 1991-2004)

Figure 58 summarizes the 1991-2004 results for OPERATING LEVERAGE predicting Experimental CEPSL. The relationship completely changes from positive with Conventional CEPSL to negative with Experimental CEPSL. There are no positive yearly coefficients for any category in any of the fourteen-years studied. For All-except-Services and Manufacturing, all of the fourteen negative yearly coefficients are also significant at alpha = .05, and the other two firm categories have only one or two of their fourteen negative yearly coefficients that are not also significant.

The inclusion of the additional firms with a five-years-ahead loss is the major difference between the Conventional CEPSL and Experimental CEPSL, so this difference is offered as the explanation for the dramatic change from a positive to a negative relationship.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| ALL-except-Services 1991-2004 | -0.017 | 0 (0) | 14 (14) |
| Wholesale, Retail, and Primary Products 1991-2004 | -0.016 | 0 (0) | 14 (13) |
| Manufacturing 1991-2004 | -0.022 | 0 (0) | 14 (14) |
| Services 1991-2004 | -0.025 | 0 (0) | 14 (12) |

Figure 58
Operating Leverage –> Long-Term Growth (Experimental CEPSL Used for 1991-2004)

With Experimental CEPSL, there is evidently a strong, negative relationship, wherein higher levels of OPERATING LEVERAGE are associated with long term decline that may include an annual net loss five years into the future.  The downside of higher risk associated with higher degrees of operating leverage is evident in the decisively negative and significant association of operating leverage with the Experimental CEPSL measurement of long-term growth.

By eliminating the firm-years with an annual net loss, the Conventional CEPSL emphasizes the upside to having a higher degree of Operating Leverage. Guthrie (2006) demonstrated that increases in the operating leverage of a firm can be associated with reductions in the firm's expected rate of return, a result that contradicted the general textbook view that operating leverage and the expected rate of return should be positively related. "All that is required to overturn the usual result is to allow the firm to cease operations if it becomes sufficiently unprofitable." This study's finding appear to generally agree with Guthrie (2006), in that the 1991-2004 average coefficient for the Operating Leverage signal is consistently negative, when predicting Experimental long-term growth that includes firms with a net loss in the five-years-ahead year.

As previously discussed, the INV signal (used by both LT-93 and AB-97 for studying changes in inventory disproportionate to sales) uses only finished goods inventory for manufacturing firms. Specifically, INV uses finished goods inventory (Compustat item "invfg") whenever finished goods is nonzero, and total inventory (Compustat "invt") if finished goods is zero. Since finished goods is typically nonzero for manufacturing firms, the INV signal includes only finished goods when the firm is a manufacturing company, and not the manufacturing company's other inventory, namely raw materials (Compustat "invrm") and work-in-process (Compustat "invwip").

As previously discussed for INV, there are situations where an increase in inventory can be good news for future profitability, but in general, an increase in inventory is considered bad news. Probably the prime reason why an increase in on-hand inventory is bad news for future earnings is that the inventory increase may indicate demand and sales for the inventory have decreased. Other reasons for increased inventory being bad news include increased risk of obsolescence (not the current version, or exceeded shelf life), shrinkage from loss or theft, and the additional costs associated with storing excess inventory. This is one reason many manufacturing companies have implemented an Enterprise Resource Planning (ERP) system with a Materials Requirement Planning (MRP) module that plans purchase and shop orders based on netting on-hand and on-order inventory against Master Schedule requirements for finished goods and their components defined in the Bills-of-Materials.

To study the changes in total manufacturing inventory for a manufacturing firm, this study uses the DELTA_TOT_MFG_INV signal, which is simply the change in total manufacturing inventory for the current year from the two-year average total manufacturing inventory for the prior two years. As such, DELTA_TOT_MFG_INV = {TOT_MFG_INV (t) - [ TOT_MFG_INV (t-1) + TOT_MFG_INV (t-2) ] / 2} } / {[ TOT_MFG_INV (t-1) + TOT_MFG_INV (t-2) ] / 2} where t is the current year and TOT_MFG_INV (t) = raw materials (t) + work-in-process (t) + finished goods (t). This signal is strictly for use in studying the future earnings of manufacturing firms who may have raw materials and/or work-in-process inventories in addition to finished goods inventory.

As expected, figure 59 shows DELTA_TOT_MFG_INV is generally negatively associated with next-year EPS change. In fifteen of eighteen years studied between 1991 and 2008, the yearly coefficient is negative. However, only one of the eighteen yearly coefficients is significant, so the negative relationship to next-year earnings is not particularly strong.  Using the Conventional CEPSL dependent variable for long-term growth, figure 59 shows a negative relationship, but again the association is not definitive, with nine of fourteen yearly coefficients negative and just two of the nine significant.  However, using Experimental CEPSL, the evidence is more clear that a current-year increase in total manufacturing inventory (raw materials + work-in-process + finished goods) is bad news for manufacturing firms' long term growth.  The yearly coefficients for DELTA_TOT_MFG_INV are negative in all fourteen of the years studied between 1991 and 2004, and eight of the fourteen yearly coefficients are significant at alpha = .05, with (not shown) an additional three of the fourteen negative yearly coefficients marginally significant at alpha = .10.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| 1-Year EPS Change (CEPS1) 1991-2008 | -0.100 | 3 (0) | 15 (1) |
| Long-Term Growth (Conventional CEPSL) 1991-2004 | -0.049 | 5 (0) | 9 (2) |
| Long-Term Growth (Experimental CEPSL) 1991-2004 | -0.452 | 0 (0) | 14 (8) |

Figure 59
DELTA_TOT_MFG_INV (for Manufacturing only)

Once again, the Experimental CEPSL shows more clearly than the Conventional CEPSL the strength of the relationship by including not only the positive-to-positive but also the negative-to-negative cases. Hence, a current-year increase (decrease) in total manufacturing inventory, comprised of raw materials, work-in-process and finished goods, is bad news (good news) for long-term growth.

In prior research, conditioning on industry has typically been done using the same fundamental signals for all the industries studied. This signal demonstrates one example where constructing a fundamental signal specific to an industry is relevance informative. There likely are other manufacturing-specific fundamental signals.

The definition used in this study for Manufacturing firms is designed to provide the highest probability that a given manufacturing firm sells only its manufactured goods, and not services or merchandise inventory, thereby allowing the imputation of Cost of Goods Manufactured or CGM (t) = invfg (t) + COGS (t) – invfg (t-1) where t is the current year and “invfg” is the Compustat item for finished goods inventory reported in the Balance Sheet.

The FG_COMPLETED_PER_AT signal is simply the ratio of a firm’s Cost of Goods Manufactured (cost of finished goods completed) to the firm’s total assets, computed as: CGM (t) / at (t) where “at” is the Compustat item for Total Assets reported in the Balance Sheet.

This signal measures for the current year a manufacturing firm’s Cost of Goods Manufactured as a percent of the firm’s total assets at book value. This signal is intended to measure for the current year how efficiently a manufacturing firm used its total resources (total assets) to complete its manufactured goods that it intended to sale.

As such, this signal should be positively and significantly related to both one-year-ahead change in EPS and changes in long-term growth.

Figure 60 summarizes the results for FG_COMPLETED_per_AT and, as expected, indicates that this signal is positively related to next-year earnings change. In predicting next-year earnings change, FG_COMPLETED_per_AT had eleven of eighteen yearly coefficients that were positive and two of these eleven were also significant at alpha = .05. In predicting Conventional long-term growth, ten of fourteen yearly signals were positive, but, less convincingly, the results using the Experimental CEPSL were more balanced, with eight negative and six positive yearly coefficients. The results appear to say the FG_COMPLETED_per_AT signal is better for predicting next-year earnings change than it is for forecasting long-term growth.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| 1-Year EPS Change (CEPS1) 1991-2008 | -0.037 | 11 (2) | 7 (0) |
| Long-Term Growth (Conventional CEPSL) 1991-2004 | 0.354 | 10 (0) | 4 (0) |
| Long-Term Growth (Experimental CEPSL) 1991-2004 | 0.889 | 8 (0) | 6 (0) |

Figure 60
FG_COMPLETED_per_AT (for Manufacturing only)

As previously discussed for FG_COMPLETED_per_AT, this study defines Manufacturing firms so as to obtain the best likelihood that a manufacturing firm sell only its manufactured goods and not services or merchandise inventory. In so doing, the author is able to compute Cost of Goods Manufactured (CGM) as described for FG_COMPLETED_per_AT. With Cost of Goods Manufactured defined, one can derive Total Manufacturing Costs for the current year as TMC(t) = invwip (t) + CGM (t) – invwip (t-1) where t is the current year and invwip is the Compustat item for work-in-process inventory reported in the Balance Sheet.

The TOT_MFG_COST_PER_AT signal is the ratio of a manufacturing firm's Total Manufacturing Costs to the firm's total assets. This ratio is computed as: TMC (t) / at (t) where. "at" is the firm's Total Assets reported in the Balance Sheet.

The TOT_MFG_COST_PER_AT signal measures for the current year a manufacturing firm's Total Manufacturing Costs as a percent of the firm's total assets at book value. Total Manufacturing Cost generally is comprised of three components: (1) Direct Materials: the raw materials used in the manufacturing process to manufacture the firms finished goods products, (2) Direct Labor: the hands-on labor charged by factory workers who assemble or process the raw materials into the finished goods, and (3) Applied Manufacturing Overhead: an allocation of the firm's manufacturing overhead costs to the cost of the products as they are produced. This signal is intended to measure for the current year the percent of a manufacturing firm's total resources (total assets) the firm used in production. Intuitively, more cost-efficient manufacturing should result in lower COGS, higher gross profits and increased net income. Therefore, the TOT_MFG_COST_T_per_AT signal is expected to be negatively related to next-year earnings and long-term growth.

Figure 61 shows that, as expected, TOT_MFG_COST_T_per_AT was negatively related to next-year EPS change in eleven of the eighteen years studied for 1991-2008. In two of these eleven negative years, the annual coefficient was also significant at alpha = .05, with (not shown) one additional negative coefficient marginally significant at alpha = .10. None of the seven positive annual coefficients were significant in predicting next-year EPS change. In predicting long-term growth with the Conventional CEPSL, figure 61 shows the yearly coefficients were negative in nine of fourteen years during 1991-2004, with (not shown) two of the nine marginally significant at alpha = .10. Using Experimental CEPSL, the results were a mix of six positive and eight negative yearly coefficients, none of which were significant.

| | Average Coefficient | Count of POSITIVE yearly coefficients (# sig. at alpha = .05) | Count of NEGATIVE yearly coefficients (# sig. at alpha = .05) |
|---|---|---|---|
| 1-Year EPS Change (CEPS1) 1991-2008 | -0.059 | 7 (0) | 11 (2) |
| Long-Term Growth (Conventional CEPSL) 1991-2004 | -0.366 | 5 (0) | 9 (0) |
| Long-Term Growth (Experimental CEPSL) 1991-2004 | -0.898 | 6 (0) | 8 (0) |

Figure 61
TOT_MFG_COST_T_per_AT (for Manufacturing only)

## 5.6 Hierarchical Regression Results

The following three tables report the hierarchical regression results:

Table 20: Hierarchical Regression Results by Category for 1991–2008
Dependent Variable = One-Year-Ahead EPS Change (CEPS1)

Table 21: Hierarchical Regression Results by Category for 1991–2004
Dependent Variable = Conventional Long-Term Growth (CEPSL)

Table 22: Hierarchical Regression Results by Category for 1991–2004
Dependent Variable = Experimental" Long-Term Growth (EXP_CEPSL)

The hierarchical regression results are reported in tables 20, 21 and 22, with results reported as each block of fundamental signals is successively added to the model. The Blocks of fundamental signals are:

- Block 1 is just the current-year change in EPS (CHGEPS).
- Block 2 comprises the AB-97 metric fundamental signals (AB-97).
- Block 3 is composed of the Added signals excluding the Operating Leverage Signal and the manufacturing-specific signals (ADDED).
- Block 4 is applicable only for the Manufacturing category. This block is the three manufacturing-specific Added signals, and is added only for Manufacturing (MFG ADDED).
- Block 4 (Block 5 for Manufacturing) is just the Operating Leverage signal defined in this study (OL)

Results are reported for all three dependent variables (next-year EPS change, "Conventional" long-term growth, and "Experimental" long-term growth) for all firm Categories (ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products, Services). The percent of explanatory/predictive power of the full model that was contributed by each block of fundamental signals is shown in the column heading

“Average Percent of Adj. R2 of Full Model Contributed by the just the Added Block of Signals.” The column with heading “Average Adj. R2 after the Block is Added” displays the cumulative adjusted R-square after adding a given block. The cumulative adjusted R-square shown for the Operating Leverage block is the same as the adjusted R-square for the full-model, since Operating Leverage is the last block added. Each block’s contribution to the full model’s explanatory/predictive power is computed as: (cumulative adjusted R-square of the block - cumulative adjusted R-square of the previous block) / adjusted R-square of the full model.

Table 20 shows the 1991-2008 hierarchical regression results, when next-year EPS change (CEPS1) is the dependent variable, and the blocks of fundamental signals are successively added to the model for each firm category. The following information is shown in table 20:

- The signal “Current-year change in EPS (CHGEPS)” contributed the most explanatory/predictive power in predicting next-year change in EPS (CEPS1). The average percent of adjusted R-square of the full model contributed by CHGEPS alone was 49%, 65%, 70% and 79% respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories. For the eighteen years studied between 1991 and 2008, the CHGEPS signal’s explanatory/predictive contribution (incremental adjusted R-square) was significant at alpha = .05 for fifteen, sixteen, fifteen and fifteen years respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories.

- The average percent of adjusted R-square of the full model in predicting next-year change in EPS contributed by the non-manufacturing-specific Added signals was 23%, 19%, 11% and 15% respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories. For the eighteen years studied, the non-manufacturing-specific Added signals contributed significant (alpha = .05) incremental explanatory/predictive power in seventeen, ten, eight, and seven years respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories.

- The average percent of adjusted R-square of the full model in predicting next-year change in EPS (CEPS1) for Manufacturing firms contributed by the manufacturing-specific Added signals was just 3%. For the fourteen years studied, the manufacturing-specific Added signals contributed significant incremental explanatory/predictive power (incremental adjusted R-square) in two of fourteen years studied at alpha = .05, and in another two years at alpha = .10.

- The average percent of adjusted R-square of the full model in predicting next-year change in EPS contributed by the AB-97 signals was 27%, 12%, 18% and 6% respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories. For the eighteen years studied, AB-97 signals contributed significant (alpha = .05) incremental explanatory/predictive power in nine, ten, ten, and five years respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories.

- The Operating Leverage signal's contribution in explaining/predicting next-year EPS change was minimal, with the average percent of adjusted R-square of the full model contributed by Operating Leverage being 1%, 2%, 0% and -1% respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories.

Based on table 20 data, the "current-year change in EPS (CHGEPS)" signal predicted next-year EPS change for Service firms much better than it did for Manufacturing firms, with an average 0.143 average adjusted R-square for Services as compared to an average 0.074 for Manufacturing. The Wholesale-Retail-Primary-Products category fell between these two with an average adjusted R-square of 0.107 being contributed by CHGEPS. The smaller explanatory/predictive power of CHGEPS in predicting next-year EPS change for Manufacturing vis-à-vis the other firm categories may be due in part to the effects of absorption costing used exclusively by Manufacturing firms. With Absorption Costing, manufacturing costs are absorbed into unfinished work-in-process and unsold finished goods inventories reported in the current year Balance Sheet rather than being expensed in the current-year Income Statement. The deferral of absorbed costs from the current year to the next year when finished goods manufactured in the prior year are sold may affect the CHGEPS-to-CEPS1 relationship for manufacturing firms.

Based on table 20 results, the signals added in this study with the guidance of accounting concepts (the Added signals) were able to contribute significant explanatory/predictive power in predicting "next-year EPS change" above that provided by the "current-year EPS change" and the AB-97 signals, which were the fundamental signals that security analysts' had said in their writings that they used. With hierarchical regression, the incremental explanatory/predictive power (incremental adjusted R-square) contributed by the Added signals was unique explanatory/predictive power that had not already been contributed by the "current-year EPS change" and the AB-97 signals.

Table 20
Hierarchical Regression Results
By Category for 1991 – 2008
Dependent Variable = One-Year-Ahead EPS Change (CEPS1)

| **ALL except Services** | | | |
|---|---|---|---|
| **<u>Blocks:</u>** | **Average Adj. R2 After the Block is Added** | **Count of Years where R2 Change from the Added Block was significant at alpha = .05 (.10)** | **Average Percent of Adj. R2 of Full Model Contributed by the just the Added Block of Signals** |
| CHGEPS | 0.036 | 15 (1) | 49% |
| AB-97 | 0.056 | 9 (2) | 27% |
| ADDED | 0.073 | 17 (0) | 23% |
| OL | 0.073 | 2 (1) | 1% |
| **Manufacturing** | | | |
| **<u>Blocks:</u>** | **Average Adj. R2 After the Block is Added** | **Count of Years where R2 Change from the Added Block was significant at alpha = .05 (.10)** | **Average Percent of Adj. R2 of Full Model Contributed by the just the Added Block of Signals** |

Table 20 -- *Continued*

| | | | |
|---|---|---|---|
| CHGEPS | 0.074 | 16 (1) | 65% |
| AB-97 | 0.087 | 10 (2) | 12% |
| ADDED | 0.108 | 10 (4) | 19% |
| MFG ADDED | 0.112 | 2 (2) | 3% |
| OL | 0.115 | 3 (1) | 2% |
| **Wholesale, Retail, and Primary Products** | | | |
| **Blocks:** | **Average Adj. R2 After the Block is Added** | **Count of Years where R2 Change from the Added Block was significant at alpha = .05 (.10)** | **Average Percent of Adj. R2 of Full Model Contributed by the just the Added Block of Signals** |
| CHGEPS | 0.107 | 15 (0) | 70% |
| AB-97 | 0.134 | 10 (3) | 18% |
| ADDED | 0.151 | 8 (2) | 11% |
| OL | 0.152 | 3 (0) | 0% |
| **Services** | | | |
| **Blocks:** | **Average Adj. R2 After the Block is Added** | **Count of Years where R2 Change from the Added Block was significant at alpha = .05 (.10)** | **Average Percent of Adj. R2 of Full Model Contributed by the just the Added Block of Signals** |
| CHGEPS | 0.143 | 15 (1) | 79% |
| AB-97 | 0.155 | 5 (1) | 6% |
| ADDED | 0.181 | 7 (1) | 15% |
| OL | 0.181 | 1 (0) | -1% |

Table 21 shows the 1991-2004 hierarchical regression results, when Conventional long-term growth (CEPSL) is the dependent variable, and the blocks of fundamental signals are successively added to the model for each firm category. The following information is shown in table 21:

- In a complete reversal from its lack of informativeness for predicting next-year EPS change (table 20), the Operating Leverage signal's contribution in explaining/predicting Conventional long-term growth was by far the most of any signal in the model, with the average percent of adjusted R-square of the full model contributed by just the Operating Leverage signal being 74%, 63%, 59% and 55% respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories. The Operating Leverage signal's explanatory/predictive contribution (incremental adjusted R-square) was significant at alpha = .05 for all of the fourteen years studied during 1991-2004 for ALL-except-Services, Manufacturing, and Wholesale-Retail-Primary-Products, and was significant in ten of fourteen years for Services.

- Current-year change in EPS (CHGEPS) was much less informative in predicting Conventional long-term growth than it was in predicting next-year EPS change (table 20). The average percent of adjusted R-square of the full model contributed by CHGEPS alone was 4%, 4%, 15% and 12% respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories. For the fourteen years studied between 1991 and 2004, the CHGEPS signal's explanatory/predictive contribution (incremental adjusted R-square) was significant at alpha = .05 for seven, two, four and four years respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories.

- The average percent of adjusted R-square of the full model in predicting Conventional long-term growth contributed by the non-manufacturing-specific Added signals was 11%, 14%, 10% and 27% respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories. For the fourteen years studied, the non-manufacturing-specific Added signals contributed significant (alpha = .05) incremental explanatory/predictive power in nine, six, zero, and three years respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories.

- The average percent of adjusted R-square of the full model in predicting Conventional long-term growth for Manufacturing firms contributed by the manufacturing-specific Added signals was 11%. For the fourteen years studied, the manufacturing-specific Added signals contributed significant incremental explanatory/predictive power (incremental adjusted R-square) in four of fourteen years studied at alpha = .05, and in another four years at alpha = .10.

- The average percent of adjusted R-square of the full model in predicting Conventional long-term growth contributed by the AB-97 signals was 11%, 9%, 16% and 7% respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories. For the fourteen years studied, AB-97 signals contributed significant (alpha = .05) incremental explanatory/predictive power in eight, three, three, and two years respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories.

For the three categories of Manufacturing, Wholesale-Retail-Primary-Products, and Services, Manufacturing's full model of studied signals provided the lowest average explanatory power (average adjusted R-square) in predicting next-year EPS change (0.115 as shown in table 20), but Manufacturing's full model provided the highest average explanatory power (average adjusted R-square) in predicting Conventional long-term growth (0.182 as shown in table 21). This difference was due to the dramatic increase in informativeness of the Operating Leverage signal, and also to the increase in the informativeness of the manufacturing-specific Added signals, in predicting Conventional long-term growth vis-à-vis predicting next-year EPS change.

The somewhat less strength of the Operating Leverage signal in predicting Conventional long-term growth for the Services category vis-à-vis for the other categories may be due to Service companies on average having less property plant and equipment than the other categories of firms, and hence, less fixed costs.

Based on the table 21 results, the signals added in this study with the guidance of accounting concepts (the Added signals) were able to contribute significant explanatory/predictive power in predicting Conventional long-term growth above that provided by the "current-year EPS change" and the signals derived from the expert guidance of security analysts, that is, the AB-97 signals. The incremental explanatory/predictive power (incremental adjusted R-square) contributed by the Added signals was unique explanatory/predictive power that had not already been contributed by the "current-year EPS change" and the AB-97 signals. The Operating Leverage and other Added signals together contributed an average of 85%, 74%, 69% and 82% respectively of the full model's explanatory/predictive power for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories.

Table 21
Hierarchical Regression Results
By Category for 1991 – 2004
Dependent Variable = Conventional Long-Term Growth (CEPSL)

| ALL except Services | | | |
|---|---|---|---|
| **Blocks:** | **Average Adj. R2 After the Block is Added** | **Count of Years where R2 Change from the Added Block was significant at alpha = .05 (.10)** | **Average Percent of Adj. R2 of Full Model Contributed by the just the Added Block of Signals** |
| CHGEPS | 0.005 | 7 (1) | 4% |
| AB-97 | 0.021 | 8 (1) | 11% |
| ADDED | 0.036 | 9 (3) | 11% |
| OL | 0.139 | 14 (0) | 74% |
| **Manufacturing** | | | |
| **Blocks:** | **Average Adj. R2 After the Block is Added** | **Count of Years where R2 Change from the Added Block was significant at alpha = .05 (.10)** | **Average Percent of Adj. R2 of Full Model Contributed by the just the Added Block of Signals** |
| CHGEPS | 0.007 | 2 (0) | 4% |
| AB-97 | 0.023 | 3 (4) | 9% |
| ADDED | 0.048 | 6 (1) | 14% |
| MFG ADDED | 0.068 | 4 (4) | 11% |
| OL | 0.182 | 14 (0) | 63% |
| **Wholesale, Retail, and Primary Products** | | | |
| **Blocks:** | **Average Adj. R2 After the Block is Added** | **Count of Years where R2 Change from the Added Block was significant at alpha = .05 (.10)** | **Average Percent of Adj. R2 of Full Model Contributed by the just the Added Block of Signals** |
| CHGEPS | 0.016 | 4 (2) | 15% |
| AB-97 | 0.033 | 3 (3) | 16% |
| ADDED | 0.043 | 0 (3) | 10% |
| OL | 0.106 | 14 (0) | 59% |
| **Services** | | | |
| **Blocks:** | **Average Adj. R2 After the Block is Added** | **Count of Years where R2 Change from the Added Block was significant at alpha = .05 (.10)** | **Average Percent of Adj. R2 of Full Model Contributed by the just the Added Block of Signals** |
| CHGEPS | 0.018 | 4 (0) | 12% |
| AB-97 | 0.028 | 2 (1) | 7% |
| ADDED | 0.070 | 3 (2) | 27% |
| OL | 0.156 | 10 (0) | 55% |

Table 22 shows the 1991-2004 hierarchical regression results, when Experimental long-term growth (CEPSL) is the dependent variable, and the blocks of fundamental signals are successively added to the model for each firm category. The following information is shown in table 22:

- As with Conventional long-term growth, the Operating Leverage signal's contribution in explaining/predicting Experimental long-term growth was the most of any signal in the model, with the average percent of the adjusted R-square of the full model contributed by just the Operating Leverage signal being 47%, 39%, 48% and 51% respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories. For the fourteen years studied between 1991 and 2004, the Operating Leverage signal's explanatory/predictive contribution (incremental adjusted R-square) was significant at alpha = .05 for fourteen, fourteen, thirteen and twelve years respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories.

- In predicting Experimental CEPSL, the average percent of adjusted R-square of the full model contributed by CHGEPS alone was 8%, 14%, 12% and 1% respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories. For the fourteen years studied between 1991 and 2004, the CHGEPS signal's explanatory/predictive contribution (incremental adjusted R-square) was significant at alpha = .05 for ten, eleven, seven and one years respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories.

- The average percent of adjusted R-square of the full model in predicting Experimental long-term growth contributed by the non-manufacturing-specific Added signals was 25%, 19%, 18% and 29% respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories. For the fourteen years studied, the non-manufacturing-specific Added signals contributed significant (alpha = .05) incremental explanatory/predictive power in fourteen, thirteen, eight, and nine years respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories. These results show the explanatory/predictive power of the non-manufacturing Added signals increased appreciably when predicting Experimental CEPSL vis-à-vis Conventional CEPSL.

- The average percent of adjusted R-square of the full model in predicting Experimental long-term growth for Manufacturing firms contributed by the manufacturing-specific Added signals was 6%. For the fourteen years studied, the manufacturing-specific Added signals contributed significant incremental explanatory/predictive power (incremental adjusted R-square) in nine of fourteen years studied at alpha = .05, and in another four years at alpha = .10.

- The average percent of adjusted R-square of the full model in predicting Experimental long-term growth contributed by the AB-97 signals was 20%, 23%, 22% and 20% respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories. For the fourteen years studied, AB-97 signals contributed significant (alpha = .05) incremental explanatory/predictive power in fourteen, thirteen, nine, and six years respectively for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories.

The Manufacturing category's full model provided the highest overall average explanatory power (average adjusted R-square) in predicting Experimental long-term growth. The full-model adjusted-R-square averages were 0.217, 0.172, 0.167 and 0.165 respectively for Manufacturing, ALL-except-Services, Wholesale-Retail-Primary-Products and Services categories.

In predicting Experimental long-term growth as compared to predicting Conventional long-term growth, the signals other than the Operating Leverage and manufacturing-specific signals increased in informativeness. Although less informative than for Conventional long-term growth, the contribution of the Operating Leverage signal was substantial in predicting Experimental long-term growth for all of the firm categories. The manufacturing-specific signals made a statistically significant contribution in nine of the fourteen years studied, based on the significance at alpha = .05 of the incremental R-square change resulting from the addition of the manufacturing-specific signals.

Based on the table 22 results, the signals added in this study with the guidance of accounting concepts (the Added signals) were able to contribute significant explanatory/predictive power in predicting Experimental long-term growth above that provided by the “current-year EPS change” and the signals derived from security analysts’ “expert guidance,” that is, the AB-97. Again, hierarchal regression showed the unique incremental explanatory/predictive power contributed by the Added signals that was not already provided by the “current-year EPS change” and the AB-97 signals. In predicting Experimental long-term growth, the Operating Leverage and other Added signals taken together (computed by adding the percent contributed by the Added blocks to the percent contributed by Operating Leverage, as shown in table 22) contributed an average of 72%, 64%, 66% and 80% respectively of the full model’s explanatory/predictive power for the ALL-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories.

Current-year EPS change (CHGEPS) was much was less informative (1%) in predicting Experimental long-term growth (CEPSL) for Services than it was for any of the other categories of firms (8%, 14% and 12%). This difference may be associated with many Services firms being regulated. For example, banking and insurance companies are included in the Service category. This difference was observed with the Experimental CEPSL but not with the Conventional CEPSL. Recall that Experimental CEPSL includes the firms with a net loss in either the current year or in the five-years-ahead year in the geometric mean growth rate formula. For Service firms, the evidence appears to be consistent with regulations having softened the relationship between changes in current-year EPS and long-term growth.

Table 22
Hierarchical Regression Results
By Category for 1991 – 2004
Dependent Variable = Experimental" Long-Term Growth (EXP_CEPSL)

| ALL except Services | | | |
|---|---|---|---|
| **<u>Blocks:</u>** | **Average Adj. R2 After the Block is Added** | **Count of Years where R2 Change from the Added Block was significant at alpha = .05 (.10)** | **Average Percent of Adj. R2 of Full Model Contributed by the just the Added Block of Signals** |
| CHGEPS | 0.014 | 10 (0) | 8% |
| AB-97 | 0.049 | 14 (0) | 20% |
| ADDED | 0.092 | 14 (0) | 25% |
| OL | 0.172 | 14 (0) | 47% |
| **Manufacturing** | | | |
| **<u>Blocks:</u>** | **Average Adj. R2 After the Block is Added** | **Count of Years where R2 Change from the Added Block was significant at alpha = .05 (.10)** | **Average Percent of Adj. R2 of Full Model Contributed by the just the Added Block of Signals** |
| CHGEPS | 0.030 | 11 (0) | 14% |
| AB-97 | 0.079 | 13 (1) | 23% |
| ADDED | 0.120 | 13 (0) | 19% |
| MFG ADDED | 0.132 | 9 (0) | 6% |
| OL | 0.217 | 14 (0) | 39% |
| **Wholesale, Retail, and Primary Products** | | | |
| **<u>Blocks:</u>** | **Average Adj. R2 After the Block is Added** | **Count of Years where R2 Change from the Added Block was significant at alpha = .05 (.10)** | **Average Percent of Adj. R2 of Full Model Contributed by the just the Added Block of Signals** |
| CHGEPS | 0.020 | 7 (2) | 12% |
| AB-97 | 0.057 | 9 (3) | 22% |
| ADDED | 0.087 | 8 (2) | 18% |
| OL | 0.167 | 13 (1) | 48% |
| **Services** | | | |
| **<u>Blocks:</u>** | **Average Adj. R2 After the Block is Added** | **Count of Years where R2 Change from the Added Block was significant at alpha = .05 (.10)** | **Average Percent of Adj. R2 of Full Model Contributed by the just the Added Block of Signals** |
| CHGEPS | 0.001 | 1 (0) | 1% |
| AB-97 | 0.034 | 6 (2) | 20% |
| ADDED | 0.081 | 9 (0) | 29% |
| OL | 0.165 | 12 (1) | 51% |

## 5.7 Analysts' Utilization of Signals and Actual Average Forecast Error Rates by Year

Tables 23 through 30 titled "Analysts' Efficient Use of Fundamental Signals" report the results for 1991-2008 for comparisons of "CEPS1-to-FY1+1," "CEPS1-to-FY1+5," and for 1991-2004, "CEPSL-to-LTG+1," and "CEPSL-to-LTG+4." For each comparison, two tables are provided: the first table reports the regression results using the earnings dependent variable {"1-year earnings change (CEPS1)" or "Conventional long-term growth (CESPL)"}; and the second table reports the regression results using one of the four analysts' forecast revisions dependent variables (FY1+1, FY1+5, LTG+1 or LTG+4). All of these dependent variables are defined in table 1. Following AB-97, only the fundamental signals applicable to all firms (the ALL-except-Services category), and only the dependent variables "next-year EPS change (CEPS1)" and "Conventional long-term growth (CEPSL)" are used to study security analysts' efficient use of the fundamental signals. Neither the "Experimental" long-term growth CEPSL nor the manufacturing-specific signals are used to study analysts' efficient use of fundamental signals. AB-97 excludes most service firms by requiring the INV and CAPX signals be nonzero.

Table 23 summarizes the results for each year, when CEPS1 was regressed on the firms that had a nonzero FY1+1 value. Table 24 summarizes the results for each year, when FY1+1 was regressed on exactly the same firms used in that year's CEPS1 regression for table 23. The same independent variables (fundamental signals) were used in tables 23 and 24 regressions, and the same firms were used in tables 23 and 24 regressions for each year. The average number of firms used in both tables 23 and 24 regressions for 1991-2008 was 344 firms per year. The results reported in tables 23 and 24 are summarized in figure 62.

| | |
|---|---|
| Avg. Adj. R2 from regressing CEPS1 on the signals: | 0.132 |
| Avg. Adj. R2 from regressing FY1+1 on the signals: | 0.095 |
| Analysts' Avg. % Use of Fundamental Signals: | 71% |
| Analysts' Avg. Actual Mean Error Percent: | 97% |
| Std. Dev. Of Analysts' Avg. Actual Error Percent: | 490% |

Figure 62
Comparison of "CEPS1-to-FY1+1"
1991-2008
Taken directly from Tables 23 and 24

As shown in figure 62, during 1991-2008 the analysts were on average 71% efficient in using the studied fundamental signals when they made their next-year EPS forecast revisions during the thirty-day period that started 1 month after the current-year earnings announcement date. During this same thirty-day period, their actual error was on average 97%, with a standard deviation of 490%. Each firm's actual error rate = absolute value [(average of the analysts' next year earnings forecasts made during the thirty-day period stating one month after the earnings announcement date - actual next-years earnings) / actual next years earnings]. The same firms used in the CEPS1 regression were also used in the FY1+1 regression, and the same independent variables are used in both regressions. The only difference between the two regressions is the dependent variable. The column heading in Table 24 titled "#SIG** CEPS1 but not SIG** FY1+1" indicates the count of years during 1991-2008 where the fundamental signal was significant at alpha = .05 in predicting CEPS1, but was not significant at alpha = .05 in explaining FY1+1. Looking at the fundamental signals with counts equal or greater than four, the fundamental signals that the analysts might have used more efficiently (count of years not used efficiently) were: CHGEPS (11), INV (6), ETR (6), CHG_MU (4), and CHG_CASH (4).

Current-year change in earnings (CHGEPS) was shown to be the most underutilized signal by security analysts in forecasting next-year earnings, with eleven years during 1991-2008 where CHGEPS was significant in predicting next-year earnings change but was insignificant in explaining security analysts' next-year earnings forecast revisions. The *a priori* expectation was that CHGEPS would be the first accounting information that security analysts would evaluate in forecasting next-year earnings. Richardson, Tuna, Wysocki (2010) (henceforth, RTW) conducted a survey is which they asked practitioners ("investment professionals") and academicians the question: "Over the last twelve months, how often have you used the following valuation techniques in your work?" with "question 6" asking about the frequency of using "Residual income (economic profit) model." RTW report, "The responses to question 6 are particularly germane to our topic of review: fundamental analysis. One observes significant differences between academics and practitioners about the type of valuation model they use. Approximately 71% of academics note they use some version of residual income valuation and only 16% of practitioners use this type of valuation model." [RTW, page 419] AB-97 define CHGEPS as "the change in earnings per share between years t -1 and t (contemporaneous with the fundamental signals), deflated by stock price at the end of year t -1." If prior-year (year t-1) EPS may be used as a one-year expectation model for estimating expected (opportunity) income for the next year (year t), then it might be argued that EPS (t) – EPS (t-1) a simplified model for abnormal or *residual* income. The facts are that RTW report only 16-percent of practitioners surveyed say they use some form of residual income valuation, and this study' finds practitioners' did not use the current-year EPS change signal (CHGEPS) in 11 years during 1990-2008, when forecasting next-year EPS.

Table 23
Analysts' Efficient Use of Fundamental Signals
Dependent Variable = CEPS1
CEPS1 - FY1+1
Averages 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) | -0.008 | 0.340 | 4 | 2 | 8 | 4 | 10 | 0 |
| CHGEPS | -0.227 | 0.109 | 14 | 0 | 18 | 14 | 0 | 0 |
| INV | -0.007 | 0.324 | 6 | 1 | 10 | 6 | 8 | 0 |
| AR | 0.009 | 0.517 | 2 | 1 | 5 | 0 | 13 | 2 |
| GM | 0.014 | 0.404 | 3 | 0 | 7 | 0 | 11 | 3 |
| SA | -0.014 | 0.293 | 5 | 1 | 12 | 3 | 6 | 2 |
| ETR | -0.314 | 0.217 | 8 | 0 | 15 | 7 | 3 | 1 |
| LF | -0.019 | 0.301 | 5 | 0 | 13 | 5 | 5 | 0 |
| CAPX | 0.003 | 0.337 | 4 | 2 | 8 | 1 | 10 | 3 |
| MKTSHR | -0.008 | 0.426 | 0 | 2 | 13 | 0 | 5 | 0 |
| CHG_MKTSHR | -0.005 | 0.382 | 0 | 1 | 9 | 0 | 9 | 0 |
| MU | -0.002 | 0.385 | 1 | 3 | 10 | 1 | 8 | 0 |
| CHG_MU | 0.036 | 0.350 | 4 | 3 | 4 | 0 | 14 | 4 |
| FCF | 0.024 | 0.240 | 5 | 1 | 5 | 1 | 13 | 4 |
| CHG_FCF | 0.000 | 0.555 | 0 | 2 | 12 | 0 | 6 | 0 |
| CASH | 0.022 | 0.400 | 5 | 0 | 9 | 0 | 9 | 5 |
| CHG_CASH | 0.020 | 0.460 | 4 | 0 | 8 | 1 | 10 | 3 |
| DEBT_AT | 0.023 | 0.268 | 3 | 1 | 2 | 0 | 16 | 3 |
| CHG_DEBT AT | 0.023 | 0.433 | 4 | 2 | 5 | 0 | 13 | 4 |
| DISC. INCOME | 0.000 | 0.435 | 2 | 1 | 9 | 1 | 9 | 1 |
| OL | 0.000 | 0.419 | 4 | 0 | 12 | 4 | 6 | 0 |
| Avg. Adj. R2 for Full Model | | | | | 0.132 | | | |
| Avg. # of Firms per Year | | | | | 344 | | | |

Table 24
Analysts' Efficient Use of Fundamental Signals
Dependent Variable = FY1+1
CEPS1 - FY1+1
Averages 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** | **# NEG SIG **** | **# SIG** CEPS1 but not SIG** FY1+1** | **# Sign <>** |
|---|---|---|---|---|---|---|---|---|---|---|
| (Constant) | -0.004 | 0.382 | 4 | 2 | 12 | 3 | 6 | 1 | ------ | ------ |
| CHGEPS | -0.012 | 0.369 | 3 | 0 | 9 | 3 | 9 | 0 | 11 | 7 |
| INV | -0.001 | 0.424 | 0 | 1 | 9 | 0 | 9 | 0 | 6 | 2 |
| AR | 0.004 | 0.384 | 2 | 2 | 2 | 0 | 16 | 2 | 2 | 0 |
| GM | -0.006 | 0.185 | 8 | 0 | 10 | 6 | 8 | 2 | 0 | 0 |
| SA | -0.002 | 0.408 | 3 | 3 | 11 | 1 | 7 | 2 | 3 | 1 |
| ETR | -0.026 | 0.294 | 6 | 0 | 9 | 4 | 9 | 2 | 6 | 3 |
| LF | -0.002 | 0.434 | 4 | 1 | 11 | 2 | 7 | 2 | 3 | 0 |
| CAPX | 0.001 | 0.446 | 1 | 3 | 7 | 0 | 11 | 1 | 3 | 1 |
| MKTSHR | -0.001 | 0.545 | 3 | 0 | 7 | 2 | 11 | 1 | 0 | 0 |
| CHG MKTSHR | 0.001 | 0.359 | 5 | 0 | 9 | 2 | 9 | 3 | 0 | 0 |
| MU | 0.001 | 0.362 | 4 | 2 | 7 | 0 | 11 | 4 | 1 | 1 |
| CHG_MU | -0.007 | 0.309 | 3 | 3 | 12 | 3 | 6 | 0 | 4 | 2 |
| FCF | 0.003 | 0.324 | 6 | 1 | 9 | 2 | 9 | 4 | 2 | 0 |
| CHG_FCF | 0.000 | 0.393 | 1 | 1 | 11 | 0 | 7 | 1 | 0 | 0 |
| CASH | 0.002 | 0.287 | 4 | 3 | 8 | 3 | 10 | 1 | 3 | 0 |
| CHG_CASH | 0.000 | 0.361 | 4 | 0 | 9 | 3 | 9 | 1 | 4 | 3 |
| DEBT_AT | 0.002 | 0.394 | 3 | 2 | 6 | 1 | 12 | 2 | 1 | 1 |
| CHG_DEBT AT | 0.007 | 0.348 | 2 | 3 | 2 | 0 | 16 | 2 | 3 | 0 |
| DISC. INCOME | -0.012 | 0.278 | 8 | 0 | 11 | 7 | 7 | 1 | 2 | 0 |
| OL | 0.000 | 0.276 | 4 | 1 | 13 | 4 | 5 | 0 | 2 | 1 |

| | |
|---|---|
| Avg. Adj. R2 | 0.095 |
| Avg. # of Firms per Year | 344 |
| Analysts' Avg. % Use of Fundamental Signals | 71% |
| Analysts' Avg. Actual Mean Error Percent | 97% |
| Std. Dev. Of Analysts' Avg. Actual Error Percent | 490% |

Table 25 summarizes the yearly regression results when CEPS1 was regressed on the firms that had a nonzero FY1+5 value. Table 26 summarizes the results for the same years summarized in table 25, where for each year, FY1+5 was regressed on exactly the same firms used in that year's CEPS1 regression for table 25. The same independent variables (fundamental signals) were used in tables 25 and 26 regressions, and the same firms were used in tables 25 and 26 regressions for each year. The average number of firms used in both the tables 25 and 26 regressions for 1991-2008 was 363 firms per year.

The results reported in tables 25 and 26 are summarized in figure 63.

| | |
|---|---|
| Avg. Adj. R2 from regressing CEPS1 on the signals: | 0.124 |
| Avg. Adj. R2 from regressing FY1+5 on the signals: | 0.070 |
| Analysts' Avg. % Use of Fundamental Signals: | 57% |
| Analysts' Avg. Actual Mean Error Percent: | 54% |
| Std. Dev. Of Analysts' Avg. Actual Error Percent: | 300% |

Figure 63
Comparison of "CEPS1-to-FY1+5"
Taken directly from Table 25 and Table 26
1991-2008

As shown in figure 63, on average the analysts were 57% efficient in using the studied fundamental signals when they made their next-year EPS forecast revisions during the thirty-day period that started five months after the current-year earnings announcement date. During this same thirty-day period, their actual error was on average 54%, with a standard deviation of 300%. As with CEPS1-to-FT1+1, the same firms used in the CEPS1 regression were also used in the FY1+5 regression, and the same independent variables were used in both regressions. The only difference between the two regressions was the dependent variable. As shown in table 26, specific fundamental signals with four or more years where analysts were not efficient in using the signal (number of years not efficiently used) were: CHGEPS (8), SA (7), ETR (6), DEBT_AT (5), and Operating Leverage (4).

The analysts' actually accuracy improved from 97% error rate in the "+1" month to 57% in the "+5" month, while their utilization of the fundamental signals decreased from 71% to 57%. It appears the analysts obtained additional information not contained in the current-year fundamental signals that helped them improve their forecasts during the time between the “+1” and the “+5” month. Still, the evidence suggests security analysts may have been able to improve both their “+1” and “+5” forecasts, if they had used the fundamental signals more efficiently.

Table 25
Analysts’ Efficient Use of Fundamental Signals
Dependent Variable = CEPS1
CEPS1 - FY1+5
Averages 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) | -0.005 | 0.420 | 4 | 0 | 7 | 3 | 11 | 1 |
| CHGEPS | -0.230 | 0.128 | 13 | 0 | 15 | 13 | 3 | 0 |
| INV | -0.005 | 0.351 | 2 | 3 | 11 | 2 | 7 | 0 |
| AR | 0.006 | 0.588 | 1 | 0 | 7 | 0 | 11 | 1 |
| GM | 0.020 | 0.415 | 1 | 2 | 8 | 0 | 10 | 1 |
| SA | -0.016 | 0.304 | 7 | 2 | 11 | 5 | 7 | 2 |
| ETR | -0.196 | 0.274 | 6 | 2 | 14 | 5 | 4 | 1 |
| LF | -0.015 | 0.386 | 0 | 2 | 14 | 0 | 4 | 0 |
| CAPX | 0.006 | 0.370 | 4 | 2 | 3 | 1 | 15 | 3 |
| MKTSHR | -0.007 | 0.458 | 1 | 2 | 10 | 1 | 8 | 0 |
| CHG_MKTSHR | 0.007 | 0.543 | 0 | 2 | 8 | 0 | 10 | 0 |
| MU | 0.001 | 0.441 | 3 | 2 | 8 | 1 | 10 | 2 |
| CHG_MU | 0.049 | 0.342 | 3 | 3 | 2 | 0 | 16 | 3 |
| FCF | 0.037 | 0.388 | 2 | 1 | 4 | 0 | 14 | 2 |
| CHG_FCF | 0.000 | 0.529 | 0 | 2 | 10 | 0 | 8 | 0 |
| CASH | 0.008 | 0.485 | 2 | 0 | 8 | 1 | 10 | 1 |
| CHG_CASH | 0.010 | 0.494 | 1 | 0 | 9 | 0 | 9 | 1 |
| DEBT_AT | 0.022 | 0.252 | 7 | 1 | 3 | 1 | 15 | 6 |
| CHG_DEBT AT | 0.022 | 0.290 | 4 | 4 | 2 | 0 | 16 | 4 |
| DISC. INCOME | -0.021 | 0.371 | 4 | 0 | 11 | 4 | 7 | 0 |
| OL | -0.001 | 0.379 | 6 | 3 | 16 | 6 | 2 | 0 |
| Avg. Adj. R2 for Full Model | | | | | 0.124 | | | |
| Avg. # of Firms per Year | | | | | 363 | | | |

Table 26
Analysts' Efficient Use of Fundamental Signals
Dependent Variable = FY1+5
CEPS1 - FY1+5
Averages 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** | **# NEG SIG **** | **# SIG** CEPS1 but not SIG** FY1+1** | **# Sign <>** |
|---|---|---|---|---|---|---|---|---|---|---|
| (Constant) | -0.010 | 0.333 | 7 | 0 | 15 | 7 | 3 | 0 | ------ | ------ |
| CHGEPS | 0.002 | 0.330 | 5 | 1 | 8 | 4 | 10 | 1 | 8 | 4 |
| INV | -0.002 | 0.377 | 3 | 0 | 14 | 3 | 4 | 0 | 1 | 0 |
| AR | 0.005 | 0.446 | 2 | 1 | 4 | 0 | 14 | 2 | 1 | 0 |
| GM | 0.002 | 0.263 | 7 | 1 | 7 | 3 | 11 | 4 | 0 | 0 |
| SA | 0.000 | 0.409 | 2 | 2 | 9 | 1 | 9 | 1 | 7 | 2 |
| ETR | -0.031 | 0.403 | 3 | 0 | 12 | 2 | 6 | 1 | 6 | 3 |
| LF | -0.002 | 0.424 | 2 | 2 | 11 | 2 | 7 | 0 | 0 | 0 |
| CAPX | 0.001 | 0.426 | 4 | 0 | 7 | 0 | 11 | 4 | 2 | 0 |
| MKTSHR | 0.004 | 0.490 | 2 | 1 | 5 | 0 | 13 | 2 | 1 | 0 |
| CHG MKTSHR | 0.005 | 0.380 | 2 | 1 | 5 | 0 | 13 | 2 | 0 | 0 |
| MU | 0.002 | 0.294 | 6 | 2 | 5 | 0 | 13 | 6 | 1 | 0 |
| CHG_MU | 0.000 | 0.355 | 5 | 2 | 9 | 3 | 9 | 2 | 3 | 0 |
| FCF | 0.031 | 0.347 | 5 | 0 | 3 | 0 | 15 | 5 | 0 | 0 |
| CHG_FCF | 0.000 | 0.463 | 2 | 0 | 11 | 2 | 7 | 0 | 0 | 0 |
| CASH | -0.014 | 0.404 | 4 | 0 | 14 | 4 | 4 | 0 | 0 | 0 |
| CHG_CASH | 0.008 | 0.390 | 3 | 1 | 7 | 1 | 11 | 2 | 1 | 0 |
| DEBT_AT | 0.003 | 0.435 | 2 | 0 | 7 | 0 | 11 | 2 | 5 | 0 |
| CHG_DEBT AT | 0.005 | 0.485 | 3 | 1 | 7 | 0 | 11 | 3 | 3 | 1 |
| DISC. INCOME | -0.009 | 0.273 | 4 | 0 | 9 | 4 | 9 | 0 | 2 | 1 |
| OL | 0.000 | 0.512 | 3 | 0 | 13 | 3 | 5 | 0 | 4 | 2 |
| Avg. Adj. R2 for Full Model | | | | | | 0.070 | | | | |
| Avg. # of Firms per Year | | | | | | 363 | | | | |
| Analysts' Avg. % Use of Fundamental Signals | | | | | | 57% | | | | |
| Analysts' Avg. Actual Mean Error Percent | | | | | | 54% | | | | |
| Std. Dev. Of Analysts' Avg. Actual Error Percent | | | | | | 300% | | | | |

Table 27 summarizes the results for each year, when CEPSL was regressed on the firms that had a nonzero LTG+1 value. Table 28 summarizes the results for each year, when LTG+1 was regressed on exactly the same firms used in that year's CEPSL regression for table 27. The same independent variables (fundamental signals) were used in the table 27 and table 28 regressions, and the same firms were used in the table

27 and table 28 regressions for each year. The average number of firms used in both the table 25 and table 26 regressions for 1991-2004 was 143 firms per year. The results reported in tables 27 and 28 are summarized in figure 64.

| | |
|---|---|
| Avg. Adj. R2 from regressing CEPSL on the signals: | 0.138 |
| Avg. # of Firms per Year used in CEPSL regression: | 143 |
| Avg. Adj. R2 from regressing LTG+1 on the signals: | 0.061 |
| Avg. # of Firms per Year used LTG+1 regression: | 143 |
| Analysts' Avg. % Use of Fundamental Signals: | 44% |
| Analysts' Avg. Actual Mean Error Percent: | 308% |
| Std. Dev. Of Analysts' Avg. Actual Error Percent: | 953% |

Figure 64
Comparison of "CEPSL-to-LTG+1"
Taken directly from Table 27 and Table 28
1991-2004

Figure 64 shows that, on average, the analysts were 44% efficient in using the studied fundamental signals during 1991-2004 when they made their long-term growth forecast revisions during the ninety-day period that started one month after the current-year earnings announcement date. During this same ninety-day period, their actual error was on average 308%, with a standard deviation of 953%. The same firms and fundamental signals were used for the regressions with CEPSL and LTG+1. The single fundamental signal that the analysts might have used more efficiently is Operating Leverage. As shown in table 27, Operating Leverage was significant at alpha = .05 for twelve of fourteen years studied when CEPSL was regressed on the fundamental signals (including Operating Leverage), but as shown in table 28, Operating Leverage was insignificant in all but one year when LTG+1 was regressed on the same fundamental signals. In addition, the signs of the two regressions' betas for Operating Leverage did not match in seven of the fourteen years studied. Using a broader sample of firms by not requiring an analyst's forecast, table 21 shows Operating Leverage alone accounted for an average 74% of the explanatory power provided by all of the fundamental signals combined in the full model when predicting Conventional CEPSL. Given this evidence, more efficient use of the Operating Leverage signal by analysts might help to improve their forecast revision accuracy for long-term growth.

Table 27
Analysts' Efficient Use of Fundamental Signals
Dependent Variable = Conventional CEPSL
CEPSL - LTG+1
Averages 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) | 0.041 | 0.454 | 2 | 0 | 4 | 0 | 10 | 2 |
| CHGEPS | -0.600 | 0.377 | 2 | 0 | 11 | 2 | 3 | 0 |
| INV | -0.024 | 0.480 | 0 | 0 | 10 | 0 | 4 | 0 |
| AR | -0.004 | 0.359 | 2 | 1 | 6 | 1 | 8 | 1 |
| GM | 0.004 | 0.449 | 0 | 2 | 7 | 0 | 7 | 0 |
| SA | -0.009 | 0.487 | 2 | 1 | 6 | 2 | 8 | 0 |
| ETR | 0.558 | 0.468 | 1 | 2 | 6 | 0 | 8 | 1 |
| LF | -0.031 | 0.511 | 1 | 1 | 8 | 1 | 6 | 0 |
| CAPX | 0.011 | 0.468 | 0 | 3 | 4 | 0 | 10 | 0 |
| MKTSHR | 0.003 | 0.439 | 1 | 0 | 7 | 0 | 7 | 1 |
| CHG_MKTSHR | 0.082 | 0.343 | 1 | 2 | 4 | 0 | 10 | 1 |
| MU | 0.000 | 0.429 | 2 | 1 | 9 | 0 | 5 | 2 |
| CHG_MU | 0.061 | 0.539 | 0 | 0 | 5 | 0 | 9 | 0 |
| FCF | 0.090 | 0.558 | 1 | 0 | 5 | 0 | 9 | 1 |
| CHG_FCF | 0.000 | 0.410 | 0 | 1 | 9 | 0 | 5 | 0 |
| CASH | -0.062 | 0.564 | 1 | 1 | 8 | 1 | 6 | 0 |
| CHG_CASH | 0.077 | 0.444 | 0 | 1 | 5 | 0 | 9 | 0 |
| DEBT_AT | -0.071 | 0.441 | 3 | 1 | 10 | 3 | 4 | 0 |
| CHG_DEBT AT | 0.028 | 0.514 | 0 | 1 | 5 | 0 | 9 | 0 |
| DISC. INCOME | 0.133 | 0.263 | 1 | 2 | 6 | 0 | 8 | 1 |
| OL | 0.010 | 0.060 | 12 | 0 | 0 | 0 | 14 | 12 |
| Avg. Adj. R2 for Full Model | | | | | 0.138 | | | |
| Avg. # of Firms per Year | | | | | 143 | | | |

Table 28
Analysts' Efficient Use of Fundamental Signals
Dependent Variable = LTG+1
CEPSL - LTG+1
Averages 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 | # NEG SIG ** | # SIG** CEPS1 but not SIG** FY1+1 | # Sign <> |
|---|---|---|---|---|---|---|---|---|---|---|
| (Constant) | -1.068 | 0.391 | 1 | 0 | 10 | 1 | 4 | 0 | ------ | ------ |
| CHGEPS | 3.380 | 0.311 | 2 | 1 | 8 | 1 | 6 | 1 | 2 | 0 |
| INV | 0.382 | 0.439 | 0 | 2 | 4 | 0 | 10 | 0 | 0 | 0 |
| AR | 1.448 | 0.438 | 3 | 0 | 4 | 0 | 10 | 3 | 0 | 0 |
| GM | 1.543 | 0.466 | 1 | 1 | 6 | 0 | 8 | 1 | 0 | 0 |
| SA | 1.079 | 0.459 | 1 | 0 | 6 | 0 | 8 | 1 | 2 | 1 |
| ETR | 32.818 | 0.330 | 2 | 2 | 5 | 1 | 9 | 1 | 1 | 1 |
| LF | -0.116 | 0.406 | 1 | 0 | 8 | 0 | 6 | 1 | 1 | 0 |
| CAPX | -0.110 | 0.437 | 1 | 2 | 6 | 1 | 8 | 0 | 0 | 0 |
| MKTSHR | 1.060 | 0.550 | 0 | 1 | 4 | 0 | 10 | 0 | 1 | 1 |
| CHG MKTSHR | -0.643 | 0.522 | 1 | 0 | 10 | 1 | 4 | 0 | 1 | 1 |
| MU | -0.052 | 0.405 | 1 | 2 | 8 | 0 | 6 | 1 | 0 | 0 |
| CHG_MU | 0.904 | 0.494 | 2 | 1 | 4 | 1 | 10 | 1 | 0 | 0 |
| FCF | 4.837 | 0.376 | 1 | 2 | 5 | 0 | 9 | 1 | 1 | 1 |
| CHG_FCF | 0.031 | 0.413 | 2 | 1 | 7 | 1 | 7 | 1 | 0 | 0 |
| CASH | -2.281 | 0.419 | 2 | 2 | 7 | 2 | 7 | 0 | 1 | 1 |
| CHG_CASH | 8.336 | 0.269 | 3 | 0 | 4 | 0 | 10 | 3 | 0 | 0 |
| DEBT_AT | 0.180 | 0.565 | 0 | 0 | 4 | 0 | 10 | 0 | 3 | 2 |
| CHG_DEBT AT | 0.124 | 0.582 | 0 | 0 | 9 | 0 | 5 | 0 | 0 | 0 |
| DISC. INCOME | -0.827 | 0.458 | 1 | 2 | 9 | 0 | 5 | 1 | 1 | 0 |
| OL | 0.007 | 0.620 | 1 | 0 | 8 | 0 | 6 | 1 | 11 | 7 |

| | |
|---|---|
| Avg. Adj. R2 for Full Model | 0.061 |
| Avg. # of Firms per Year | 143 |
| Analysts' Avg. % Use of Fundamental Signals | 44% |
| Analysts' Avg. Actual Mean Error Percent | 308% |
| Std. Dev. Of Analysts' Avg. Actual Error Percent | 953% |

Table 29 summarizes the results for each year, when CEPSL was regressed on the firms that had a nonzero LTG+4 value. Table 30 summarizes the results for each year, when for each year LTG+4 was regressed on exactly the same firms used in that year's CEPSL regression for table 29. The same independent variables (fundamental signals) were used in the table 29 and table 30 regressions, and the same firms were used in the Table 29 and Table 30 regressions for each year. The average number of firms used in both the table 29 and table 30 regressions for 1991-2004 was 135 firms per year.

The results reported in tables 29 and 30 for comparison of regression on "Conventional" long-term growth to regression on analysts' long-term forecast revisions made during the ninety days that started four months after the current-year earnings announcement date ("CEPSL-to-LTG+4") is summarized in figure 65.

| | |
|---|---|
| Avg. Adj. R2 from regressing CEPSL on the signals: | 0.142 |
| Avg. Adj. R2 from regressing LTG+4 on the signals: | 0.097 |
| Analysts' Avg. % Use of Fundamental Signals: | 68% |
| Analysts' Avg. Actual Mean Error Percent: | 346% |
| Std. Dev. Of Analysts' Avg. Actual Error Percent: | 1206% |

Figure 65
Comparison of "CEPSL-to-LTG+4"
1991-2004
Taken directly from Tables 29 and 30

As shown in figure 65, on average the analysts were 68% efficient in using the studied fundamental signals when they made their long-term growth forecast revisions during the ninety-day period that started four months after the current-year earnings announcement date. During this same ninety-period, their actual error was on average 346%, with a standard deviation of 1,206%. The CEPSL and the LTG+4 yearly regressions used the same set of firms. Based on the results reported in table 30, the only fundamental signal studied that analysts' consistently did not use efficiently in making their LTG+4 forecast revisions was the Operating Leverage signal. The evidence indicates that security analysts did not use the Operating Signal in making their LTG+4 long-term growth forecast revisions in twelve of fourteen years studied during 1991-2004. For all of the other signals studied, the count of years where a signal was not used efficiently by analysts was two or less out of fourteen years studied, and, hence, none of the other signals were deemed to have been underutilized. Using a larger sample of firms, table 21 used hierarchical regression to show Operating Leverage alone accounted for an average 74% of the power provided by the full model of signals in predicting Conventional long-term growth (CEPSL) for the All-except-Services Category of firms. Based on this evidence, is appears that more precise information about firms' total fixed costs and more efficient use of the Operating Leverage signal might help analysts improve their accuracy in forecasting long-term growth.

In comparing analysts' long-term growth forecast revisions (LTG+1) made during the three-month period ("+1" period) that began one-month after the reference (current) year earnings announcement to the analysts' long-term growth forecast revisions (LTG+4) made during the three-month period ("+4" period) that began four-months after the reference year earnings announcement, analysts were 44% efficient in using the fundamental signals during the "+1" period as compared to 68% efficient in the "+4" period. However, the actual average error rate increased slightly from 308% in the "+1" period to 346% in the "+4" period. This finding is unexpected, and may indicate that, by the time the analysts made their LTG+4 forecast revisions, the time was well into the next year, and the analysts' were using the reference year data more efficiently, but were also using other information besides the reference year (by that time, the prior year) fundamental signals.

Table 29
Analysts' Efficient Use of Fundamental Signals
Dependent Variable = Conventional CEPSL
CEPSL - LTG+4
Averages 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) | 0.035 | 0.459 | 1 | 1 | 6 | 0 | 8 | 1 |
| CHGEPS | -0.725 | 0.475 | 1 | 1 | 13 | 1 | 1 | 0 |
| INV | -0.039 | 0.511 | 1 | 0 | 10 | 1 | 4 | 0 |
| AR | -0.023 | 0.490 | 0 | 2 | 9 | 0 | 5 | 0 |
| GM | 0.000 | 0.507 | 2 | 0 | 8 | 0 | 6 | 2 |
| SA | 0.011 | 0.356 | 0 | 2 | 6 | 0 | 8 | 0 |
| ETR | -1.954 | 0.414 | 1 | 2 | 9 | 0 | 5 | 1 |
| LF | -0.023 | 0.465 | 1 | 2 | 8 | 0 | 6 | 1 |
| CAPX | 0.008 | 0.385 | 0 | 1 | 6 | 0 | 8 | 0 |
| MKTSHR | -0.026 | 0.330 | 0 | 2 | 8 | 0 | 6 | 0 |
| CHG_MKTSHR | 0.031 | 0.403 | 1 | 0 | 7 | 0 | 7 | 1 |
| MU | -0.012 | 0.335 | 2 | 1 | 9 | 1 | 5 | 1 |
| CHG_MU | 0.014 | 0.386 | 2 | 1 | 7 | 0 | 7 | 2 |
| FCF | 0.071 | 0.573 | 0 | 2 | 7 | 0 | 7 | 0 |
| CHG_FCF | 0.002 | 0.474 | 0 | 4 | 5 | 0 | 9 | 0 |
| CASH | 0.022 | 0.571 | 0 | 2 | 8 | 0 | 6 | 0 |
| CHG_CASH | 0.114 | 0.520 | 0 | 0 | 4 | 0 | 10 | 0 |
| DEBT_AT | -0.051 | 0.467 | 1 | 1 | 10 | 1 | 4 | 0 |
| CHG_DEBT AT | 0.077 | 0.415 | 2 | 1 | 5 | 0 | 9 | 2 |
| DISC. INCOME | 0.209 | 0.314 | 2 | 1 | 5 | 0 | 9 | 2 |
| OL | 0.011 | 0.046 | 12 | 0 | 0 | 0 | 14 | 12 |
| Avg. Adj. R2 for Full Model | | | | | 0.142 | | | |
| Avg. # of Firms per Year | | | | | 135 | | | |

Table 30
Analysts' Efficient Use of Fundamental Signals
Dependent Variable = LTG+4
CEPSL - LTG+4
Averages 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** | **# NEG SIG **** | **# SIG** CEPS1 but not SIG** FY1+1** | **# Sign <>** |
|---|---|---|---|---|---|---|---|---|---|---|
| (Constant) | -0.879 | 0.550 | 1 | 0 | 10 | 1 | 4 | 0 | ------ | ------ |
| CHGEPS | -1.311 | 0.493 | 2 | 1 | 8 | 1 | 6 | 1 | 1 | 0 |
| INV | -0.255 | 0.378 | 2 | 2 | 7 | 1 | 7 | 1 | 1 | 0 |
| AR | 1.388 | 0.441 | 1 | 2 | 3 | 0 | 11 | 1 | 0 | 0 |
| GM | 3.059 | 0.477 | 2 | 0 | 5 | 0 | 9 | 2 | 1 | 0 |
| SA | 0.417 | 0.345 | 2 | 4 | 6 | 0 | 8 | 2 | 0 | 0 |
| ETR | -46.463 | 0.406 | 2 | 1 | 10 | 0 | 4 | 2 | 1 | 1 |
| LF | -1.112 | 0.549 | 0 | 0 | 10 | 0 | 4 | 0 | 1 | 0 |
| CAPX | 0.239 | 0.410 | 1 | 0 | 6 | 1 | 8 | 0 | 0 | 0 |
| MKTSHR | -0.125 | 0.570 | 2 | 0 | 6 | 1 | 8 | 1 | 0 | 0 |
| CHG MKTSHR | -2.477 | 0.371 | 3 | 0 | 12 | 3 | 2 | 0 | 1 | 1 |
| MU | 0.459 | 0.416 | 0 | 2 | 3 | 0 | 11 | 0 | 2 | 2 |
| CHG_MU | 1.083 | 0.452 | 1 | 2 | 6 | 0 | 8 | 1 | 1 | 0 |
| FCF | 4.620 | 0.453 | 2 | 1 | 6 | 0 | 8 | 2 | 0 | 0 |
| CHG_FCF | -0.027 | 0.434 | 2 | 1 | 5 | 1 | 9 | 1 | 0 | 0 |
| CASH | -1.895 | 0.435 | 1 | 2 | 9 | 0 | 5 | 1 | 0 | 0 |
| CHG_CASH | 13.852 | 0.377 | 3 | 0 | 3 | 0 | 11 | 3 | 0 | 0 |
| DEBT_AT | 1.119 | 0.431 | 0 | 2 | 4 | 0 | 10 | 0 | 1 | 1 |
| CHG_DEBT AT | 0.710 | 0.509 | 0 | 0 | 5 | 0 | 9 | 0 | 2 | 1 |
| DISC. INCOME | -6.491 | 0.489 | 0 | 2 | 12 | 0 | 2 | 0 | 2 | 2 |
| OL | 0.004 | 0.539 | 0 | 1 | 7 | 0 | 7 | 0 | 12 | 5 |

| | |
|---|---|
| Avg. Adj. R2 for Full Model | 0.097 |
| Avg. # of Firms per Year | 135 |
| Analysts' Avg. % Use of Fundamental Signals | 68% |
| Analysts' Avg. Actual Mean Error Percent | 346% |
| Std. Dev. Of Analysts' Avg. Actual Error Percent | 1206% |

Table 31 reports results similar to those reported in table 8, except table 31 has the AB-97 condition that in order for a firm to be included in the study, there must be at least one analyst's next-year earnings forecast issued one month after the reference year earnings announcement.

Table 31
ALL-Except-Services
Conditioned on Existence of Analysts' One-Year-Ahead EPS Forecast
(same as required in AB-97 table 2)
Dependent Variable = CEPS1
Averages 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) | -0.006 | 0.479 | 4 | 1 | 8 | 3 | 10 | 1 |
| CHGEPS | -0.249 | 0.049 | 16 | 1 | 18 | 16 | 0 | 0 |
| INV | -0.007 | 0.409 | 3 | 1 | 12 | 3 | 6 | 0 |
| AR | 0.002 | 0.432 | 2 | 1 | 4 | 2 | 14 | 0 |
| GM | 0.016 | 0.420 | 5 | 0 | 7 | 2 | 11 | 3 |
| SA | -0.025 | 0.364 | 3 | 2 | 14 | 3 | 4 | 0 |
| ETR | -0.279 | 0.266 | 6 | 3 | 17 | 6 | 1 | 0 |
| LF | -0.019 | 0.367 | 3 | 2 | 12 | 3 | 6 | 0 |
| CAPX | 0.006 | 0.362 | 4 | 4 | 5 | 1 | 13 | 3 |
| MKTSHR | -0.016 | 0.357 | 3 | 0 | 10 | 3 | 8 | 0 |
| CHG_MKTSHR | 0.000 | 0.417 | 0 | 1 | 10 | 0 | 8 | 0 |
| MU | -0.001 | 0.432 | 1 | 3 | 8 | 1 | 10 | 0 |
| CHG_MU | 0.057 | 0.215 | 7 | 0 | 2 | 0 | 16 | 7 |
| FCF | 0.069 | 0.264 | 6 | 0 | 5 | 0 | 13 | 6 |
| CHG_FCF | -0.001 | 0.445 | 1 | 1 | 13 | 1 | 5 | 0 |
| CASH | 0.017 | 0.395 | 4 | 1 | 10 | 1 | 8 | 3 |
| CHG_CASH | -0.012 | 0.450 | 3 | 1 | 8 | 2 | 10 | 1 |
| DEBT_AT | 0.025 | 0.347 | 6 | 2 | 2 | 1 | 16 | 5 |
| CHG_DEBT AT | 0.043 | 0.212 | 10 | 1 | 0 | 0 | 18 | 10 |
| DISC. INCOME | -0.027 | 0.459 | 5 | 0 | 12 | 4 | 6 | 1 |
| OL | 0.000 | 0.396 | 2 | 2 | 12 | 2 | 6 | 0 |
| Avg. Adj. R2 for Full Model | | | | | 0.115 | | | |
| Avg. # of Firms per Year | | | | | 494 | | | |

Table 32 reports results similar to those reported in table 9, except table 32 has the AB-97 condition that in order for a firm to be included in the study, there must be at least one analyst's long-term growth forecast issued during the "+1" period beginning one month after the reference year earnings announcement ("+1" is one month in AB-97, but is ninety days in this study).

Table 32
ALL-Except-Services
Conditioned on Existence of Analysts' Long-Term Growth Forecast
(same as required in AB-97 table 2)
Dependent Variable =Conventional CEPSL
Averages 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) | 0.048 | 0.430 | 4 | 1 | 4 | 0 | 10 | 4 |
| CHGEPS | -0.598 | 0.269 | 4 | 2 | 12 | 4 | 2 | 0 |
| INV | -0.006 | 0.478 | 0 | 0 | 6 | 0 | 8 | 0 |
| AR | 0.011 | 0.505 | 1 | 1 | 6 | 0 | 8 | 1 |
| GM | 0.099 | 0.422 | 2 | 2 | 6 | 1 | 8 | 1 |
| SA | -0.041 | 0.405 | 2 | 1 | 8 | 2 | 6 | 0 |
| ETR | 0.160 | 0.439 | 2 | 3 | 7 | 0 | 7 | 2 |
| LF | 0.003 | 0.433 | 0 | 2 | 7 | 0 | 7 | 0 |
| CAPX | 0.006 | 0.437 | 1 | 0 | 6 | 0 | 8 | 1 |
| MKTSHR | -0.009 | 0.435 | 1 | 1 | 7 | 1 | 7 | 0 |
| CHG_MKTSHR | 0.034 | 0.338 | 1 | 1 | 6 | 0 | 8 | 1 |
| MU | -0.003 | 0.417 | 0 | 0 | 7 | 0 | 7 | 0 |
| CHG_MU | 0.101 | 0.369 | 2 | 0 | 4 | 0 | 10 | 2 |
| FCF | 0.058 | 0.604 | 0 | 1 | 6 | 0 | 8 | 0 |
| CHG_FCF | 0.000 | 0.475 | 2 | 0 | 7 | 1 | 7 | 1 |
| CASH | -0.067 | 0.634 | 1 | 0 | 7 | 1 | 7 | 0 |
| CHG_CASH | 0.129 | 0.554 | 1 | 0 | 4 | 0 | 10 | 1 |
| DEBT_AT | -0.059 | 0.360 | 1 | 1 | 11 | 1 | 3 | 0 |
| CHG_DEBT AT | 0.014 | 0.434 | 0 | 1 | 8 | 0 | 6 | 0 |
| DISC. INCOME | 0.121 | 0.391 | 3 | 0 | 7 | 1 | 7 | 2 |
| OL | 0.011 | 0.001 | 14 | 0 | 0 | 0 | 14 | 14 |
| Avg. Adj. R2 for Full Model | | | | | 0.197 | | | |
| Avg. # of Firms per Year | | | | | 223 | | | |

## 5.8 Adjusted R-Square by Year by Block of Fundamental Signals

In order to tests Hypotheses 1 through 3, the individual adjusted R-squares for each of the years studied for each of the models and categories of firms are required. Tables 33 through 44 display the adjusted R-square values obtained from hierarchical regression results for each year studied, when the future earnings dependent variable (DV) was regressed successively on the blocks (groups) of fundamental signals. With the addition of the final block, the adjusted R-square is shown for the full model of signals. Adjusted R-square from OLS multivariate linear regressions is a measure of the explanatory/predictive power of the model being tested. Each time a block of signals is added to the model, the adjusted R-square obtained is an indication of the cumulative explanatory/predictive power of all of the blocks added so far, including the just-added block. The adjusted R-square of the model with the just-added block minus the adjusted R-square of the model prior to the addition of the just-added block, is a measure of the incremental R-square obtained from the just-added block of signals. The incremental adjusted R-square is a measure of the unique contribution of the just-added block of signals above that which was contributed by the previously added blocks. Any multicollinearity that may exist between the signals is accounted for in determining incremental R-square. Hence, each added block's incremental R-square is an indication of the unique contribution to explaining/predicting the DV that was not provided by the previously added blocks of signals.

The blocks of fundamental signals used in Tables 33 through 44 are defined as follows:

Block 1 - Current year (reference year) change in EPS (**CHGEPS only**)

Block 2 - **AB-97** metric fundamental signals (INV, AR, SA, LF, CAPX, ETR, and GM)

Block 3 **–** **ADDED** signals other than manufacturing-specific and Operating Leverage (MKTSHR, CHG_MKTSHR, MU, CHG_MU, FCF, CHG_FCF, CASH, CHG_CASH, DEBT_AT, CHG_DEBT_AT, and DESC_INCOME)

Block 4 **–** OPERATING LEVERAGE (**OP**) fundamental signal

For Manufacturing firms only, Block 4 is the manufacturing-specific (**MFG**) Added signals (DELTA_TOT_MFG_INV, FG_COMPLETED_PER_AT, and TOT_MFG_COST_PER_AT), and Block 5 is OPERATING LEVERAGE (**OP**).

Tables 33 through 36 show adjusted R-square values obtained when regressing one-year-ahead EPS change (CEPS1) on the blocks of fundamental signals. Each table shows the results for the category of firms studied:

Table 33 - All-except-Services
Table 34 - Manufacturing
Table 35 - Wholesale-Retail-Primary-Products
Table 36 - Services

The eighteen-year averages shown at the bottom of tables 33 through 36 agree with the averages shown in Table 20, "Hierarchical Regression Results" under the column heading "Average Adj. R2 after the Block is Added."

Table 33
Adjusted R-Squares by Year, by Block Category = ALL except Services
DV = One-Year-Ahead EPS Change (CEPS1)

| **Year** | **CHGEPS only** | **CHGEPS + AB-97** | **CHGEPS + AB-97 + ADDED** | **Full Model (CHGEPS + AB-97 + ADDED + OP)** |
|---|---|---|---|---|
| 1991 | -0.001 | 0.031 | 0.061 | 0.062 |
| 1992 | 0.032 | 0.036 | 0.051 | 0.051 |
| 1993 | 0.043 | 0.055 | 0.090 | 0.090 |
| 1994 | 0.017 | 0.018 | 0.028 | 0.035 |
| 1995 | 0.079 | 0.088 | 0.102 | 0.101 |
| 1996 | 0.022 | 0.021 | 0.033 | 0.033 |
| 1997 | 0.060 | 0.062 | 0.079 | 0.079 |
| 1998 | 0.061 | 0.082 | 0.097 | 0.097 |
| 1999 | 0.000 | 0.002 | 0.011 | 0.011 |
| 2000 | 0.009 | 0.153 | 0.160 | 0.159 |
| 2001 | 0.004 | 0.005 | 0.008 | 0.008 |
| 2002 | 0.004 | 0.002 | 0.026 | 0.026 |
| 2003 | 0.053 | 0.052 | 0.070 | 0.070 |
| 2004 | 0.002 | 0.002 | 0.022 | 0.022 |
| 2005 | 0.013 | 0.046 | 0.056 | 0.060 |
| 2006 | 0.170 | 0.229 | 0.238 | 0.238 |

Table 33 -- *Continued*

| | | | | |
|---|---|---|---|---|
| 2007 | 0.022 | 0.037 | 0.049 | 0.049 |
| 2008 | 0.059 | 0.084 | 0.128 | 0.128 |
| **18-Year Avg.** | **0.036** | **0.056** | **0.073** | **0.073** |

Table 34
Adjusted R-Squares by Year, by Block  Category = Manufacturing
DV = One-Year-Ahead EPS Change (CEPS1)

| Year | CHGEPS only | CHGEPS + AB-97 | CHGEPS + AB-97 + ADDED | CHGEPS + AB-97 + ADDED + MFG | Full Model (CHGEPS + AB-97 + ADDED + MFG + OP |
|---|---|---|---|---|---|
| 1991 | 0.082 | 0.091 | 0.091 | 0.099 | 0.097 |
| 1992 | 0.027 | 0.054 | 0.066 | 0.062 | 0.060 |
| 1993 | 0.147 | 0.180 | 0.209 | 0.232 | 0.231 |
| 1994 | 0.006 | 0.019 | 0.032 | 0.032 | 0.032 |
| 1995 | 0.087 | 0.113 | 0.165 | 0.167 | 0.166 |
| 1996 | 0.002 | 0.018 | 0.035 | 0.040 | 0.043 |
| 1997 | 0.044 | 0.063 | 0.075 | 0.078 | 0.083 |
| 1998 | 0.032 | 0.053 | 0.082 | 0.080 | 0.079 |
| 1999 | 0.451 | 0.496 | 0.513 | 0.511 | 0.511 |
| 2000 | 0.045 | 0.048 | 0.059 | 0.064 | 0.062 |
| 2001 | 0.048 | 0.058 | 0.084 | 0.086 | 0.085 |
| 2002 | 0.057 | 0.053 | 0.112 | 0.109 | 0.109 |
| 2003 | 0.022 | 0.015 | 0.025 | 0.026 | 0.026 |
| 2004 | 0.012 | 0.008 | 0.013 | 0.018 | 0.020 |
| 2005 | 0.036 | 0.039 | 0.053 | 0.053 | 0.087 |
| 2006 | 0.004 | 0.024 | 0.023 | 0.027 | 0.027 |
| 2007 | 0.015 | 0.014 | 0.031 | 0.051 | 0.057 |
| 2008 | 0.213 | 0.225 | 0.283 | 0.287 | 0.288 |
| **18-Year Avg.** | **0.074** | **0.087** | **0.108** | **0.112** | **0.115** |

Table 35
Adjusted R-Squares by Year, by Block
Category = Wholesale-Retail-Primary-Products
DV = One-Year-Ahead EPS Change (CEPS1)

| Year | CHGEPS only | CHGEPS + AB-97 | CHGEPS + AB-97 + ADDED | Full Model (CHGEPS + AB-97 + ADDED + OP) |
|---|---|---|---|---|
| 1991 | 0.019 | 0.011 | 0.071 | 0.070 |
| 1992 | 0.058 | 0.112 | 0.135 | 0.134 |
| 1993 | 0.091 | 0.104 | 0.119 | 0.117 |
| 1994 | 0.085 | 0.093 | 0.111 | 0.123 |
| 1995 | 0.147 | 0.160 | 0.149 | 0.148 |
| 1996 | 0.075 | 0.098 | 0.120 | 0.118 |
| 1997 | 0.042 | 0.037 | 0.028 | 0.026 |
| 1998 | 0.119 | 0.242 | 0.260 | 0.259 |
| 1999 | 0.002 | 0.046 | 0.049 | 0.048 |

Table 35 – *Continued*

| | | | | |
|---|---|---|---|---|
| 2000 | 0.475 | 0.500 | 0.496 | 0.497 |
| 2001 | 0.248 | 0.288 | 0.306 | 0.305 |
| 2002 | -0.002 | 0.010 | 0.005 | 0.002 |
| 2003 | 0.044 | 0.050 | 0.176 | 0.174 |
| 2004 | 0.001 | 0.014 | 0.013 | 0.011 |
| 2005 | 0.100 | 0.143 | 0.159 | 0.160 |
| 2006 | 0.010 | 0.030 | 0.030 | 0.039 |
| 2007 | 0.118 | 0.184 | 0.179 | 0.185 |
| 2008 | 0.289 | 0.290 | 0.317 | 0.316 |
| **18-Year Avg.** | **0.107** | **0.134** | **0.151** | **0.152** |

Table 36
Adjusted R-Squares by Year, by Block   Category = Services
DV = One-Year-Ahead EPS Change (CEPS1)

| **Year** | **CHGEPS only** | **CHGEPS + AB-97** | **CHGEPS + AB-97 + ADDED** | **Full Model (CHGEPS + AB-97 + ADDED + OP)** |
|---|---|---|---|---|
| 1991 | 0.104 | 0.100 | 0.108 | 0.103 |
| 1992 | 0.617 | 0.618 | 0.652 | 0.652 |
| 1993 | 0.023 | 0.018 | 0.048 | 0.043 |
| 1994 | 0.158 | 0.160 | 0.183 | 0.179 |
| 1995 | 0.026 | 0.069 | 0.125 | 0.136 |
| 1996 | 0.156 | 0.153 | 0.192 | 0.193 |
| 1997 | 0.015 | 0.024 | 0.035 | 0.034 |
| 1998 | 0.097 | 0.125 | 0.131 | 0.129 |
| 1999 | 0.002 | -0.008 | 0.000 | -0.001 |
| 2000 | 0.122 | 0.138 | 0.280 | 0.279 |
| 2001 | 0.042 | 0.115 | 0.120 | 0.118 |
| 2002 | 0.489 | 0.542 | 0.580 | 0.579 |
| 2003 | 0.514 | 0.512 | 0.519 | 0.518 |
| 2004 | 0.000 | 0.000 | 0.006 | 0.004 |
| 2005 | 0.004 | 0.007 | 0.012 | 0.011 |
| 2006 | 0.012 | 0.002 | 0.002 | 0.003 |
| 2007 | 0.083 | 0.097 | 0.132 | 0.131 |
| 2008 | 0.110 | 0.110 | 0.139 | 0.140 |
| **18-Year Avg.** | **0.143** | **0.155** | **0.181** | **0.181** |

Tables 37 through 40 show adjusted R-square values obtained when regressing "conventional" long-term growth (CEPSL) on the blocks of fundamental signals.  Each table shows the results for the category of firms studied:

Table 37 - All-except-Services
Table 38 - Manufacturing

Table 39 - Wholesale-Retail-Primary-Products
Table 40 – Services

The fourteen-year averages shown at the bottom of tables 37 through 40 agree with the averages shown in Table 21, “Hierarchical Regression Results” under the column heading “Average Adj. R2 after the Block is Added.”

Table 37
Adjusted R-Squares by Year, by Block Category = ALL except Services
DV = Conventional Long-Term Growth (CEPSL)

| **Year** | **CHGEPS only** | **CHGEPS + AB-97** | **CHGEPS + AB-97 + ADDED** | **Full Model (CHGEPS + AB-97 + ADDED + OP)** |
|---|---|---|---|---|
| 1991 | -0.001 | 0.013 | 0.020 | 0.182 |
| 1992 | -0.001 | 0.007 | 0.018 | 0.173 |
| 1993 | 0.000 | -0.003 | 0.012 | 0.150 |
| 1994 | 0.001 | 0.011 | 0.019 | 0.082 |
| 1995 | 0.012 | 0.024 | 0.036 | 0.094 |
| 1996 | -0.001 | 0.003 | 0.013 | 0.082 |
| 1997 | 0.006 | 0.007 | 0.017 | 0.156 |
| 1998 | 0.010 | 0.020 | 0.025 | 0.111 |
| 1999 | 0.021 | 0.020 | 0.042 | 0.086 |
| 2000 | -0.001 | 0.036 | 0.049 | 0.192 |
| 2001 | 0.007 | 0.013 | 0.046 | 0.239 |
| 2002 | 0.012 | 0.074 | 0.091 | 0.160 |
| 2003 | 0.005 | 0.049 | 0.070 | 0.153 |
| 2004 | 0.003 | 0.022 | 0.045 | 0.093 |
| **14-Year Avg.** | **0.005** | **0.021** | **0.036** | **0.139** |

Table 38
Adjusted R-Squares by Year, by Block Category = Manufacturing
DV = Conventional Long-Term Growth (CEPSL)

| **Year** | **CHGEPS only** | **CHGEPS + AB-97** | **CHGEPS + AB-97 + ADDED** | **CHGEPS + AB-97 + ADDED + MFG** | **Full Model (CHGEPS + AB-97 + ADDED + MFG + OP** |
|---|---|---|---|---|---|
| 1991 | 0.001 | -0.005 | 0.015 | 0.026 | 0.205 |
| 1992 | -0.003 | 0.012 | 0.028 | 0.037 | 0.232 |
| 1993 | 0.002 | -0.014 | 0.007 | 0.023 | 0.203 |
| 1994 | -0.003 | -0.007 | 0.033 | 0.041 | 0.114 |
| 1995 | 0.001 | 0.001 | 0.037 | 0.086 | 0.124 |
| 1996 | -0.004 | -0.017 | 0.006 | 0.030 | 0.067 |
| 1997 | 0.006 | -0.001 | 0.035 | 0.081 | 0.242 |
| 1998 | -0.003 | 0.020 | 0.048 | 0.065 | 0.117 |
| 1999 | 0.066 | 0.083 | 0.137 | 0.140 | 0.284 |

Table 38 -- *Continued*

| | | | | | |
|---|---|---|---|---|---|
| 2000 | 0.006 | 0.038 | 0.046 | 0.088 | 0.241 |
| 2001 | 0.023 | 0.087 | 0.138 | 0.142 | 0.355 |
| 2002 | -0.002 | 0.048 | 0.047 | 0.064 | 0.156 |
| 2003 | 0.015 | 0.059 | 0.039 | 0.062 | 0.090 |
| 2004 | -0.002 | 0.023 | 0.060 | 0.067 | 0.125 |
| **Avg.** | **0.007** | **0.023** | **0.048** | **0.068** | **0.182** |

Table 39
Adjusted R-Squares by Year, by Block
Category = Wholesale-Retail-Primary-Products
DV = Conventional Long-Term Growth (CEPSL)

| Year | CHGEPS only | CHGEPS + AB-97 | CHGEPS + AB-97 + ADDED | Full Model (CHGEPS + AB-97 + ADDED + OP) |
|---|---|---|---|---|
| 1991 | -0.001 | 0.000 | 0.034 | 0.160 |
| 1992 | -0.005 | -0.011 | -0.030 | 0.079 |
| 1993 | 0.004 | -0.012 | -0.008 | 0.111 |
| 1994 | 0.004 | 0.033 | 0.025 | 0.064 |
| 1995 | 0.013 | 0.046 | 0.068 | 0.112 |
| 1996 | -0.005 | 0.014 | 0.010 | 0.093 |
| 1997 | 0.028 | 0.026 | 0.024 | 0.051 |
| 1998 | 0.030 | 0.053 | 0.072 | 0.119 |
| 1999 | 0.004 | -0.008 | -0.006 | 0.008 |
| 2000 | 0.002 | 0.046 | 0.036 | 0.144 |
| 2001 | 0.005 | -0.003 | 0.025 | 0.059 |
| 2002 | 0.068 | 0.103 | 0.137 | 0.178 |
| 2003 | 0.011 | 0.092 | 0.130 | 0.196 |
| 2004 | 0.060 | 0.078 | 0.091 | 0.106 |
| **14-Year Avg.** | **0.016** | **0.033** | **0.043** | **0.106** |

Table 40
Adjusted R-Squares by Year, by Block Category = Services
DV = Conventional Long-Term Growth (CEPSL)

| Year | CHGEPS only | CHGEPS + AB-97 | CHGEPS + AB-97 + ADDED | Full Model (CHGEPS + AB-97 + ADDED + OP) |
|---|---|---|---|---|
| 1991 | 0.100 | 0.139 | 0.156 | 0.356 |
| 1992 | -0.012 | -0.057 | 0.021 | 0.225 |
| 1993 | -0.012 | 0.027 | -0.021 | 0.082 |
| 1994 | -0.010 | -0.024 | -0.109 | 0.148 |
| 1995 | 0.123 | 0.108 | 0.241 | 0.302 |
| 1996 | 0.009 | 0.007 | 0.116 | 0.161 |
| 1997 | -0.008 | 0.021 | 0.068 | 0.116 |
| 1998 | -0.007 | -0.008 | -0.034 | -0.034 |
| 1999 | 0.034 | 0.017 | 0.082 | 0.090 |
| 2000 | -0.003 | -0.010 | 0.017 | 0.030 |
| 2001 | -0.003 | -0.022 | 0.053 | 0.146 |

Table 40 -- *Continued*

| | | | | |
|---|---|---|---|---|
| 2002 | 0.041 | 0.081 | 0.122 | 0.213 |
| 2003 | 0.000 | 0.058 | 0.179 | 0.171 |
| 2004 | 0.000 | 0.060 | 0.095 | 0.174 |
| **14-Year Avg.** | **0.018** | **0.028** | **0.070** | **0.156** |

Tables 41 through 44 show adjusted R-square values obtained when regressing "experimental" long-term growth (EXP_CEPSL) on the blocks of fundamental signals. Each table shows the results for the category of firms studied:

Table 41 - All-except-Services
Table 42 - Manufacturing
Table 43 - Wholesale-Retail-Primary-Products
Table 44 - Services

The fourteen-year averages shown at the bottom of tables 41 through 44 agree with the averages shown in Table 22, "Hierarchical Regression Results" under the column heading "Average Adj. R2 after the Block is Added."

Table 41
Adjusted R-Squares by Year, by Block
Category = ALL except Services
DV = Experimental Long-Term Growth (EXP_CEPSL)

| **Year** | **CHGEPS only** | **CHGEPS + AB-97** | **CHGEPS + AB-97 + ADDED** | **Full Model (CHGEPS + AB-97 + ADDED + OP)** |
|---|---|---|---|---|
| 1991 | 0.012 | 0.053 | 0.098 | 0.182 |
| 1992 | 0.011 | 0.063 | 0.119 | 0.220 |
| 1993 | 0.027 | 0.054 | 0.094 | 0.156 |
| 1994 | 0.006 | 0.025 | 0.054 | 0.166 |
| 1995 | 0.030 | 0.052 | 0.075 | 0.163 |
| 1996 | 0.015 | 0.034 | 0.089 | 0.130 |
| 1997 | 0.010 | 0.043 | 0.096 | 0.137 |
| 1998 | 0.011 | 0.029 | 0.085 | 0.172 |
| 1999 | 0.058 | 0.082 | 0.116 | 0.221 |
| 2000 | 0.000 | 0.056 | 0.096 | 0.177 |
| 2001 | 0.015 | 0.063 | 0.105 | 0.183 |
| 2002 | -0.001 | 0.033 | 0.083 | 0.184 |
| 2003 | -0.001 | 0.023 | 0.065 | 0.110 |
| 2004 | 0.000 | 0.069 | 0.109 | 0.208 |
| **14-Year Avg.** | **0.014** | **0.049** | **0.092** | **0.172** |

Table 42
Adjusted R-Squares by Year, by Block
Category = Manufacturing
DV = Experimental Long-Term Growth (EXP_CEPSL)

| **Year** | **CHGEPS only** | **CHGEPS + AB-97** | **CHGEPS + AB-97 + ADDED** | **CHGEPS + AB-97 + ADDED + MFG** | **Full Model CHGEPS + AB-97 + ADDED + MFG + OP** |
|---|---|---|---|---|---|
| 1991 | 0.000 | 0.097 | 0.177 | 0.195 | 0.284 |
| 1992 | 0.007 | 0.079 | 0.160 | 0.196 | 0.251 |
| 1993 | 0.081 | 0.112 | 0.153 | 0.156 | 0.184 |
| 1994 | 0.029 | 0.054 | 0.081 | 0.091 | 0.158 |
| 1995 | 0.041 | 0.053 | 0.057 | 0.058 | 0.146 |
| 1996 | 0.026 | 0.069 | 0.121 | 0.123 | 0.184 |
| 1997 | 0.099 | 0.138 | 0.167 | 0.183 | 0.208 |
| 1998 | 0.033 | 0.057 | 0.102 | 0.117 | 0.189 |
| 1999 | 0.042 | 0.088 | 0.146 | 0.164 | 0.278 |
| 2000 | 0.009 | 0.083 | 0.107 | 0.120 | 0.208 |
| 2001 | 0.030 | 0.066 | 0.098 | 0.117 | 0.198 |
| 2002 | -0.001 | 0.103 | 0.123 | 0.127 | 0.319 |
| 2003 | -0.001 | 0.027 | 0.072 | 0.081 | 0.174 |
| 2004 | 0.019 | 0.078 | 0.108 | 0.124 | 0.252 |
| **Avg.** | **0.030** | **0.079** | **0.120** | **0.132** | **0.217** |

Table 43
Adjusted R-Squares by Year, by Block
Category = Wholesale-Retail-Primary-Products
DV = Experimental Long-Term Growth (EXP_CEPSL)

| **Year** | **CHGEPS only** | **CHGEPS + AB-97** | **CHGEPS + AB-97 + ADDED** | **Full Model (CHGEPS + AB-97 + ADDED + OP)** |
|---|---|---|---|---|
| 1991 | 0.016 | 0.049 | 0.066 | 0.152 |
| 1992 | -0.002 | 0.013 | 0.040 | 0.152 |
| 1993 | 0.051 | 0.067 | 0.132 | 0.138 |
| 1994 | -0.001 | 0.018 | 0.040 | 0.114 |
| 1995 | 0.009 | 0.063 | 0.075 | 0.166 |
| 1996 | 0.028 | 0.038 | 0.033 | 0.078 |
| 1997 | -0.002 | 0.044 | 0.054 | 0.105 |
| 1998 | 0.096 | 0.132 | 0.164 | 0.215 |
| 1999 | 0.032 | 0.070 | 0.090 | 0.260 |
| 2000 | 0.008 | 0.032 | 0.072 | 0.216 |
| 2001 | 0.007 | 0.105 | 0.165 | 0.192 |
| 2002 | -0.003 | 0.030 | 0.078 | 0.155 |
| 2003 | 0.001 | 0.010 | 0.041 | 0.128 |
| 2004 | 0.038 | 0.120 | 0.173 | 0.268 |
| **14-Year Avg.** | **0.020** | **0.057** | **0.087** | **0.167** |

Table 44
Adjusted R-Squares by Year, by Block
Category = Services
DV = Experimental Long-Term Growth (CEPSL)

| Year | CHGEPS only | CHGEPS + AB-97 | CHGEPS + AB-97 + ADDED | Full Model (CHGEPS + AB-97 + ADDED + OP) |
|---|---|---|---|---|
| 1991 | -0.007 | 0.065 | 0.177 | 0.190 |
| 1992 | -0.008 | 0.013 | -0.007 | 0.086 |
| 1993 | -0.005 | 0.014 | 0.031 | 0.202 |
| 1994 | -0.006 | 0.059 | 0.100 | 0.197 |
| 1995 | 0.005 | 0.051 | 0.148 | 0.158 |
| 1996 | -0.005 | 0.011 | 0.023 | 0.123 |
| 1997 | -0.003 | 0.009 | 0.093 | 0.146 |
| 1998 | 0.047 | 0.111 | 0.168 | 0.293 |
| 1999 | 0.000 | -0.001 | 0.002 | 0.129 |
| 2000 | -0.003 | 0.017 | 0.062 | 0.080 |
| 2001 | 0.005 | 0.058 | 0.093 | 0.240 |
| 2002 | 0.004 | -0.001 | 0.081 | 0.139 |
| 2003 | -0.004 | 0.016 | 0.064 | 0.125 |
| 2004 | -0.001 | 0.058 | 0.104 | 0.201 |
| **14-Year Avg.** | **0.001** | **0.034** | **0.081** | **0.165** |

In order to test Hypotheses 4 and 5, the annual results for security analysts' utilization of the fundamental signals is required. Tables 45 through 48 report for each year studied the security analysts' percent utilization of the studied fundamental signals and the analysts' average actual forecast error rates. The averages shown at the bottom of each of these tables match the averages shown in tables 23 through 30, titled "Analysts' Efficient Use of Fundamental Signals." Table 45 has the following information:

Year: the year for which the information pertains

Column (a): adjusted R-square from regressing the dependent variable "one-year-ahead EPS change (CEPS1)" on the fundamental signals applicable to the "ALL-except-Services" category of firms for which there is also a nonzero dependent variable "one-year-ahead EPS forecast revision made one month after current year (reference year) earnings announcement (FY1+1)"

| | |
|---|---|
| Column (b): | adjusted R-square from regressing the dependent variable “one-year-ahead EPS forecast revision made one month after current year (reference year) earnings announcement (FY1+1)” on the fundamental signals applicable to the “ALL-except-Services” category of firms for which there is also a nonzero dependent variable “one-year-ahead EPS change (CEPS1)” |
| Column (a) / (b): | Column (a) adjusted R-square divided by Column (b) adjusted R-Square – the “raw” percent utilization of the studied signals. |
| (a) / (b) Adjusted: | same as “Column (a) / (b)” except any percent utilization greater than 100% is set to 100% and any utilization less than zero is set to zero. |
| Actual Error Rate: | Average of the individual forecast error rate, computed as the average of each security analyst’s actual forecast percent error = absolute value [(forecast value for next-year EPS made during the month starting one month after the earnings announcement date - the actual EPS realized) / (the actual EPS realized)] |

The reason for adjusting the “raw” percent utilization is that it is assumed that security analysts can’t utilize the signals more than 100% and can’t underutilize the signals less than zero percent. Raw utilization percents that exceed 100% may indicate that the analysts used other information not provided in the studied signals. Negative raw utilization can occur when either the adjusted R-square for column (a) or column (b) is negative, indicating the adjustment for number of predictors exceeded the unadjusted R-square.

In data shown at the bottom of column “(b) / (a) Adjusted Percent Utilization” shows two averages: first shown is the column average and second (shown in parenthesis) is the result from dividing the average shown at the bottom of column (a) by the average shown at the bottom of column (b). For example, in Table 45, 71% is 95% divided by 132%, which matches the percent utilization displayed in table 24. The percent utilization shown in parenthesis is computed without the adjustment for “>

100% or < 0%” made to column (a) / (b), whereas the first percent utilization shown not in parentheses is computed after the adjustments are made. These two percentages are comparable in tables 45 through 48, which may be viewed as support for this adjustment being reasonably valid.

The averages shown at the bottom of Table 45 match the averages reported in tables 23 and 24.

Table 45
Analysts’ Percent Utilization of Signals and
Actual Average Forecast Error Rates
By Year for 1991-2008
DV = One-Year Ahead Forecast Revisions (FY1+1)

| **Year** | **(a) Adj. R-square Predicting CEPS1** | **(b) Adj. R-square Explaining FY1+1** | **(b) / (a) Percent Utilization** | **(b) / (a) Adjusted Percent Utilization** | **Actual Error Rate** |
|---|---|---|---|---|---|
| 1991 | 0.161 | 0.037 | 23% | 23% | 88% |
| 1992 | 0.171 | 0.128 | 75% | 75% | 62% |
| 1993 | 0.119 | 0.092 | 77% | 77% | 70% |
| 1994 | 0.177 | 0.086 | 49% | 49% | 88% |
| 1995 | 0.103 | 0.085 | 83% | 83% | 152% |
| 1996 | 0.096 | 0.114 | 118% | 100% | 65% |
| 1997 | 0.132 | 0.057 | 43% | 43% | 235% |
| 1998 | 0.076 | 0.090 | 118% | 100% | 65% |
| 1999 | 0.099 | 0.180 | 182% | 100% | 65% |
| 2000 | 0.085 | 0.124 | 147% | 100% | 171% |
| 2001 | 0.144 | 0.106 | 73% | 73% | 84% |
| 2002 | 0.099 | 0.080 | 81% | 81% | 52% |
| 2003 | 0.157 | 0.083 | 53% | 53% | 65% |
| 2004 | 0.065 | 0.106 | 164% | 100% | 81% |
| 2005 | 0.094 | 0.193 | 205% | 100% | 91% |
| 2006 | 0.072 | 0.028 | 39% | 39% | 59% |
| 2007 | 0.026 | 0.048 | 186% | 100% | 126% |
| 2008 | 0.505 | 0.065 | 13% | 13% | 125% |
| **AVG.** | **0.132** | **.095** | | **73% (71%)** | **97%** |

Table 46 reports the same information that is reported in Table 45, except that FY1+5 is used in place of FY1+1. Table 46 averages shown at the bottom of the table match the averages reported in tables 25 and 26.

Table 46
Analysts' Percent Utilization of Signals and
Actual Average Forecast Error Rates
By Year for 1991-2008
DV = One-Year Ahead Forecast Revisions (FY1+5)

| **Year** | **(a) Adj. R-square Predicting CEPS1** | **(b) Adj. R-square Explaining FY1+1** | **(a) / (b) Percent Utilization** | **(a) / (b) Adjusted Percent Utilization** | **Actual Error Rate** |
|---|---|---|---|---|---|
| 1991 | 0.247 | -0.007 | -3% | 0% | 63% |
| 1992 | 0.048 | 0.113 | 239% | 100% | 59% |
| 1993 | 0.044 | -0.036 | -82% | 0% | 23% |
| 1994 | 0.090 | 0.108 | 120% | 100% | 44% |
| 1995 | 0.055 | 0.096 | 173% | 100% | 44% |
| 1996 | 0.087 | 0.086 | 99% | 99% | 41% |
| 1997 | 0.223 | 0.090 | 40% | 40% | 61% |
| 1998 | 0.045 | 0.031 | 69% | 69% | 67% |
| 1999 | 0.178 | 0.069 | 39% | 39% | 43% |
| 2000 | 0.041 | 0.127 | 313% | 100% | 70% |
| 2001 | 0.042 | 0.058 | 137% | 100% | 64% |
| 2002 | 0.171 | 0.096 | 56% | 56% | 36% |
| 2003 | 0.083 | 0.109 | 132% | 100% | 30% |
| 2004 | 0.072 | 0.076 | 106% | 100% | 56% |
| 2005 | 0.123 | 0.108 | 88% | 88% | 67% |
| 2006 | 0.127 | 0.058 | 45% | 45% | 33% |
| 2007 | 0.154 | 0.044 | 29% | 29% | 101% |
| 2008 | 0.397 | 0.041 | 10% | 10% | 65% |
| **AVG.** | **0.124** | **0.070** | | **65% (57%)** | **54%** |

Table 47 reports similar information to that reported in Table 45, except that conventional long-term growth (CEPSL) and LTG+1 is used in place of one-year-ahead EPS change (CEPS1) and FY1+1. Table 47 averages shown at the bottom of the table match the averages reported in tables 27 and 28.

Table 48 reports similar information to that reported in Table 47, except LTG+4 is used in place of LTG+1. Averages shown at the bottom of table 48 match the averages reported in tables 29 and 30.

Table 47
Analysts' Percent Utilization of Signals and
Actual Average Forecast Error Rates
By Year for 1991-2004
DV = Long-Term Growth Forecast Revisions (LTG+1)

| **Year** | **(a) Adj. R-square Predicting CEPSL** | **(b) Adj. R-square Explaining LTG+1** | **(a) / (b) Percent Utilization** | **(a) / (b) Adjusted Percent Utilization** | **Actual Error Rate** |
|---|---|---|---|---|---|
| 1991 | 0.413 | 0.066 | 16% | 16% | 318% |
| 1992 | 0.148 | 0.083 | 56% | 56% | 209% |
| 1993 | 0.112 | 0.046 | 41% | 41% | 280% |
| 1994 | 0.082 | 0.016 | 19% | 19% | 305% |
| 1995 | 0.078 | 0.042 | 54% | 54% | 262% |
| 1996 | 0.048 | 0.184 | 381% | 100% | 379% |
| 1997 | 0.164 | 0.003 | 2% | 2% | 486% |
| 1998 | 0.175 | 0.019 | 11% | 11% | 422% |
| 1999 | 0.024 | 0.026 | 107% | 100% | 294% |
| 2000 | 0.166 | 0.141 | 85% | 85% | 29,280% |
| 2001 | 0.227 | 0.076 | 33% | 33% | 305% |
| 2002 | 0.210 | 0.064 | 30% | 30% | 126% |
| 2003 | 0.099 | 0.064 | 64% | 64% | 278% |
| 2004 | -0.014 | 0.029 | -212% | 0% | 339% |
| **AVG** | **0.138** | **0.061** | | **44% (44%)** | **308% *** |

***** This average does not include the extraordinary 29,280% actual average error rate that occurred during the first months of 2000.

Table 48
Analysts' Percent Utilization of Signals and
Actual Average Forecast Error Rates
By Year for 1991-2004
DV = Long-Term Growth Forecast Revisions (LTG+4)

| **Year** | **(a) Adj. R-square Predicting CEPSL** | **(b) Adj. R-square Explaining LTG+4** | **(a) / (b) Percent Utilization** | **(a) / (b) Adjusted Percent Utilization** | **Actual Error Rate** |
|---|---|---|---|---|---|
| 1991 | 0.263 | 0.133 | 50% | 50% | 418% |
| 1992 | 0.180 | 0.135 | 75% | 75% | 169% |
| 1993 | 0.216 | 0.039 | 18% | 18% | 404% |
| 1994 | 0.195 | 0.199 | 102% | 100% | 327% |
| 1995 | 0.096 | 0.219 | 229% | 100% | 361% |
| 1996 | 0.085 | -0.018 | -21% | 0% | 471% |
| 1997 | 0.063 | 0.188 | 301% | 100% | 555% |
| 1998 | 0.105 | 0.092 | 88% | 88% | 476% |
| 1999 | 0.136 | 0.079 | 58% | 58% | 286% |
| 2000 | 0.112 | 0.018 | 16% | 16% | 395% |
| 2001 | 0.320 | 0.073 | 23% | 23% | 239% |
| 2002 | 0.188 | 0.039 | 21% | 21% | 179% |
| 2003 | -0.012 | 0.123 | -1044% | 100% | 207% |
| 2004 | 0.047 | 0.042 | 89% | 89% | 353% |
| **AVG** | **0.142** | **0.097** | | **60% (68%)** | **346%** |

## 5.9 Hypothesis Testing Results

### *5.9.1 Hypothesis 1*

Hypothesis 1a states, "The predictive/explanatory power of the full model of fundamental signals used in this research to predict future one-year ahead accounting earnings changes significantly increased during 2000-2008 as compared to 1991-1999." This hypothesis was tested for each of the four categories of firms by using statistical "t-tests" to compare the mean of the adjusted R-square values from the nine yearly regressions during 1991-1999 to the mean of the adjusted R-square values from the nine yearly regressions for 2000-2008, where "one-year-ahead EPS change (CEPS1)" was the predicted dependent variable. The results from the t-tests for testing Hypothesis 1a are summarized in Figure 66.

| Data Source | Category of Firms | Mean (std. dev.) Adj. R2 1991-1999 | Mean (std. dev.) Adj. R2 2000-2008 | p-value from t-test (1-tail and unequal variances) |
|---|---|---|---|---|
| Table 33 | ALL-except-Services | 0.062 (0.032) | 0.084 (0.076) | 0.219 |
| Table 34 | Manufacturing | 0.145 (0.151) | 0.085 (0.082) | 0.157 |
| Table 35 | Wholesale-Retail-Primary-Products | 0.116 (0.068) | 0.188 (0.164) | 0.125 |
| Table 36 | Services | 0.163 (0.195) | 0.198 (0.218) | 0.125 |

Figure 66
Hypothesis 1a Test Results using CEPS1
Results from t-tests using adjusted R-squares from 1991-1999 and 2000-2008

Figure 66 shows the mean explanatory/predictive power (measured by mean adjusted R-square) of the studied fundamental signals in predicting one-year-ahead EPS change (CEPS1) did increase during 2000-2008 as compared to 1991-1999 for all of the categories of firms except the Manufacturing category. However, the p-values from the t-tests show none of the categories had a statistically significant difference in the mean explanatory/predictive power between 1991-1999 and 2000-2008 (all p-values > .10).

In summary, Hypothesis1a is rejected. The evidence is not compelling that the observed differences between the mean explanatory/predictive power of the studied fundamental signals during 1991-1999 as compared to 2000-2008 in predicting one-year-ahead EPS change are significantly different than zero.

Hypothesis 1b is the same as Hypothesis 1a, except for long-term (five-year) growth during 1998-2004 as compared to1991-1997. This hypothesis was tested for each of the four categories of firms by using statistical “t-tests” to compare the mean of the adjusted R-square values from the seven yearly regressions during 1991-1997 to the mean of the adjusted R-square values from the seven yearly regressions for 1998-2004, where both “Conventional long-term growth (CEPSL)” and “Experimental long-term growth (EXP_CEPSL)” were predicted. The results from the t-tests for testing Hypothesis 1b for Conventional CEPSL are summarized in Figure 67.

| **Data Source** | **Category of Firms** | **Mean (std. dev.) Adj. R2 1991-1999** | **Mean (std. dev.) Adj. R2 2000-2008** | **p-value from t-test (1-tail and unequal variances)** |
|---|---|---|---|---|
| Table 37 | ALL-except-Services | 0.131 (0.044) | 0.148 (0.056) | 0.275 |
| Table 38 | Manufacturing | 0.169 (0.067) | 0.195 (0.099) | 0.290 |
| Table 39 | Wholesale-Retail-Primary-Products | 0.096 (0.037) | 0.116 (0.066) | 0.251 |
| Table 40 | Services | 0.199 (0.101) | 0.113 0.089 | 0.059 |

Figure 67
Hypothesis 1b Test Results using Conventional CEPSL
Results from t-tests using adjusted R-squares from 1991-1997 and 1998-2004

Figure 67 shows the mean explanatory/predictive power (measured by mean adjusted R-square) of the studied fundamental signals in predicting Conventional long-term growth (CEPSL) did increase during 1998-2004 as compared to 1991-1997 for all of the categories of firms except the Service category. However, the p-value results show none of the categories except Services had a statistically significant difference in the mean explanatory/predictive power between 1991-1997 and 1998-2004 (all p-values > .10), and that difference in means was only marginally significant for Services.

The results from the t-tests for testing Hypothesis 1b for Experimental CEPSL are summarized in Figure 68.

| Data Source | Category of Firms | Mean (std. dev.) Adj. R2 1991-1999 | Mean (std. dev.) Adj. R2 2000-2008 | p-value from t-test (1-tail and unequal variances) |
|---|---|---|---|---|
| Table 41 | ALL-except-Services | 0.165 (0.030) | 0.179 (0.035) | 0.216 |
| Table 42 | Manufacturing | 0.202 (0.050) | 0.231 (0.053) | 0.155 |
| Table 43 | Wholesale-Retail-Primary-Products | 0.129 (0.031) | 0.205 (0.051) | 0.004 |
| Table 44 | Services | 0.157 (0.043) | 0.172 (0.075) | 0.328 |

Figure 68
Hypothesis 1b Test Results using Experimental CEPSL
Results from t-tests using adjusted R-squares from 1991-1997 and 1998-2004

Figure 68 shows the mean explanatory/predictive power (measured by mean adjusted R-square) of the studied fundamental signals in predicting Experimental long-term growth (EXP_CEPSL) increased during 1998-2004 as compared to 1991-1997 for all of the categories of firms. The Services category's average adjusted R-square was less in 1998-2004 than it had been in 1991-1997 when measured by the Conventional CEPSL, but this situation reversed when using the Experimental EXP_CEPSL. In addition, the p-value results show the difference was significant (at alpha=.05) for the Wholesale-Retail-Primary-Products category of firms. None of the other three categories had a statistically significant difference in the mean explanatory/predictive power between 1991-1997 and 1998-2004 (all p-values > .10) when predicting Experimental long-term growth. For Wholesale-Retail-Primary-Products, when using the Experimental EXP_CEPSL, the evidence indicates a significant increase in mean adjusted-R-square in 1998-2004 from 1991-1997.

### *5.9.2 Hypothesis 2*

Hypothesis 2a states, “Adding the block of fundamental signals identified in this study using the guidance of fundamental financial and managerial/cost accounting concepts can significantly increase the explanatory/predictive power of earnings-signals models that predict one-year-ahead EPS change with just those metric fundamental signals identified in prior research (LT-93 and AB-97) using the guidance of experts (security analysts)”.  Hypothesis 2b is, “Same as 2.a above, except for long-term (five-year) growth.”

Hierarchal Regression was used to test Hypothesis 2a and 2b. After adding the current-year EPS change (CHGEPS) and the seven AB-97 metric fundamental signals, the Added signals were added to the model, and the significance of the incremental adjusted R-square change resulting from the Added block of signals was noted. By adding CHGEPS and the AB-97 signals before adding the Added signals, the incremental adjusted R-square provided by the Added signals was from only the *unique* explanatory/predictive power provided by the Added signals block. Each of the Added signals was based on the guidance provided in the FASB Concept Statements and KWK, an accounting principles textbook that had been used by many colleges and university to teach first-year accounting students the fundamentals of financial and managerial accounting.

The hierarchical regression results displayed in table 20 provide the data for testing Hypothesis 2a for 1991 through 2008. Figure 69 summarizes the information in table 20, showing the Added signals contributed incremental adjusted R-square change that was significant at alpha=.05 (number of years significant at alpha = .10 in parenthesis) for the following number of years, by category of firm:

| | Added except Mfg Specific and OL | Added Mfg. Specific | Added Operating Leverage (OL) |
|---|---|---|---|
| ALL-except-Services | 17 (0) – 23% | n/a | 2 (1) - 1% |
| Manufacturing | 10 (4) – 19% | 2 (2) – 3% | 3 (1) - 2% |
| Wholesale, Retail, and Primary Products | 8 (2) – 11% | n/a | 3 (0) - 0% |
| Services | 7 (1) - 15% | n/a | 1 (0) - 0% |

Figure 69
Years during 1991-2008 where Added Signals provided Sig. Incremental Adj. R-Square
DV = One-Year-Ahead EPS Change (CEPS1), Source = table 20

Figure 69 also repeats the information in table 20 showing the average percent of the total adjusted R-square of the full model that was contributed by the Added block of signals during 1991-2008.

In predicting CEPS1, the Added signals excluding manufacturing-specific and Operating Leverage provided significant incremental explanatory/predictive power to the models in the majority of the years studied for the All-except-Services (17 of 18) and Manufacturing (10 of 18) categories. Although less than a majority, these signals also provided significant incremental explanatory/predictive power in a substantial number of years for the Wholesale-Retail-Primary-Products (8 of 18) and Services (7 of 18) categories of firms. Although not complete, there is support for accepting Hypothesis 2a, especially for the All-except-Services and Manufacturing firms. Although there were a few years in which their contribution was significant, Figure 69 shows the Added fundamental signals specific to manufacturing and the Operating

Leverage signal generally did not provide significant incremental power in predicting CEPS1.

The hierarchical regression results displayed in table 21 provide the data for testing Hypothesis 2b for 1991-2004, where the DV is Conventional long-term growth (CEPSL). Figure 70 summarizes the information in table 21.

| | Added except Mfg Specific and OL | Added Mfg. Specific | Added Operating Leverage (OL) |
|---|---|---|---|
| ALL-except-Services | 9 (3) – 11% | n/a | 14 (0) - 74% |
| Manufacturing | 6 (1) – 14% | 4 (4) - 11% | 14 (1) - 63% |
| Wholesale, Retail, and Primary Products | 0 (3) – 10% | n/a | 14 (0) - 59% |
| Services | 3 (2) – 27% | n/a | 10 (0) - 55% |

Figure 70
Years during 1991-2004 where Added Signals provided Sig. Incremental Adj. R-Square
DV = Conventional Long-Term Growth (CEPSL), Source = table 21

Figure 70 matches the information in table 21 showing the average percent of the total adjusted R-square of the full model that was contributed by the Added block of signals.

In predicting Conventional long-term growth (CEPSL), the Added signals excluding manufacturing-specific and Operating Leverage provided incremental explanatory/predictive power in some of the years for All-except-Services (nine of fourteen) and Manufacturing (six of fourteen). Curiously, these signals were not significant for Wholesale-Retail-Primary-Products in any of the fourteen years studied. For four of fourteen years studied, the Added signals specific to manufacturing contributed significant (at alpha = .05) incremental explanatory power to the model, with another four years where these signals contributed marginally significant explanatory power (at alpha = .10). However, it was the Operating Leverage Added signal that contributed the most incremental explanatory/predictive power. In predicting Conventional CEPSL, the Operating Leverage signal contributed significant (at alpha = .05) incremental power in *all* of the fourteen years studied for All-except Services, Manufacturing, and Wholesale-Retail-Primary-Products, and in ten of fourteen years for Services. Moreover, the percent of the full-mode's total adjusted R-square provided by just this one signal alone for All-except Services, Manufacturing, Wholesale-Retail-Primary-Products and Services was respectively 74%, 63%, 59% and 55%.

The hierarchical regression results displayed in table 22 provide the data for testing Hypothesis 2b for 1991-2004, where the DV is Experimental long-term growth (EXP_CEPSL). Figure 71 summarizes the information in table 22.

| | Added except Mfg Specific and OL | Added Mfg. Specific | Added Operating Leverage (OL) |
|---|---|---|---|
| ALL-except-Services | 14 (0) – 25% | n/a | 14 (0) – 47% |
| Manufacturing | 13 (0) – 19% | 9 (0) – 6% | 14 (0) – 39% |
| Wholesale, Retail, and Primary Products | 8 (2) – 18% | n/a | 13 (1) – 48% |
| Services | 9 (0) – 29% | n/a | 12 (1) – 51% |

Figure 71
Years during 1991-2004 where Added Signals provided
Sig. Incremental Adj. R-Square
DV = Experimental Long-Term Growth (EXP_CEPSL), Source = table 22

Figure 71 matches the information in table 22 showing the average percent of the total adjusted R-square of the full model that was contributed by the Added block of signals.

In predicting Experimental long-term growth (EXP_CEPSL), the Added signals excluding manufacturing-specific and Operating Leverage provided incremental explanatory/predictive power in all or most of the years for All-except-Services (fourteen of fourteen) and Manufacturing (thirteen of fourteen), and for the majority of years for Wholesale-Retail-Primary-Products (eight of fourteen) and Services (nine of fourteen). For nine of fourteen years studied, the Added signals specific to manufacturing contributed significant (at alpha = .05) incremental explanatory power to the model. But, again, it was the Operating Leverage Added signal that contributed the most incremental explanatory/predictive power, providing significant (at alpha = .05) incremental power in all of the fourteen years studied for All-except Services and Manufacturing, and in most of the years studied for Wholesale-Retail-Primary-Products (thirteen of fourteen) and Services (twelve of fourteen). The percent of the full-mode's total adjusted R-square provided by just this one signal alone in predicting EXP_CEPSL for All-except Services, Manufacturing, Wholesale-Retail-Primary-Products and Services was respectively 47%, 39%, 48% and 51%.

In summary, the evidence appears to support general acceptance of Hypothesis 2a and, owing largely to the contribution of the Operating Leverage signal, complete acceptance of Hypothesis 2b.

The purpose of Hypothesis 2a and 2b was not to show that, armed with the knowledge provided in a first-year university accounting course, one can generate earnings-signals models that out-perform security analysts' models. Surely the analysts use financial statement information other than just the LT-93/AB-97 fundamental signals. Some analysts may be reluctant to share their best forecasting methods that provide a competitive advantage in forecasting. Furthermore, analysts use information other than the financial statement numbers in making their forecasts, such as information obtained from management, as well as industry and macro economic outlooks.  Rather, the goal of Hypothesis 2a and 2b is to demonstrate that users of the financial statements with a reasonable understanding of the fundamental accounting principles are not limited to just the signals that the analysts said they use and can use the financial statements to develop other fundamental signals that are relevant to future accounting earnings.

*5.9.3  Hypothesis 3*

Hypothesis 3a states, “As a result of SOX, the earnings relevance of change in current year earnings (CHGEPS) in predicting next-year earnings change (CEPS1) significantly increased in the post-SOX era vis-à-vis the Pre-SOX era.”  Testing of a similar hypothesis for long-term growth was not performed, since 2004 was as far as the data would allow for assessing long-term growth and SOX became effective in 2002.

This hypothesis was tested for each of the four categories of firms by using statistical “t-tests” to compare the mean of the adjusted R-square values for just CHGEPS from the six yearly regressions during 1996-2001 (per SOX era) to the mean of the adjusted R-square values for just CHGEPS from the six yearly regressions for 2003-2008 (post-SOX era), where “one-year-ahead EPS change (CEPS1)” was the predicted dependent variable.  The data for the tests come from tables 33, 34, 35 and 36, and the results from the t-tests for are summarized in figure 72.

| Data Source | Category of Firms | Mean (std. dev.) Adj. R2 1996-2001 (Pre-SOX) | Mean (std. dev.) Adj. R2 2003-2008 (Post-SOX) | p-value from t-test (1-tail and unequal variances) |
|---|---|---|---|---|
| Table 33 | ALL-except-Services | 0.026 (0.028) | 0.053 (0.061) | 0.176 |
| Table 34 | Manufacturing | 0.160 (0.176) | 0.094 (0.106) | 0.225 |
| Table 35 | Wholesale-Retail-Primary-Products | 0.104 (0.171) | 0.051 (0.080) | 0.256 |
| Table 36 | Services | 0.072 (0.062) | 0.121 (0.198) | 0.294 |

Figure 72
Hypothesis 3a Test Results using just CHGEPS to predict CEPS1
Results from t-tests using adjusted R-squares from 1996-2001 and 2003-2008

Figure 72 shows the mean explanatory/predictive power (measured by mean adjusted R-square) of just CHGEPS in predicting one-year-ahead EPS change (CEPS1) did increase during 2003-2008 as compared to 1996-2001 for All-except-Services and Services, but decreased for Manufacturing and Wholesale-Retail-Primary-Products. The mean adjusted R-square decreased by 59% for Manufacturing and by 49% for Wholesale-Retail-Primary-Products, but increased by 168% for Services. However, the p-value results from the t-rests show none of the categories had a statistically significant difference in the mean explanatory/predictive power between 1996-2001 and 2003-2008 (all p-values > .10).

In summary, Hypothesis 3a is rejected. The evidence is not compelling that the observed differences between the mean explanatory/predictive power of CHGEPS during 1996-2001 (pre-SOX) as compared to 2003-2008 (post-SOX) in predicting one-year-ahead EPS change are significantly different than zero.

*5.9.4 Hypothesis 4*

Hypothesis 4a states, "In the post-EDGAR era, security analysts more efficiently utilized the studied fundamental signals in making their one-year-ahead EPS forecast revisions vis-à-vis in the pre-EDGAR era." Hypothesis 4b contents that, in the post-EDGAR era, security analysts more efficiently utilized the studied fundamental signals in making their long-term (five-year) growth forecast revisions vis-à-vis in the pre-EDGAR era."

The data used to test Hypothesis 4a is displayed in tables 45 and 46 regarding security analysts' utilization of the studied fundamental signals in making their forecast revisions for one-year-ahead EPS. Since the phase-in period for EDGAR ended in May 1996, the mean of the analysts' yearly percent utilization of the studied signals during 1991-1995 is compared to the mean of the analysts' yearly percent utilization of the studied signals during 1997-2001. These two five-year periods are the pre- and post-EDGAR periods studied.

Hypothesis 4a was first tested using statistical "t-tests" to compare the mean of the annual "Adjusted Forecast Utilization" percentages shown in table 45 during 1991-1995 (pre-EDGAR era) to the mean of the adjusted R-square values for the same percentages for 1997-2001 (post-EDGAR era), where "One-Year-Ahead EPS Forecast Revisions made one month after the current-year earnings announcement date (FY1+1)" was the predicted dependent variable. A second t-test was conducted exactly as the first, except table 46 data was used and the predicted dependent variables was "One-Year-Ahead EPS Forecast Revisions made five months after the current-year earnings announcement date (FY1+5)."  The results from these two t-tests are summarized in figure 73.

| Data Source | One-Year-Ahead EPS Forecast Revisions Period | Mean (std. dev.) Percent Utilization 1991-1995 (Pre-EDGAR) | Mean (std. dev.) Percent Utilization 1997-2001 (Post-EDGAR) | p-value from t-test (1-tail and unequal variances) |
|---|---|---|---|---|
| Table 45 | FY1+1 | 0.613<br>(0.251) | 0.833<br>(0.252) | 0.103 |
| Table 46 | FY1+5 | 0.600<br>(0.548) | 0.697<br>(0.302) | 0.370 |

Figure 73
Comparison of Analysts' Mean Percent Use of Signals before and after EDGAR
Test Results for Analysts' Percent Use of Signals in Making FY1+1 and FY1+5

The evidence is not compelling that there is any significant difference in security analysts' percent utilization of the studied fundamental signals in making their FY1+5 forecast revisions, when the two means for percent utilization during the per- and post-EDGAR periods are compared.  However, for FY1+1 forecast revisions, there is marginally significant evidence that security analysts' mean 83.3-percent utilization of the studied fundamental signals in making the FY1+1 forecast revisions with EDGAR during 1997-2001 was more than their mean 61.3-percent utilization of the studied fundamental signals in making their FY1+1 forecast revisions during 1991-1995 without EDGAR.  This evidence is consistent with EDGAR enabling the security analysts to have more timely access to the financial statement information before making their next-year EPS forecast revisions during the 30-day period that began one month after the earnings announcement for the just-completed year.  The lack of significant results for FY1+5 is consistent with security analysts having had access to the financial statement information by the fifth month after the just-completed year's earnings announcement data about the same with EDGAR as without EDGAR.

The data used to test Hypothesis 4b is displayed in tables 47 and 48 regarding security analysts' utilization of the studied fundamental signals in making their forecast revisions for long-term growth. The same pre- and post-EDGAR periods are used to test Hypothesis 4b as were used to test Hypothesis 4a.

Hypothesis 4b was first tested using statistical "t-tests" to compare the mean of the annual "Adjusted Forecast Utilization" percentages shown in table 47 during 1991-1995 (pre-EDGAR) to the mean of the adjusted R-square values for the same percentages for 1997-2001 (post-EDGAR), where "long-term growth forecast revisions made during the 3-month period beginning one month after the current-year earnings announcement date (LTG+1)" was the predicted dependent variable. A second t-test was conducted exactly as the first, except table 48 data was used and the predicted dependent variables was "long-term growth forecast revisions made during the 3-month period beginning four months after the current-year earnings announcement date (LTG+4)." The results from these two t-tests are summarized in figure 74.

| Data Source | Long-term Growth Forecast Revisions Period | Mean (std. dev.) Percent Utilization 1991-1995 (Pre-EDGAR) | Mean (std. dev.) Percent Utilization 1997-2001 (Post-EDGAR) | p-value from t-test (1-tail and unequal variances) |
|---|---|---|---|---|
| Table 47 | LTG+1 | 0.373 (0.190) | 0.463 (0.441) | 0.345 |
| Table 48 | LTG+4 | 0.687 (0.351) | 0.570 (0.374) | 0.312 |

Figure 74
Comparison of Analysts' Mean Percent Use of Signals before and after EDGAR
Test Results for Analysts' Percent Use of Signals in making LTG+1 and LTG+4

The evidence is not compelling that there is any significant difference in security analysts' percent utilization of the studied fundamental signals in making either their LTG+1 or LTG+4 forecast revisions, when the two means for percent utilization during the per- and post-EDGAR periods are compared.  Security analysts' mean percent utilization of the studied signals when making LTG+1 forecast revisions did increase from 37.3-percent without EDGAR to 46.3-percent with EDGAR, but this difference was not statistically significant (p-value = 0.345).

*5.9.5  Hypothesis 5*

Hypothesis 5a states, "In the post-Regulation FD era, security analysts more efficiently utilized the studied fundamental signals in making their one-year-ahead EPS forecast revisions vis-à-vis in the pre-regulation FD era."  Hypothesis 5b is the same as Hypothesis 5a, except long-term (five-year) growth forecast revisions is used rather than one-year-ahead EPS forecast revisions.

The data used to test Hypothesis 5a is displayed in tables 45 and 46 regarding security analysts' utilization of the studied fundamental signals in making their forecast revisions for one-year-ahead EPS.  Since Regulation Fair Disclosure (regulation FD) was implemented in October 2000, the mean of the analysts' yearly percent utilization of the studied signals during 1996-1999 is compared to the mean of the analysts' yearly percent utilization of the studied signals during 2001-2004.  These two four-year periods are the pre- and post-Regulation FD periods studied. The per-Regulation FD period was chosen to begin in 1996, so as not to include any years prior to the EDGAR implementation that occurred in 1996. EDGAR had already been implemented during all of the year pre- and post Regulation FD years studied and, hence, cannot be a confounding factor.

Hypothesis 5a was first tested using statistical "t-tests" to compare the mean of the annual "Adjusted Forecast Utilization" percentages shown in table 45 during 1996-1999 (pre-Regulation FD) to the mean of the adjusted R-square values for the same percentages for 2001-2004 (post-Regulation FD), where "One-Year-Ahead EPS Forecast Revisions made one month after the current-year earnings announcement date (FY1+1)" was the predicted dependent variable.  A second t-test was conducted exactly as the first, except table 46 data was used and the predicted dependent variables was "One-Year-Ahead EPS Forecast Revisions made five months after the current-year earnings announcement date (FY1+5)."  The results from these two t-tests are summarized in figure 75.

| Data Source | One-Year-Ahead EPS Forecast Revisions Period | Mean (std. dev.) Percent Utilization 1992-1999 (Pre-Reg. FD) | Mean (std. dev.) Percent Utilization 2001-2008 (Post-Reg. FD) | p-value from t-test (1-tail and unequal variances) |
|---|---|---|---|---|
| Table 45 | FY1+1 | 0.858<br>(0.284) | 0.767<br>(0.196) | 0.310 |
| Table 46 | FY1+5 | 0.620<br>(0.286) | 0.891<br>(0.218) | 0.093 |

Figure 75
Analysts' Mean Percent Use of Signals before and after Regulation FD
Test Results for Analysts' Percent Use of Signals in making FY1+1 and FY1+5

The evidence is not compelling that there is any significant difference in security analysts' percent utilization of the studied fundamental signals in making their FY1+1 forecast revisions, when the two means for percent utilization during the pre- and post-Regulation FD periods are compared.  However, for FY1+5 forecast revisions, there is marginally significant evidence that security analysts' mean 89.1-percent utilization of the studied fundamental signals in making the FY1+5 forecast revisions during 2001-2004 after Regulation FD was more than their mean 62.0-percent utilization of the studied fundamental signals in making their FY1+5 forecast revisions during 1996-1999 before Regulation FD. The evidence for FY1+5 is consistent with Regulation FD having reduced the security analysts' communications with firms' managers and, hence, the security analysts having to rely more on the financial statement information after Regulation FD vis-à-vis before Regulation FD.

The data used to test Hypothesis 5b is displayed in tables 47 and 48 regarding security analysts' utilization of the studied fundamental signals in making their forecast revisions for long-term growth. The same pre- and post-Regulation FD periods are used to test Hypothesis 5b as were used to test Hypothesis 5a.

Hypothesis 5b was first tested using statistical "t-tests" to compare the mean of the annual "Adjusted Forecast Utilization" percentages shown in table 47 during 1996-1999 (pre-Regulation FD) to the mean of the adjusted R-square values for the same percentages for 2001-2004 (post-Regulation FD), where "long-term growth forecast revisions made during the three-month period beginning one month after the current-year earnings announcement date (LTG+1)" was the predicted dependent variable. A second t-test was conducted exactly as the first, except table 48 data was used and the predicted dependent variables was "long-term growth forecast revisions made during the three-month period beginning four months after the current-year earnings announcement date (LTG+4)." The results from these two t-tests are summarized in figure 76.

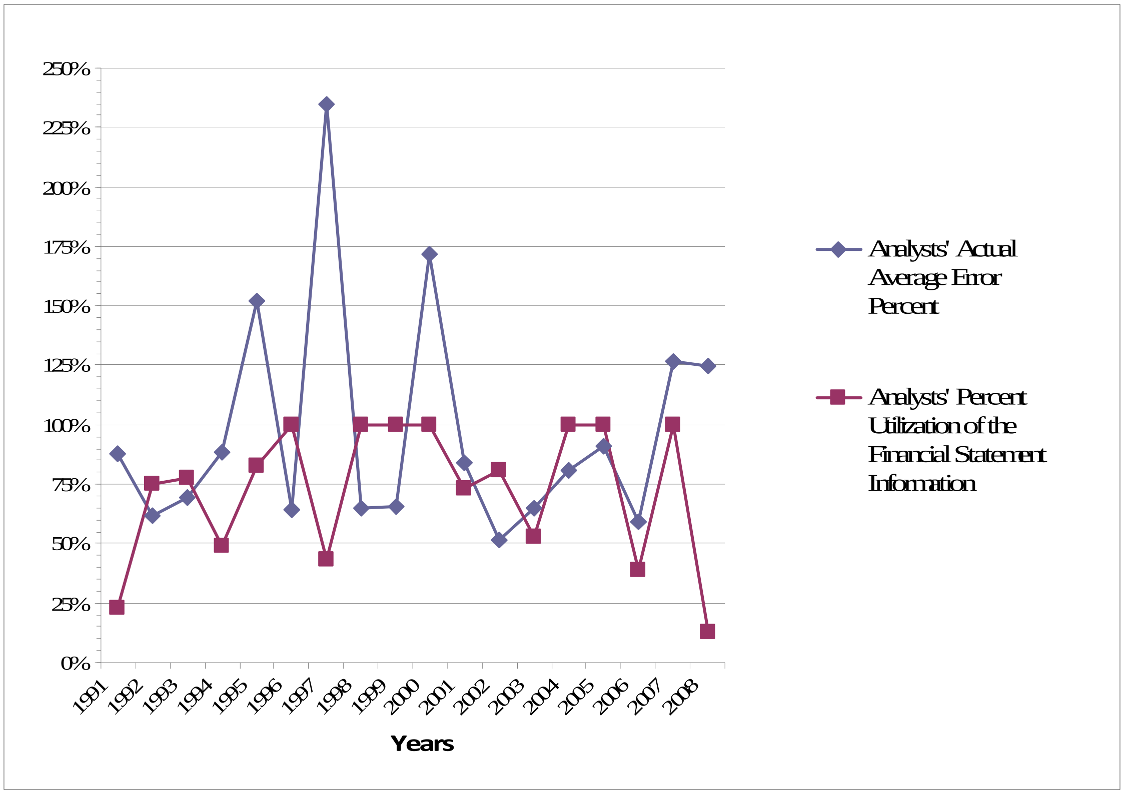
| Data Source | Long-term Growth Forecast Revisions Period | Mean (std. dev.) Percent Utilization 1991-1995 (Pre-Reg. FD) | Mean (std. dev.) Percent Utilization 1997-2001 (Post-Reg. FD) | p-value from t-test (1-tail and unequal variances) |
|---|---|---|---|---|
| Table 47 | LTG+1 | 0.532 (0.541) | 0.320 (0.263) | 0.258 |
| Table 48 | LTG+4 | 0.614 (0.445) | 0.583 (0.422) | 0.461 |

Figure 76
Analysts' Mean Percent Use of Signals before and after Regulation FD
Test Results for Analysts' Percent Use of Signals in Making LTG+1 and LTG+4

Figure 76 shows the evidence is not compelling that there is any significant difference in security analysts' percent utilization of the studied fundamental signals in making either their LTG+1 or LTG+4 forecast revisions, when the two means for percent utilization during the per- and post-Regulation FD periods are compared.

### *5.10 Comparing Security Analysts' Actual Average Error Rates to Utilization of the Studied Fundamental Signals*

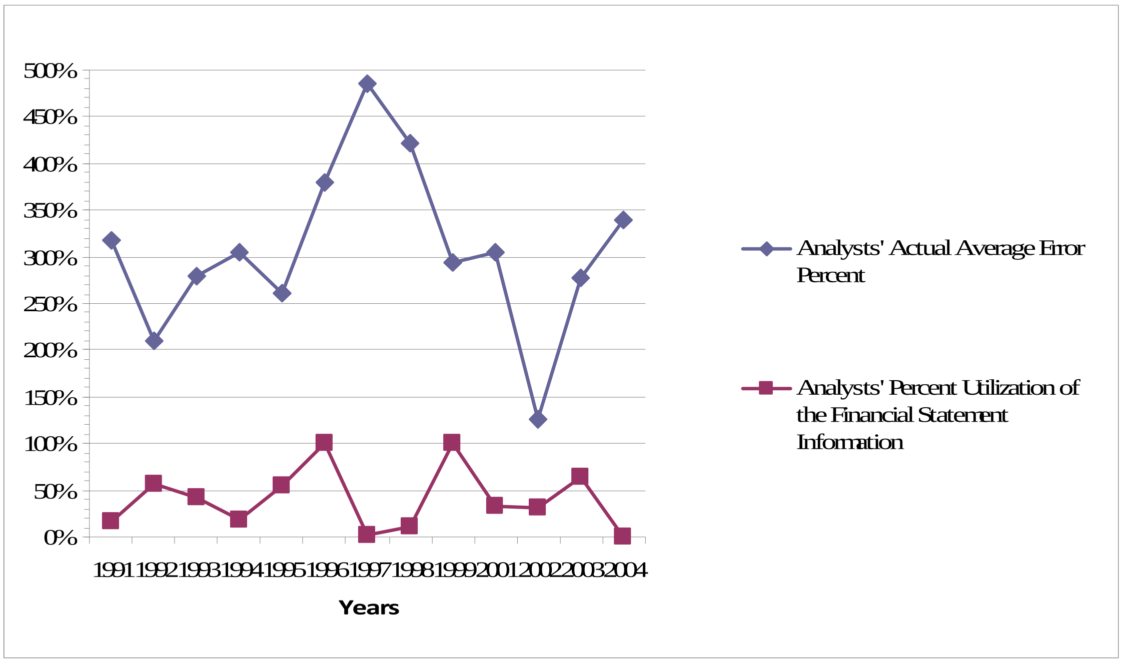
Given the studied fundamental signals are relevant in predicting future earnings, it should follow that more efficient use of the studied fundamental signals corresponds to lower actual forecast errors, and vice versa. Hence, in the years where security analysts' average efficient utilization percent increased, the expectation is that there was a corresponding reduction in the analysts' average actual forecast error rate, and vice versa. Graph 1 displays the yearly results from Table 45 for analysts' one-year-ahead earnings forecasts made one month after the reference year's earnings announcement date.




Graph 1
Analysts' Next-Year Earnings Forecast Accuracy Compared to Signal Utilization

For some of the years studied between 1991 and 2008, the expected inverse relationship between efficient utilization of the fundamental signals and actual one-year-ahead earnings forecast error rate was observed. For example, in 1992, 1996, 1998 and 2002, the efficient utilization of the signals increased as the actual forecast error rate decreased. Similarly, in 1994, 1997 and 2003 efficient utilization decreased as the actual error rate increased. However, the inverse relationship was not evident for 1993, 1995, 2000, 2001, and 2004-2008. The lack of a consistent inverse relationship between signal utilization and actual error rate may be due to other factors not studied in the earnings-signals models, such as one-year changes in the macro economy and one-year changes in industry economies.

Graph 2 depicts the yearly results from Table 47 for analysts' long-term growth (Conventional) forecasts made during the three months that began one month after the reference year's earnings announcement date.




Graph 2
Analysts' Long-Term Growth Forecast Accuracy Compared to Signal Utilization

For most of the years studied between 1991 and 2004, the expected inverse relationship between efficient utilization of the fundamental signals and actual long-term growth forecast errors was observed. For example, in 1992, 1995, 1998 and 1999 the efficient utilization of the signals increased as the actual forecast error rate decreased. Similarly, in 1993, 1994, 1997, 2001 and 2004 efficient utilization decreased as the actual error rate increased. Year 2000 was omitted, because there was such a large average actual error rate for this year (29380%). Hence the expected inverse relationship was evident in 9 of the 12 years studied.

The more consistent inverse relationship between the actual forecast error rates and the efficient utilizations of the signals that was observed for long-term-growth vis-à-vis one-hear-ahead earnings forecasts may be explained by the five-year outlook smoothing the one-year-changes in the macro and/or industry economies. This supposition is supported by the earning-signals models used in this study generally having more consistent yearly adjusted R-squares in predicting long-term growth vis-à-vis in predicting one-year-ahead EPS change.

*5.11 Summary of Results*

A proxy for Operating Leverage was developed as a fundamental signal by using just the items available in Compustat. The evidence shows this signal was consistently significant and important in predicting firms' long-term growth. The results from yearly regressions during 1991-2004 show the Operating Leverage signal was a significant predictor of long-term growth (Conventional CEPSL) for all fourteen of the years studied between 1991 and 2004. When regressing long-term growth for all except service firms on the "full model" of all fundamental signals studied, the average coefficient estimate for the Operating Leverage signal was positive (.008), and the yearly betas were all positive and significant for each of the fourteen years studied (table 9). Moreover, the p-value for every one of the fourteen yearly Operating Leverage signal coefficients was 0.000. In predicting long-term growth for all firms, this one signal contributed on average 74% of the total explanatory power (adjusted R-square) provided by the full model (table 21).

The Operating Leverage signal formula uses an estimate of "manufacturing overhead" that approximates "total fixed manufacturing costs" for manufacturing firms. With this estimate, the Operating Leverage signal was a significant predictor (alpha = .05) of long-term growth for manufacturing firms for all fourteen years studied during 1991-2004 (table 12). The average of the coefficients was positive (0.009), the yearly coefficients were positive in all fourteen years, and the p-values for twelve yearly Operating Leverage signal betas were 0.000 and the other two yearly coefficient p-values were .002 and .012. The Operating Leverage signal contributed on average 63% of the total explanatory power provided by the full model in predicting long-term growth for manufacturing firms during 1991-2004 (table 21).

The evidence supporting the significance of the Operating Leverage signal in predicting long-term growth gives rise to the recommendation that FASB consider establishing Generally Accepted Accounting Principles that require all publicly-traded firms to report an estimate of their total fixed costs. If reporting total fixed costs is deemed too costly, then the FASB should consider at least requiring manufacturing firms to report their total manufacturing overhead (as a component of their Total Manufacturing Costs), so as to provide a more accurate estimate of manufacturing firms' total fixed manufacturing costs.

A version of long-term growth is introduced that allows for negative EPS (a net loss) in either the current year or the five-years-ahead future year, when using the geometric mean growth rate formula to compute long-term growth. Called "Experimental" Long-Term Growth, this dependent variable enables fundamental signals to predict long-term decline when there is a five-years-ahead loss and long-term recovery when there is a current-year loss. The "conventional" long-term growth used in prior research allows only positive EPS values to be used in the geometric mean growth rate formula.

Whereas the regression coefficient for the Operating Leverage fundamental signal was consistently positive in predicting "Conventional" long term growth, this signal was consistently negative in predicting "Experimental" long-term growth. When regressing "Experimental" long-term growth for all firms except services on the "full model" of all fundamental signals studied, the average beta estimate for the Operating Leverage signal was negative (-0.017), and the yearly betas were all negative and significant for each of the fourteen years studied (table 10). As with Conventional long term growth, the p-value for every one of the fourteen yearly Operating Leverage signal coefficients was 0.000. This study's finding of consistently negative coefficients for the Operating Leverage signal when using the Experimental long term growth dependent variable appears to corroborate the results reported by Guthrie [2006] that an inverse relationship between operating leverage and expected rates of return exists when unprofitable outcomes are included in the study.

Experimental long-term growth provided more definitive results than Conventional long-term growth for many of the studied fundamental signals. For example, for the fourteen years studied between 1991 and 2004, when predicting

Experimental long-term growth, the AB-97 capital expenditure signal (CAPX) had fourteen positive yearly coefficients of which eight were significant, as compared twelve positive yearly coefficients with just one of these significant, when predicting Conventional long-term growth.  Similarly, when predicting Experimental long-term growth, the AB-97 general selling an d administrative expenses signal (SA) had thirteen of fourteen yearly coefficients positive with seven of these thirteen significant, as compared to just eight of fourteen negative with only two of the eight significant, when predicting Conventional long-term growth.. Likewise, when predicting Experimental long-term growth, the AB-97 GM signal had fourteen of fourteen yearly coefficients positive with nine of these fourteen significant, as compared to ten of fourteen positive with five of the ten significant, when predicting Conventional long-term growth.  In the cases where Experimental long-term growth more clearly shows the effects of the studied fundamental signal vis-à-vis Conventional long-term growth, the reason is likely because the firms that experience a five-years-ahead loss are included in the study.

Fundamental signals applicable only to manufacturing firms were developed that may significantly contribute to predicting long-term growth for manufacturing firms.  Proxies for Total Manufacturing Costs and Cost of Goods Manufactured were developed, and fundamental signals were constructed from these proxies. In addition, a signal was developed that measures change in total manufacturing inventories, including raw materials, work-in-process and finished goods.  The hierarchical regression evidence for 1991-2004 (tables 21 and 22) indicates these manufacturing-specific signals, taken together, uniquely contributed to the predictive power of the full model by an average 11% in predicting Conventional long-term growth and by an average 6% in predicting Experimental long-term growth.  Along with the Operating Leverage Signal, these manufacturing signals represent this study's effort to incorporate managerial/cost accounting concepts in the development of fundamental signals for use in fundamental financial analysis.

In addition to the Operating Leverage signal and manufacturing-specific signals previously discussed, other "Added" fundamental signals were identified or developed with the guidance provided by financial accounting fundamental concepts. These Added signals included a fundamental signal (MKTSHR) based on a firm's market share of sales, and another signal (MU) based on a firms' average markup on the goods and/or services sold.  Other Added signals were identified based on the fundamental concepts of free-cash-flows, cash-on-hand, total liabilities expressed as a percent of total assets, and discretionary income.   The hierarchical regression results indicate these "Added" signals, taken together, contributed on average 23% of the explanatory/predictive power of the full model in predicting one-year-ahead EPS change for all firms except services during 1991-2008 (table 20).  In addition, these Added signals contributed on average 11% and 25% respectively in predicting Conventional and Experimental long-term growth for all firms except services during 1991-2004 (tables 21 and 22).

A method for quantifying security analysts' percent of utilization of the studied fundamental signals was developed and used to express quantitatively how efficiently security analysts' used the studied fundamental signals when making their next-year

EPS and long-term growth forecast revisions. This method is a refinement to the methodology developed by AB-97 in reporting their table 3 results. Using this enhanced AB-97 methodology, the evidence for 1991-2008 indicates analysts were on average 71% efficient in using the studied fundamental signals, when they made their next-year EPS forecast revisions during the thirty-day period that started 1 month after the current-year earnings announcement date. In addition, the security analysts' average actual error rate was measured, when making the same forecasts during the same timeframe. During 1991-2008, the security analysts had an average 97% error rate in forecasting next-year EPS during the thirty-day period beginning one month after the current-year earnings announcement date, the same thirty-days in which the analysts' efficiency in using the studied fundamental signals was on average 71% (table 24).

The fundamental signal that analysts most often failed to utilize in making one-year-ahead EPS forecast revisions was the AB-97 current-year EPS change (CHGEPS). During 1991-2008, there were eleven years where the CHGEPS was a significant predictor of next-year EPS change but was not significant in explaining security-analysts' next-year EPS forecast revisions made during the thirty-day period following the current-year earnings announcement (table 24). Also, in seven of these eleven years, the signs of the CHGEPS regression coefficients did not match, indicating analysts' failure to correctly interpret the direction on the CHGEPS signal's relationship to next-year EPS change. CHGEPS is one measure of residual income obtained by subtracting the prior-year EPS (one-year "random walk" expectation model) from the current-year EPS. Richardson, Tuna, Wysocki [2010] report only 16-percent of surveyed practitioners ("investment professionals ") said they used some form of residual income.

The evidence for 1991-2004 indicates that analysts were on average 44% efficient in using the studied fundamental signals, when they made long-term growth forecast revisions during the ninety-day period that started 1 month after the current-year earnings announcement date. During the same timeframes, security analysts had an average 308% error rate in forecasting long-term growth (table 28). The fundamental signal that analysts most often failed to utilize in making their long-term forecast revisions was the Operating Leverage signal. The evidence indicates that, in eleven of the fourteen years studied during 1991-2004, security analysts did not efficiently use the Operating Leverage signal, when making their long-term growth forecast revisions. Moreover, this one signal was evidently the primary studied signal that the analysts failed to efficiently use, inasmuch as all of the other signals were used efficiently in no less than eleven of the fourteen years studied (table 28). This evidence suggests security analysts might improve their long-term growth forecasting accuracy, if they more efficiently used the information provided in firm's total fixed costs, as measured with Operating Leverage. Ideally, standards will be changed to require firms to report an estimate of their total fixed costs (or at least manufacturing firms will be required to report an estimate of their total manufacturing overhead), so as to enable a more accurate measure of firms' total fixed costs and, hence, their degree of operating leverage.

Evidence from testing Hypothesis 2 indicates the Added fundamental signals identified in this study based on fundamental financial/managerial accounting concepts guidance can significantly contribute to the explanatory/predictive power of earning-signals models that were previously developed using the expert guidance of security analysts. In predicting next-year EPS change for all firms except service firms, the hierarchical regression results show that the Added signals *uniquely* contributed 23% of the total explanatory/predictive power provided by the full model that also contained the current-year EPS change signal and all of the AB-97 metric fundamental signals (table 20). Similarly, in predicting next-year EPS change for manufacturing, wholesale-retail-primary-products and service firms, the Added signals unique contribution to the full-model's explanatory/predictive power was 19%, 11% and 15% respectively (table 20). In predicting "Conventional" long-term growth for all firms except services, the hierarchical regression results indicate the Added signals including the Operating Leverage signal uniquely contributed 85% (of which, 74% was from the Operating Leverage signal alone) of the total explanatory/predictive power provided by the full model that also contained the current-year EPS change signal and all of the AB-97 metric fundamental signals (table 21). Likewise, in predicting "Conventional" long-term growth for manufacturing, wholesale-retail-primary-products and service firms, the full set of Added signals unique contribution to the full-model's explanatory/ predictive power was 88%, 69% and 82% respectively (table 21). Similarly, the full complement of Added signals provided most of the power of the full models in predicting Experimental long-term growth, uniquely contributing 82%, 64%, 66%, and

80% respectively for the All-except-Services, Manufacturing, Wholesale-Retail-Primary-Products and Services categories of firms (table 22).

In testing Hypothesis 1, the evidence is not compelling that the observed differences between the mean explanatory/predictive power of the studied fundamental signals during 1991-1999 as compared to 2000-2008 in predicting one-year-ahead EPS change is significantly different than zero. Also, except for Wholesale-Retail-Primary-Products, the evidence is not compelling that the observed differences between the mean explanatory/predictive power of the studied fundamental signals during 1991-1997 as compared to 1998-2004 in predicting either Conventional or Experimental long-term growth were significantly different than zero. However, in predicting Experimental long-term growth for Wholesale-Retail-Primary-Products, there is evidence of an increase in explanatory/predictive power of the studied fundamental signals. The evidence is compelling that the observed differences between the mean explanatory/predictive power (average adjusted R-square of .129) of the studied fundamental signals during 1991-1997 as compared to 1988-2004 (average adjusted R-square of .205) in predicting Experimental long-term growth were significantly different than zero.

Hypothesis 4 posits the electronic innovations in financial statement reporting brought about by EDGAR during the 1990s improved security analysts' efficient use of the studied fundamental signals in making their one-year-ahead forecast revisions. Marginal support was found for this Hypothesis. In making one-year-ahead EPS forecast revisions one month after the just-concluded year's earnings announcement date (dependent variable FY1+1), there is marginally significant evidence that security analysts' mean 83.3% utilization of the studied fundamental signals in making their FY1+1 forecast revisions with EDGAR during 1997-2001 was more than their mean 61.3% utilization of the studied fundamental signals in making their FY1+1 forecast revisions during 1991-1995 without EDGAR. But, in making one-year-ahead EPS forecast revisions five months after the just-concluded year's earnings announcement date (dependent variable FY1+5), The evidence is not compelling that there was any significant difference in security analysts' percent utilization of the studied fundamental signals in making their FY1+5 forecast revisions, when the two means for percent utilization during the per- and post-EDGAR periods are compared. This evidence is consistent with EDGAR having enabled the security analysts to have more timely access to the financial statement information before making their next-year EPS forecast revisions one month after the earnings announcement date. The lack of significant results for forecast revisions made five months after the earnings announcement date is consistent with security analysts having had access to the financial statement information by the fifth month after the earnings announcement with EDGAR the same as they had without EDGAR. Regarding long-term growth forecasts, the evidence is not compelling that there was any significant difference in security analysts' percent utilization of the studied fundamental signals in making their long-term growth forecast revisions before EDGAR vis-à-vis after EDGAR.

Hypothesis 5 posits that Regulation Full Disclosure (FD) placed restrictions on security analysts' ability to obtain information directly from firms' management, and these restrictions resulted in analysts relying more on the financial statement information and thus using that information more efficiently. The evidence is not compelling that there was any significant difference in security analysts' percent utilization of the studied fundamental signals in making their one-year-ahead EPS forecast revisions one month after the just-concluded year's earnings announcement (FY1+1), when the two means for percent utilization during the per- and post-Regulation FD periods are compared. However, for one-year-ahead EPS forecast revisions five months after the just-concluded year's earnings announcement (FY1+5), there is marginally significant evidence that security analysts' mean 89.1% utilization of the studied fundamental signals in making the FY1+5 forecast revisions during 2001-2004 after Regulation FD was more than their mean 62.0% utilization of the studied fundamental signals in making their FY1+5 forecast revisions during 1996-1999 before Regulation FD. The evidence for FY1+5 is consistent with Regulation FD having reduced the security analysts' communications with firms' managers and, hence, the security analysts having to rely more on the financial statement information after vis-à-vis before Regulation FD. Regarding long-term growth forecasts, the evidence is not compelling that there was any significant difference in security analysts' percent utilization of the studied fundamental signals in making their long-term growth forecast revisions before Regulation FD vis-à-vis after Regulation FD.

In testing Hypothesis 3, the results do not support the notion that the Sarbanes-Oxley Act of 2002 (SOX) significantly changed the relevance of current-year earnings in predicting next-year earnings. The evidence is not compelling that the observed differences between the mean explanatory/predictive power of current-year EPS change (CHGEPS) during 1996-2001 (pre-SOX) as compared to 2003-2008 (post-SOX) in predicting one-year-ahead EPS change are significantly different than zero.

In comparing security analysts' actual average error rates to the analysts' efficient utilization of the studied fundamental signals, the expected inverse relationship between analysts' efficient use of the signals and analysts' actual forecast error rates was found in 7-of-18 years studied, when forecasting one-year-ahead EPS, and in 9-of-13 years studied, when forecasting long-term growth. The more consistent annual inverse relationship between the actual forecast error rates and the efficient utilization of the signals that was observed for long-term-growth vis-à-vis one-hear-ahead earnings forecasts may be explained by the five-year outlook smoothing the one-year-changes in the macro and/or industry economies.

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