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Cost Behavior and Fundamental Analysis of SG&A Costs

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In fundamental analysis, it is customary to interpret an increase in the ratio of selling, general, and administrative costs to sales (the SG&A cost ratio) between two periods as a negative signal about future profitability and firm value. Implicit in this interpretation is an expectation that SG&A costs should normally move proportionately with increases or decreases in revenues, and that an increase in the ratio signals management inefficiency in controlling costs. While this expectation provides a straightforward interpretation for analysis purposes, it ignores important aspects of SG&A cost behavior. We observe that both fixity of costs and stickiness of costs may cause the ratio of SG&A costs to sales to increase, rather than decrease proportionately with sales, when revenue declines. Sticky costs, in fact, may represent deliberate retention of SG&A resources based on managers' expectations that revenue will increase in the future. In this case, an increase in the SG&A cost ratio may actually convey positive information about managers' expectations of future earnings. We estimate an earnings prediction model and find that future earnings are positively related to changes in the SG&A cost ratio in periods in which revenue declines, inconsistent with traditional interpretation of SG&A cost changes. We also find that abnormal positive returns may be earned on portfolios formed by going long on firms with high increases in the SG&A cost ratio (and short on firms with low increases in the SG&A cost ratio) in revenue-declining periods.

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1. Introduction

Fundamental analysis is concerned with trying to decipher the complex mapping between the value of corporate securities and key value drivers such as earnings, growth, and competitive position. It involves a systematic evaluation of relations between financial statement items to obtain information that is useful for predicting future earnings and valuing the firm. In this regard, it is a diagnostic approach to analyzing financial statements that applies specific interpretations to financial ratios and changes in financial ratios to obtain signals about future performance. A signal is incrementally informative about future earnings or current stock returns if it provides information beyond what is conveyed by current earnings changes themselves.

A signal used in fundamental analysis may have different implications for future earnings under different circumstances (Lev & Thiagarajan [1993]).¹ In this study, we evaluate how the direction of change in sales (up or down) conditions the interpretation of the change in selling, general, and administrative (SG&A) costs to sales ratio as a signal about future firm performance. The SG&A signal is a potentially important signal because SG&A costs are more than 25 percent of sales revenue for our broad sample of firms and the ratio of SG&A costs to sales is closely monitored by investors and analysts (Palepu, Healy, & Bernard [2000], 9; Wild, Subramanyam, & Halsey [2003], 472). In fundamental analysis, an increase in the ratio of SG&A costs to sales between the previous and current periods is customarily interpreted to be a negative signal about future profitability (Lev & Thiagarajan [1993]). This interpretation is made because the ratio of SG&A costs to sales (the SG&A cost ratio) is considered to be a measure of operating efficiency—an increase in the ratio indicates inefficiency and inability of managers to control costs, whereas a decrease in the ratio indicates efficiency and the ability to control costs. Because management's ability or inability to control costs is likely to persist in future periods, traditional

1. For example, an increase in inventory levels relative to sales may be interpreted as a signal that demand for the company's products is falling. If weakened demand is persistent, future earnings expectations would be reduced when this signal is observed. An increase in inventory levels relative to sales may also be interpreted as an indication that managers' sales expectations have increased. In this case, the signal would have positive implications for future earnings (Bernard & Noel [1991]). A signal subject to such conflicting interpretations may become more useful if other information can be used to determine which interpretation is appropriate in a specific situation. If, for instance, the "demand is falling" interpretation is typically appropriate for mature firms and the "improved sales expectation" interpretation is typically appropriate for growth firms, then additional information about growth in sales may be used to interpret the implications of the signal for future earnings.

fundamental analysis predicts decreases in future earnings and firm valuation when the SG&A cost ratio increases in a period.

An assumption implicitly made when applying this interpretation of the SG&A signal is that SG&A costs should move proportionately with sales. We question whether this assumption about SG&A cost behavior is appropriate, especially in situations in which revenue declines. If a portion of SG&A costs is fixed throughout the range of revenue realizations, then the ratio of SG&A costs to sales will naturally increase when revenue declines. In addition, managers may deliberately retain slack resources when revenue declines to avoid the adjustment costs of retrenching and then ramping up again if they believe that the decline in revenue is temporary. Previous evidence has, in fact, demonstrated that SG&A costs are sticky, meaning that they do not fall as much when revenue declines as they rise when revenue increases (Anderson, Banker, & Janakiraman [2003]). Thus, both fixity and stickiness of costs may cause the SG&A cost ratio to increase for reasons other than inefficiency during periods in which revenue declines.

Lev and Thiagarajan (1993) investigated whether ratios and other values used in fundamental analysis were value-relevant by estimating a model that related excess returns to contemporaneous earnings changes and fundamental signals. They found evidence that excess returns were negatively related to changes in the SG&A cost ratio consistent with fundamental analysis and the proportional costs assumption. Abarbanell and Bushee (1997) observed that studying the links between fundamental signals and future earnings changes allows a direct test of the economic intuition underlying the original construction of the signals. However, Abarbanell and Bushee (1997) found at best mild support for the interpretation of increases (decreases) in the SG&A cost ratio as an unfavorable (a favorable) signal of future earnings changes.

As described in these previous studies, fundamental analysis of SG&A cost changes does not consider how cost behavior may affect the expectation of the SG&A cost ratio differently during periods in which revenue increases and when revenue decreases. Banker and Chen (2006) found that an earnings forecasting model reflecting both cost variability and cost stickiness outperformed earnings forecasting models based on disaggregation of earnings information as in Fairfield, Sweeney, and Yohn (1996) and Sloan (1996). We seek to evaluate how different expectations about cost behavior in revenue-increasing and revenue-decreasing periods would affect the use of the SG&A signal in fundamental analysis. To test whether the SG&A signal has different information properties in revenue-increasing and revenue-decreasing periods, we estimate an earnings prediction model that is similar to the model estimated by Abarbanell and Bushee (1997) but that separately identifies the SG&A signal during periods in which revenue increases and during periods in which revenue decreases. We find evidence consistent with our hypothesis that the SG&A signal provides positive information about future earnings during periods in which revenue declines whereas it provides negative information about future earnings during periods in which revenue increases.

We also investigate whether abnormal positive returns may be earned on portfolios formed in revenue-decreasing periods by going long on firms with high increases in the SG&A cost ratio and short on firms with low increases in the SG&A cost ratio. This would be the case if capital market participants initially evaluated the SG&A signal as a measure of operating efficiency (based on expectations of SG&A costs obtained by assuming proportionate cost behavior) and subsequent firm performance was better than anticipated for firms with high increases in SG&A cost ratios relative to other firms. We find evidence of significantly positive abnormal stock returns for portfolios formed based on the SG&A cost ratio in revenue-decreasing periods, suggesting that expectations formed by capital market participants were consistent with the traditional fundamental analysis assessment of the SG&A signal (proportional cost model) as a measure of operating efficiency.

We extend our analysis by estimating a model of SG&A costs that incorporates fixed and sticky elements of cost behavior. To derive an alternative SG&A signal, we use expectations of SG&A costs based on this model in place of expectations based on the proportional cost model of cost behavior. When we substitute this alternative signal of cost behavior in our earnings prediction model, we find that there is no significant relation between future earnings and the new, and arguably the correct, SG&A signal, indicating that an SG&A signal that subtracts expectations of SG&A costs adjusted for fixed and sticky cost behavior is not informative about future earnings.

The remainder of this paper is organized as follows. In Section 2, we develop our hypothesis that the SG&A signal provides different information about future earnings during periods in which revenue decreases versus periods when revenue increases. In Section 3, we describe our data and provide descriptive statistics of our main variables over time and across industries. In Section 4, we evaluate the information properties of the SG&A signal in terms of predicting future earnings and abnormal stock returns. In Section 5, we provide various robustness tests. We conclude by discussing the implications of this research in Section 6.

2. Development of Hypotheses

Implicit in traditional fundamental analysis is the assumption that the ratio of SG&A costs to sales follows a random walk process:²

$$\frac{SG\&A_{i,t}}{SALES_{i,t}} = \frac{SG\&A_{i,t-1}}{SALES_{i,t-1}} + \varepsilon_{i,t} \quad (\text{Proportional cost assumption}) \quad (1)$$

2. If the stochastic process is assumed to be AR(1) instead of random walk, then a weighted difference, $\frac{SG\&A_{i,t}}{SALES_{i,t}} - \rho \frac{SG\&A_{i,t-1}}{SALES_{i,t-1}}$ where ρ is the first-order serial correlation, would be the appropriate signal rather than the simple first difference used in fundamental analysis.

This expectations model (eq. 1) is consistent with the proportional cost model of cost behavior that is prevalent in financial analysis and cost accounting textbooks (Hornigren, Sundem, & Stratton [1996], 80). Differences ($\varepsilon_{i,t}$) between observed actual cost ratios ($\frac{SG\&A_{i,t}}{SALES_{i,t}}$) and expected cost ratios ($\frac{SG\&A_{i,t-1}}{SALES_{i,t-1}}$) are interpreted as evidence of increases or decreases in operating efficiency. Increases in the SG&A cost ratio (departures from proportional costs) are treated as evidence that resources are being used less efficiently and that managers are unable to effectively control costs, whereas decreases in this ratio are applauded by investors and analysts. "It is the soft underbelly of a company's spending," said Steve Balog, director of U.S. equity research for Lehman Brothers Inc. "SG&A supplies a quick test of whether management is serious. If comparables are 5 percent and yours is [*sic*] 7 percent, don't talk about being lean and mean—unless you've got a very convincing story" (Mintz [1994]).

The valuation impact of the SG&A signal is driven by the notion that the underlying managerial weakness manifest by an increase in the SG&A cost ratio (a positive $\varepsilon_{i,t}$) and the managerial prowess demonstrated by a decrease in the SG&A cost ratio (a negative $\varepsilon_{i,t}$) are likely to persist in future periods as implied by a random walk process. In their empirical study of fundamental analysis, Lev and Thiagarajan (1993) related excess stock returns during a period to earnings changes and various signals, including the percentage change in SG&A costs minus the percentage change in sales.³ The coefficient on the SG&A signal was negative in 13 of 14 annual periods and was significantly negative in 7 of the 14 periods. These findings are consistent with the traditional interpretation of changes in the ratio of SG&A costs to sales.

Abarbanell and Bushee (1997) noted that if a signal is informative about future earnings, a direct correspondence between future earnings and the signal should be observable. They investigated whether specific signals, including changes in the ratio of SG&A costs to sales, were informative about changes in future earnings. They found only weak evidence that changes in one-period-ahead earnings were negatively related to the change in the SG&A cost ratio. Thus, results of tests of the efficacy of the SG&A signal based on contemporaneous stock prices are apparently stronger than results based on future earnings.

We focus our attention on cost behavior during periods in which revenue declines, because cost behavior has different implications for the SG&A signal in revenue-decreasing periods than in revenue-increasing periods.

2.1 Fixity of SG&A Costs

Banker and Hughes (1994); Cooper and Kaplan (1998); and Balakrishnan, Petersen, and Soderstrom (2004) consider how available capacity may change

3. Assume that the percentage change in SG&A costs exceeds the percentage change in sales if and only if the ratio of SG&A costs to sales increases.

with a change in expected activity level. Slack is created when activity level decreases. This leads to an increase in the SG&A cost ratio unless the slack is removed. Slack may be created because a portion of SG&A costs are fixed for the range of activity. When revenue activity falls, average costs go up, resulting in an increase in the SG&A cost ratio because the fixed capacity costs are spread over a lower sales level. If the sales level is restored in a subsequent period, then average costs will be reduced to their former level.

Firms with a higher proportion of fixed to variable SG&A costs (greater operating leverage) will experience relatively greater increases in the SG&A signal during periods in which revenue declines. Those firms with higher operating leverage with respect to SG&A costs will also experience greater increases in earnings in subsequent periods if the revenue demand is restored. Because the distribution of revenue over time has a positive drift in general,⁴ a positive SG&A signal caused by fixity of costs in a revenue-decreasing period would be associated with an expectation of a positive change in earnings in subsequent periods. This positive interpretation of an increase in the SG&A signal is in direct opposition to the traditional fundamental analysis interpretation of the SG&A signal.⁵

2.2 Stickiness of SG&A Costs

Slack may be created because managers deliberately do not remove SG&A resources that are not required to support the reduced level of activity—SG&A costs are sticky (Anderson, Banker, & Janakiraman [2003]). Cost stickiness may occur for behavioral reasons or economic reasons. From a behavioral perspective, a manager's loss function may be asymmetric to activity level changes. For instance, the disutility incurred with understaffing may be higher than the disutility incurred with overstaffing (Balakrishnan, Petersen, & Soderstrom [2004]). Managers may, for example, be reluctant to fire people or reduce other resources when demand drops (Cooper & Kaplan [1992]). Such inefficient behavior would contribute to a positive SG&A signal when revenue declines, consistent with the traditional interpretation of an increase in the SG&A signal as evidence of poor cost control by managers.

From an economic perspective, managers making decisions about the level of SG&A resources to employ during a period in which revenue falls need to trade off bearing the adjustment costs that would be incurred to cut committed

4. We find that in our sample of 23,002 firm-year observations 75 percent of sales-increasing observations are followed by sales increase in the next year and 25 percent of sales-increasing observations are followed by sales decrease in the next year, while 56 percent of sales-decreasing observations are followed by sales increase in the next year and 44 percent of sales-decreasing observations are followed by sales decrease in the next year.

5. When sales increase, the presence of fixed costs should lead to a decline in the SG&A cost ratio. If this ratio increases nonetheless, it signals the likely inability of managers to control costs when sales increase.

resources (and ramp up resources again if demand is subsequently restored) with bearing the costs of maintaining slack (excess) resources during the period of reduced demand (Anderson, Banker, & Janakiraman [2003]). Adjustment costs may include such retrenchment costs as severance pay or penalties for early termination of leases and such restoration costs as employee search and training costs and facility opening costs. If managers believe that a drop in demand is likely to persist, they may decide that the expected costs to maintain slack resources (excess capacity) for a prolonged period would outweigh the adjustment costs and may take actions to reduce SG&A costs immediately, maintaining or lowering the ratio of SG&A costs to sales.

If, on the other hand, they believe that the drop in demand is temporary, their expectations of the slack resource costs relative to the adjustment costs would be lower, and they may decide to retain slack resources during the period of reduced demand, causing the ratio of SG&A costs to sales to increase. In this case, the increase in the SG&A cost ratio is not caused by managers' failure to properly control costs but, in fact, is the result of deliberate economic decisions aimed at maximizing firm value. Because the decision is affected by managers' assessment of the likelihood that demand will be restored in the near future, the increase in the cost ratio provides positive information about managers' expectations of future firm performance.⁶

We have identified three factors that may influence the SG&A signal when revenue declines: fixity of costs, managers' failure to control costs, and managers' economic decisions to maintain resources during a downturn. Two of these factors have implications for fundamental analysis that differ from the customary interpretation of changes in the SG&A cost ratio as a signal of managerial efficiency. Increases in the SG&A cost ratio caused by cost fixity do not reflect managerial inefficiency and are not informative about managers' expectations of future firm performance. But, because future earnings changes are relatively more positive for firms with higher proportions of fixed SG&A costs to sales when the distribution of revenue over time has a positive drift, a higher SG&A cost ratio caused by fixity of costs in a revenue-decreasing period would be associated with expectations of higher future earnings. Increases in the SG&A cost ratio that are caused by managers deliberately trading off the costs of maintaining slack with adjustment costs do not reflect inefficiency. Instead, they provide positive information about managers' expectation of future earnings. Thus, increases in the SG&A signal in revenue-decreasing periods caused by fixity and stickiness of SG&A costs may provide positive information about future earnings whereas increases caused by management failure to control costs may provide negative information about future earnings.

6. If managers perceive a sales increase to be temporary, then they may choose not to increase the amount of SG&A resources. This may result in the opportunity cost of lost contribution on sales foregone because of inadequate SG&A resources. Because both SG&A costs and sales revenue will be lower due to managerial choices in this case, the impact on the SG&A cost ratio is ambiguous, unlike in the sales decrease case when the SG&A cost ratio increases.

With regard to revenue-increasing periods, these dimensions of cost behavior do not lead to conflicting interpretations of the SG&A signal. An increase in activity leads to strained resources as opposed to slack resources, and managers feel pressure to add more capacity to support this increased demand. But the stretched capacity under higher sales volume typically leads to a decrease in the SG&A cost ratio. Average fixed costs also decrease during revenue-increasing periods. These cost behavior effects do not run counter to the traditional interpretation of an increase in the SG&A cost ratio as evidence of inefficiency and loss of cost control by managers.

Based on these observations that fixed and sticky cost behavior may affect the interpretation of the SG&A signal in revenue-decreasing periods but not in revenue-increasing periods, we test the following hypothesis.

- H₁: The association between future earnings changes and the change in the SG&A cost ratio observed in a period is different for revenue-decreasing and revenue-increasing periods.

3. Description of Sample Data

We obtained the accounting data used in our investigation from the 2003 Compustat active and inactive files for the years 1980 to 2003. We obtained stock return data used in calculating excess or abnormal returns from the 2003 Centre for Research in Securities Prices (CRSP) monthly files. Our actual sample period runs from 1983 to 2002 because three years of prior data are used to compute some of the control variables, such as the effective tax rate, and one year of subsequent data is needed to obtain one-year-ahead earnings changes for our analysis. We trimmed the data to eliminate extreme observations by removing observations where the value of any variable was in the top or bottom 0.5 percent of its distribution (Chen & Dixon [1972]). We also deleted firm-year observations in the financial services industry (Standard Industrial Classification [SIC] codes from 6000 to 6999) because of differences in interpreting financial reports between these industries and other industries (Subramanyam [1996]).⁷ The final sample contains 23,002 firm-year observations from 1983 to 2002.

We provide descriptive statistics for the SG&A signals obtained when a random walk model is used to form expectations and for other variables in Table 1.

$$SG\&A\ signal = \frac{SG\&A_t}{SALES_t} - \frac{SG\&A_{t-1}}{SALES_{t-1}} \quad (\text{Proportional cost model}) \quad (2)$$

$SG\&A_t$ is the reported SG&A expense (Compustat #189) and $SALES_t$ is the net sales revenue (Compustat #12) for period t . EPS_t is basic earnings per common

7. When we repeated our analysis with the financial services industry included, we found that the results were similar to those reported.

TABLE 1
Descriptive Statistics

Panel A: SG&A signals, sales changes, and earnings changes

	Mean	Standard Deviation	Q1	Median	Q3
$\frac{SG\&A_{i,t} - SG\&A_{i,t-1}}{SALES_{i,t}}$ when sales increase	-0.017**	0.076	-0.018**	-0.003**	0.006**
$\frac{SG\&A_{i,t} - SG\&A_{i,t-1}}{SALES_{i,t}}$ when sales decrease	0.037**	0.100	-0.000	0.013**	0.041**
$\frac{(SALES_t - SALES_{t-1})/SALES_{t-1}}{EPS_{i,t} - EPS_{i,t-1}}$	0.114**	0.291	-0.026**	0.076**	0.202**
$P_{i,t-1}$	0.019**	0.201	-0.029**	0.006**	0.038**

Panel B: Year-by-year sales changes and SG&A signals

Year	Number of firms with sales increase	Number of firms with sales decrease	Percentage of firms with sales increase	Percentage of firms with sales decrease	Average percentage of sales growth $(SALES_t - SALES_{t-1})/SALES_{t-1}$	Average $\frac{SG\&A_{i,t} - SG\&A_{i,t-1}}{SALES_{i,t}}$ when sales increase	Average $\frac{SG\&A_{i,t} - SG\&A_{i,t-1}}{SALES_{i,t}}$ when sales decrease
1983	789	361	69%	31%	9%	-0.009	0.027
1984	960	220	81%	19%	17%	-0.016	0.037
1985	725	420	63%	37%	7%	-0.013	0.024
1986	730	449	62%	38%	6%	-0.011	0.043
1987	868	281	76%	24%	15%	-0.018	0.032
1988	885	230	79%	21%	16%	-0.020	0.033
1989	906	313	74%	26%	12%	-0.017	0.033
1990	860	412	68%	32%	10%	-0.014	0.041

TABLE 1 (continued)

Year	Number of firms with sales increase	Number of firms with sales decrease	Percentage of firms with sales increase	Percentage of firms with sales decrease	Average percentage of sales growth (SALES _t -SALES _{t-1})/SALES _{t-1}	Average	
						SG&A _{it} /SALES _{it} when sales increase	SG&A _{it-1} /SALES _{it-1} when sales decrease
1991	695	527	57%	43%	6%	-0.016	0.028
1992	876	379	70%	30%	10%	-0.014	0.023
1993	893	406	69%	31%	10%	-0.016	0.030
1994	936	278	77%	23%	14%	-0.017	0.034
1995	922	267	78%	22%	16%	-0.016	0.043
1996	874	319	73%	27%	14%	-0.017	0.036
1997	853	292	74%	26%	15%	-0.010	0.042
1998	717	369	66%	34%	10%	-0.008	0.047
1999	741	316	70%	30%	14%	-0.026	0.043
2000	779	267	74%	26%	21%	-0.029	0.068
2001	514	498	51%	49%	3%	-0.020	0.051
2002	502	373	57%	43%	3%	-0.032	0.040

Panel C: Industry-by-industry sales changes and SG&A signals

Industry	Number of firms with sales increase	Number of firms with sales decrease	Percentage of firms with sales increase	Percentage of firms with sales decrease	Average percentage of sales growth (SALES _t -SALES _{t-1})/SALES _{t-1}	Average	
						SG&A _{it} /SALES _{it} when sales increase	SG&A _{it-1} /SALES _{it-1} when sales decrease
Business Equipment	3,461	1,650	68%	32%	13%	-0.013	0.030
Chemicals	511	194	72%	28%	13%	-0.027	0.070
Consumer Durable	616	238	72%	28%	8%	-0.006	0.016
Energy	1,085	736	60%	40%	11%	-0.006	0.017
Health	1,110	356	76%	24%	13%	-0.037	0.032
Manufacturing	2,876	1,479	66%	34%	18%	-0.045	0.090
Consumer Nondurable	1,441	588	71%	29%	8%	-0.010	0.022

Other	2,085	905	70%	30%	8%	-0.003	0.017
Shops	2,515	748	77%	23%	12%	-0.005	0.015
Telecom	256	69	79%	21%	18%	-0.014	0.022
Utilities	69	14	83%	17%	8%	-0.015	0.003

Note: Table 1 shows sample characteristics for 23,002 firm-year observations from 1983 to 2002. We trim the sample by deleting firm-year observations that lie in the top or bottom 0.5 percent for each variable. We also delete firm-year observations in financial service industry (SIC codes from 6000 to 6999). The number of observations varies from 875 in 2002 to 1299 in 1993.

SG&A, is selling, general, and administrative costs of year t (Compustat annual #189).

SALES, is net sales revenue of year t (Compustat annual #12).

EPS, is basic earnings per common share before extraordinary items of year t (Compustat annual #58).

P_t is the stock price at the fiscal year-end of year t (Compustat annual #199).

** and * denote p -value at or below 0.01 and 0.05, respectively, based on a two-sided parametric t -test for mean and nonparametric sign test for Q1, median, and Q3.

The industry classifications are based on Fama and French's 12-industry definition after deleting the financial service industry (SIC codes 6000-6999).

1. Business Equipment: Computers, Software, and Electronic Equipment (SIC codes 3570-3579, 3660-3692, 3694-3699, 3810-3829, 7370-7379)
2. Chemicals: Chemicals and Allied Products (SIC codes 2800-2829, 2840-2899)
3. Consumer Durable: Cars, TVs, Furniture, and Household Appliances (SIC codes 2500-2519, 2590-2599, 3630-3659, 3710-3711, 3714-3714, 3716-3716, 3750-3751, 3792-3792, 3900-3939, 3990-3999)
4. Energy: Oil, Gas, and Coal Extraction and Products (SIC codes 1200-1399, 2900-2999)
5. Health: Healthcare, Medical Equipment, and Drugs (SIC codes 2830-2839, 3693-3693, 3840-3859, 8000-8099)
6. Manufacturing: Machinery, Trucks, Planes, Off Firm, Paper, and Com Printing (SIC codes 2520-2589, 2600-2699, 2750-2769, 3000-3099, 3200-3569, 3580-3629, 3700-3709, 3712-3713, 3715-3715, 3717-3749, 3752-3791, 3793-3799, 3830-3839, 3860-3899)
7. Consumer Nondurable: Food, Tobacco, Textiles, Apparel, Leather, and Toys (SIC codes 0100-0999, 2000-2399, 2700-2749, 2770-2799, 3100-3199, 3940-3989)
8. Other: Everything Else—Mines, Constr, BldMnt, Trans, Hotels, Bus Serv, and Entertainment (various other SIC codes)
9. Telecom: Telephone and Television Transmission (SIC codes 4800-4899)
10. Shops: Wholesale, Retail, and Some Services (Laundries, Repair Shops) (SIC codes 5000-5999, 7200-7299, 7600-7699)
11. Utilities: Utilities (SIC codes 4900-4949)

share before extraordinary items (Compustat #58) and P_t is the stock price at the fiscal year-end (Compustat #199).⁸

Based on Panel A of Table 1, we observe that SG&A costs changed differently in sales-increasing and sales-decreasing periods. During periods in which sales increased, the mean value of the SG&A signal of -0.017 (median = -0.003) is significantly negative, indicating that on average companies experienced a reduction in the SG&A cost ratio when sales rose. During periods in which sales decreased, the mean value of the SG&A signal of 0.037 (median = 0.013) is significantly positive, indicating that firms on average experienced an increase in the SG&A cost ratio when sales fell.

In Panel B of Table 1, we provide descriptive information about the number of sales-increasing and sales-decreasing observations by year and the mean values of the sales growth and SG&A signals. The percentages of firms that experienced sales increases or sales decreases appear to have varied with macroeconomic conditions. The percentages of sales-decreasing firms were lower (21% to 26%) in the expansion period from 1987 to 1989. This percentage increased to 43 percent in the recession year of 1991 and then dropped to between 22 percent and 27 percent in the boom years of 1994 to 1997. It increased again to more than 40 percent during the recent downturn in 2001 and 2002. The SG&A signal when sales increased was negative in all 20 years and the SG&A signal when sales decreased was positive in all 20 years. To mitigate any potential biases induced by sales change clustering over time, we adopt a year-by-year regression approach, as in Lev and Thiagarajan (1993) and Abarbanell and Bushee (1997), and report the yearly distribution of coefficient estimates in Tables 2, 3, and 5.

In Panel C of Table 1, we provide descriptive information about the number of sales-increasing and sales-decreasing observations and the average sales growth and SG&A signals by industry using the Fama and French (1997) industry definitions. The utilities industry had the lowest percentage of sales-decreasing firm-years (17%), while the energy industry had the highest percentage of sales-decreasing firm-years (40%), which is consistent with demand volatility in these markets. The average SG&A signal is negative in revenue-increasing years and positive in revenue-decreasing years for all industry groups. For robustness, we report results of an industry-by-industry analysis of one-year-ahead earnings changes in Table 4.

4. Empirical Results

Following Abarbanell and Bushee (1997), we estimate an empirical specification that relates future earnings change to the SG&A signal, current earnings change, and other control variables. To test whether the SG&A signal has different implications, we partition the SG&A signal according to revenue-increasing

8. Both EPS_t and P_t are adjusted for stock splits and stock dividends.

TABLE 2
Analysis of SG&A Signal Based on Proportional Cost Model

$$SG\&A\ Signal = \frac{SG\&A_{i,t}}{SALES_{i,t}} - \frac{SG\&A_{i,t-1}}{SALES_{i,t-1}}$$

Panel A: One-year-ahead earnings changes
(Mean coefficient estimates of year-by-year regressions from 1983 to 2002)

$$CEPS1_{i,t} = \alpha + \beta_1 SG\&A_{i,t}^+ + \beta_2 SG\&A_{i,t}^- + \delta CHGPEPS_{i,t} + \sum_{j=1}^{10} \gamma_j \text{Other Signals}_{ij} + \epsilon_{i,t}$$

Coefficients	Other Signals													
	INT	SG&A ⁺	SG&A ⁻	CHGPEPS	INV	AR	CAPX	GM	ETR	EQ	AQ	LF	LEV	GROWTH
Predicted sign	?	?	+	-	-	-	-	-	-	-	-	-	?	?
Mean across years	0.002 (0.31)	-0.047 (-1.97)	0.125 (3.38)	-0.198 (-8.84)	-0.254 (-6.52)	-0.024 (-1.22)	-0.166 (-2.11)	-0.007 (-0.22)	-0.085 (-3.14)	-0.001 (-0.27)	-0.003 (-1.16)	-0.003 (-0.42)	0.018 (6.06)	0.012 (3.37)
MacBeth <i>F</i> -statistic	10	9	16	1	1	8	5	11	4	11	10	10	18	15
positive (Significant)	(5)	(2)	(12)	(1)	(0)	(2)	(0)	(5)	(3)	(1)	(1)	(5)	(14)	(8)
negative (Significant)	10	11	4	19	19	12	15	9	16	9	10	10	2	5
Mean adjusted <i>R</i> ²	(3)	(6)	(1)	(19)	(13)	(5)	(2)	(5)	(12)	(3)	(4)	(5)	(0)	(1)

TABLE 2 (continued)

Panel B: Returns on portfolios formed on SG&A signal when sales decrease

SG&A portfolio rank	Mean value of SG&A signal of year t	Mean value of size and book-to-market adjusted returns of year $t + 1$	T-value of returns
Lowest	0.006	0.3%	0.32
2	0.018	2.0%	1.69
3	0.044	3.4%	2.29
Highest	0.159	8.9%	4.12

Note: Table 2 shows valuation implications of SG&A signal obtained from the null model—proportional cost model.

For regressions in Panel A, we delete firm-year observations that lie on the top or bottom 0.5 percent of each variable. We also delete firm-year observations in financial service industry (SIC codes from 6000 to 6999). The final sample contains 23,002 firm-year observations from 1983 to 2002. T -statistics are computed based on Fama-MacBeth's (1973) procedure. For portfolio tests in Panel B, we delete firm-year observations that lie on the top or bottom 0.5 percent of SG&A signal value. T -values are based on 20 yearly distributions of mean values.

$$\text{One-year-ahead Earnings Change (CEPS)}_{1,t} = \frac{EPS_{i,t+1} - EPS_{i,t}}{P_{i,t-1}}$$

$$\text{SG\&A Signal (SG\&A}_{i,t}^{+}) = \frac{SG\&A_{i,t}}{SALES_{i,t}} - \frac{SG\&A_{i,t-1}}{SALES_{i,t-1}} \text{ when sales increase, and 0 otherwise.}$$

$$\text{SG\&A Signal (SG\&A}_{i,t}^{-}) = \frac{SG\&A_{i,t}}{SALES_{i,t}} - \frac{SG\&A_{i,t-1}}{SALES_{i,t-1}} \text{ when sales decrease, and 0 otherwise.}$$

$$\text{Current-year Earnings Change (CHGEP)}_{i,t} = \frac{EPS_{i,t} - EPS_{i,t-1}}{P_{i,t-1}}$$

Fundamental signals are defined as follows (adapted from Lev & Thiagarajan [1993]; and Abarbanell & Bushee [1997]):

$$\text{Inventory (INV)} = \frac{\text{Inventory (Compustat annual \#78 or \#3)}_{i,t}}{SALES_{i,t}} - \frac{\text{Inventory}_{i,t-1}}{SALES_{i,t-1}}$$

$$\text{Accounts Receivable (AR)} = \frac{\text{Accounts Receivable (\#2)}_{i,t}}{SALES_{i,t}} - \frac{\text{Accounts Receivable}_{i,t-1}}{SALES_{i,t-1}}$$

$$\text{Capital Expenditure (CAPX)} = \frac{\text{Firm Capital Expenditure (\#30)}_{i,t}}{\text{Industry Capital Expenditure}_{i,t}} - \frac{\text{Firm Capital Expenditure}_{i,t-1}}{\text{Industry Capital Expenditure}_{i,t-1}}$$

$$\text{Gross Margin (GM)} = \frac{\text{Gross Margin (\#12 - \#41)}_{i,t-1}}{SALES_{i,t-1}} - \frac{\text{Gross Margin}_{i,t}}{SALES_{i,t}}$$

$$\text{Effective Tax Rate (ETR)} = \left[\left(\frac{1}{3} \sum_{\tau=1}^3 \text{Tax Rate}_{i,t-\tau} \right) - \text{Tax Rate}_{i,t} \right] * \text{CHGEP}_{i,t}$$

$$\text{where Tax Rate}_{i,t} = \frac{\text{Tax Expense (\#16)}_{i,t}}{\text{EBT (\#170 + \#65)}_{i,t}}$$

Earnings Quality (EQ) = 0 for LIFO, 1 for FIFO or other (#59)

Audit Qualification (AQ) = 0 for Unqualified, 1 for Qualified or other (#149)

$$\text{Labor Force (LF)} = \left(\frac{SALES_{i,t-1}}{\# \text{Employees (\#29)}_{i,t-1}} - \frac{SALES_{i,t}}{\# \text{Employees}_{i,t}} \right) / \frac{SALES_{i,t-1}}{\# \text{Employees}_{i,t-1}}$$

Leverage (LEV) = (Long-term Debt (#9) / Equity (#60)) _{t} - (Long-term Debt/Equity) _{$t-1$}

Sales Growth (GROWTH) = (SALES _{t} / SALES _{$t-1$}) - (SALES _{$t-1$} / SALES _{$t-2$})

and revenue-decreasing periods. We estimate the model described in eq. (3) on a yearly basis.

$$CEPS1_{i,t} = \alpha + \beta_1 SG\&A_{i,t}^+ + \beta_2 SG\&A_{i,t}^- + \delta CHGEP S_{i,t} + \sum_{j=1}^{10} \gamma_{ij} Other\ Signals_{ij} + \epsilon_{i,t} \quad (3)$$

$$\text{where } CEPS1_{i,t} = \frac{EPS_{i,t+1} - EPS_{i,t}}{P_{i,t-1}},$$

$$SG\&A_{i,t}^+ = \frac{SG\&A_{i,t}}{SALES_{i,t}} - \frac{SG\&A_{i,t-1}}{SALES_{i,t-1}} \text{ when sales increase, and 0 otherwise,}$$

$$SG\&A_{i,t}^- = \frac{SG\&A_{i,t}}{SALES_{i,t}} - \frac{SG\&A_{i,t-1}}{SALES_{i,t-1}} \text{ when sales decrease, and 0 otherwise, and}$$

$$CHGEP S_{i,t} = \frac{EPS_{i,t} - EPS_{i,t-1}}{P_{i,t-1}}.$$

When estimating the model, we removed influential observations with Studentized residuals greater than three or Cook's D-statistic greater than one (Belsley, Kuh, & Welsch [1980]). We performed White's (1980) test for heteroscedasticity and found that heteroscedasticity was not a problem for our models. We also applied the Belsley, Kuh, and Welsch (1980) diagnostic to test for multicollinearity. All of the condition indexes were less than two, well below the suggested cutoff.

We present results of estimating eq. (3) in Panel A of Table 2. The estimated coefficients on the SG&A signal when sales increased (β_1) are significantly negative for 6 of the 20 periods studied and significantly positive for 2 periods. The mean coefficient of -0.047 is significantly negative (Fama-MacBeth t -statistic = -1.97). These results are broadly consistent with the customary interpretation of fundamental analysis that more than proportionate increases in SG&A costs are unfavorable signals for future performance. But, the estimated coefficients on the SG&A signal when sales decreased (β_2) are significantly positive in 12 of 20 periods studied and significantly negative in only 1 period. The mean coefficient of 0.125 is significantly positive (Fama-MacBeth t -statistic = 3.38). These results are not consistent with the customary interpretation of the SG&A signal. In fact, it appears that the cost behavior interpretation that an increase in the SG&A cost ratio provides favorable information about future earnings dominates the customary proportional costs interpretation. The lack of statistical significance of the SG&A signal reported by Abarbanell and Bushee (1997) may be attributable to the confounding effects of the two interpretations when no distinction is made between revenue-increasing and revenue-decreasing periods.

With regard to the estimated coefficients on other variables, the negative mean coefficient of -0.198 (t -statistic = -8.84) on the current change in earnings is consistent with mean reversion in the time series of earnings. The mean estimated

coefficients on other fundamental signals—including the inventory signal (*INV*), the capital expenditure signal (*CAPX*), and the effective tax rate signal (*ETR*)—are negative, as expected. And the estimated coefficients on change in leverage (*LEV*) and change in sales growth (*GROWTH*) are positively related to one-year-ahead earnings.

4.1 Portfolio Analysis

If investors misinterpreted the SG&A signal during periods in which sales declined, then a correction in stock prices should have occurred later when other information about future earnings became available. To investigate this possibility, we formed portfolios based on firm-year observations with positive SG&A signals when sales decreased. We calculated 12-month abnormal buy-and-hold portfolio returns adjusted for size and book-to-market cumulated from the beginning of the fourth month after the fiscal year-end in which the signal was observed (Fama & French [1992]). We followed Fama and French (1992, 1993) and Barber and Lyon (1997) to calculate size and book-to-market adjusted returns for each firm-year observation. Size for year t is the market value of equity at the end of June of year t . The book-to-market value for year t is the book value of equity at the end of the fiscal year ending in $t-1$ divided by the market value of equity at the end of the calendar year ending in year $t-1$.

We computed mean portfolio returns for each year in our sample and then calculated overall mean returns and t -statistics based on the distribution of the 20 yearly portfolio mean returns (Abarbanell & Bushee 1998). We report these values in Panel B of Table 2. The highest positive SG&A cost ratio portfolio (for sales-decreasing firm-year observations) earned a significantly positive mean return of 8.9 percent (t -statistic of 4.12). The lowest positive SG&A cost ratio portfolio earned an insignificantly positive return of 0.3 percent. This evidence is consistent with the possibility that investors mispriced the high SG&A cost ratio firms in years when revenue declined.

4.2 Alternative Model of Expected SG&A Costs

The analysis we presented in Table 2 uses an SG&A signal based on expectations formed that are consistent with the proportional costs assumption made in fundamental analysis. Based on this model, we found that a lower-than-expected reduction in SG&A costs when revenue declined was favorably associated with future earnings.

In this part, we present an alternative model of SG&A costs (eq. 4) that incorporates fixed and sticky cost behavior.

$$\frac{SG\&A_{i,t}}{SALES_{i,t-1}} = a_1 \frac{1}{SALES_{i,t-1}} + b_1 \frac{SALES_{i,t}}{SALES_{i,t-1}} + b_2 \frac{SALES_{i,t}}{SALES_{i,t-1}} * Sales_decrease_dummy_{i,t} + u_{i,t} \quad (4)$$

Underlying this model is the notion that SG&A costs in a period are determined by a fixed component and variable component so that $SG\&A_t = \text{fixed } SG\&A + \text{unit variable } SG\&A * SALES_t$. To accommodate sticky costs, the *unit variable* $SG\&A * SALES_t$ term is interacted with a dummy variable representing revenue-decreasing periods. For estimation purposes, all terms are divided by $SALES_{t-1}$. In this alternative model, the coefficient a_1 captures the effects of fixed cost behavior, the coefficient b_1 captures the unit (per dollar of sales) variable cost behavior, and the coefficient b_2 captures the effects of sticky cost behavior on SG&A costs in period t . If predicted values from this alternative model that incorporates fixed and sticky SG&A cost behavior are used to form expectations of SG&A costs in period t , then the alternative SG&A signal is the residual $u_{i,t}$. Having taken out the fixed cost and sticky cost effects, we do not expect any correlation between this new signal and future earnings.

We estimate this SG&A costs model (eq. 4) separately for each year and use the Fama-French industry combination to mitigate an autocorrelation problem that may occur in a pooled estimation (DeFond & Jiambalvo [1994]) and increase the power of our test of the alternative SG&A signal in fundamental analysis. The average values of the estimated coefficients a_1 and b_2 are both significantly positive, which is consistent with positive fixed costs and sticky costs positively affecting the level of SG&A costs in relation to sales in periods when revenue declines. The model is apparently well specified with an average R -squared value of 81.2 percent across the 216 industry-year estimations.

We report the results of estimating eq. (3) with the alternative SG&A signal in Panel A of Table 3. As expected, we find that there is no consistently positive or negative association between one-year-ahead earnings changes and the new SG&A signal for observations when revenue declined. The estimated coefficient (β_2) is significantly positive in one year and significantly negative in another year and the mean coefficient estimate of 0.020 is not significantly different from zero (Fama-MacBeth t -statistic is equal to 1.05). For observations when revenue increased, the estimated coefficient (β_1) is significantly positive in two years and not significantly negative in any years. The mean coefficient estimate of 0.006 is not significantly different from zero (Fama-MacBeth t -statistic = 0.77). In Panel B of Table 3, we provide results of replicating our portfolio analysis using the alternative SG&A signal. None of the portfolio returns are statistically different from zero. These results indicate that, when the fixed and sticky cost behavior elements are removed from the SG&A signal, the remaining portion is simply white noise that has no implications for future performance.

5. Robustness

The analysis presented in Table 2 is performed on a year-by-year basis to avoid any biases caused by time-period clustering. In Table 4, we present results when the analysis is performed on an industry-by-industry basis pooled over

TABLE 3

Analysis of SG&A Signal based on Alternative Model

SG&A signals are residuals obtained from the following 216 regressions for Fama and French's 11 industry-year combinations. The median coefficient estimates for a_1 , b_1 , and b_2 are 0.528, 0.177, and 0.029, respectively. The aggregate Z-statistics for a_1 , b_1 , and b_2 are 125.45, 371.72, and 8.96, respectively. The mean adjusted R^2 for the 216 industry-year regressions is 81.2 percent.

$$\frac{SG\&A_{i,t}}{SALES_{i,t-1}} = a_1 \frac{1}{SALES_{i,t-1}} + b_1 \frac{SALES_{i,t}}{SALES_{i,t-1}} + b_2 \frac{SALES_{i,t}}{SALES_{i,t-1}} * Sales_decrease_dummy_{i,t} + u_{i,t}$$

Panel A: One-year-ahead earnings changes
(Mean coefficient estimates of year-by-year regressions from 1983 to 2002)

$$CEPS1_{i,t} = \alpha + \beta_1 SG\&A^+_{i,t} + \beta_2 SG\&A^-_{i,t} + \delta CHGEPSt_{i,t} + \sum_{j=1}^{10} \gamma_j \text{Other Signals}_{i,t} + \epsilon_{i,t}$$

Coefficients	Other Signals													
	INT	SG&A ⁺	SG&A ⁻	CHGEPSt	INV	AR	CAPX	GM	ETR	EQ	AQ	LF	LEV	GROWTH
Predicted sign	?	?	+	-	-	-	-	-	-	-	-	-	-	?
Mean across years	0.001	0.006	0.020	-0.194	-0.326	-0.032	-0.226	0.038	-0.080	0.001	-0.004	0.001	0.020	0.012
(Fama-MacBeth t-statistic)	(0.24)	(0.77)	(1.05)	(-9.12)	(-6.58)	(-1.46)	(-2.91)	(1.04)	(-2.81)	(0.22)	(-1.40)	(0.18)	(5.96)	(3.74)
Years positive (Significant)	12	10	12	1	1	6	4	11	5	13	7	12	18	17
Years negative (Significant)	8	10	8	19	19	14	16	9	15	7	13	8	2	3
Mean adjusted R ²	(1)	(0)	(1)	(19)	(12)	(0)	(1)	(2)	(10)	(3)	(2)	(2)	(0)	(0)
			7.7%											

TABLE 3 (continued)

Panel B: Returns on portfolios formed on alternative SG&A signal when sales decrease

SG&A portfolio rank	Mean value of SG&A signal of year t	Mean value of size and book-to-market adjusted returns of year $t + 1$	T -value of returns
Lowest	0.016	1.4%	0.87
2	0.055	1.5%	0.81
3	0.114	1.8%	0.75
Highest	0.248	1.3%	0.44

Note: Table 3 shows valuation implications of SG&A signal obtained from an alternative model that attempts to eliminate the cost fixity and cost stickiness effect. Aggregate Z -statistics are computed from t -statistics in the industry-year regressions, assuming cross-sectional independence among industries

(Patell [1976]; DeFond & Jimbalvo [1994]; Dechow, Huson, & Sloan [1994]),
$$Z = \frac{1}{\sqrt{N}} \sum_{j=1}^N \frac{t_j}{\sqrt{k_j/(k_j-2)}}$$

where t_j is the t -statistic for industry-year portfolio j , k_j is the degree of freedom in regression for industry-year portfolio j , and N is the number of industry-year portfolios in sample. The Z -statistic is distributed asymptotically as standard normal. Variable definitions are the same as in Table 2.

time. We follow the Fama and French (1997) 12-industry definition and delete the financial services industry. We include asset intensity and employee intensity as additional variables to alleviate potential heteroscedasticity and autocorrelation within industries. The coefficient on the SG&A signal (based on the proportional cost model) for observations when sales declined is significantly positive for 8 of the 11 industries and is significantly negative for none of the industries. The mean coefficient across industries of 0.281 is significantly positive (aggregate Z -statistic is 7.74).⁹ The coefficient on the SG&A signal when sales increased is significantly negative for 5 of the 11 industries and significantly positive for 1 industry. The mean coefficient of -0.094 is significantly negative (aggregate Z -statistic is -3.05). The results of the industry-by-industry analysis provide strong support for a positive interpretation of an increase in the SG&A cost ratio in revenue-decreasing periods, which is consistent with the results of the year-by-year analysis.

5.1 Magnitude of the SG&A Cost Ratio

Given that fixity and stickiness increase SG&A costs relative to sales in revenue-decreasing years, the influence of fixed and sticky costs on changes in a

9. We report Fama-MacBeth t -statistics for year-by-year cross-sectional regressions because the Fama-MacBeth t -statistic does not assume cross-sectional independence of observations over time (Abarbanell & Bushee [1997]; Lev & Thiagarajan [1993]). We report aggregate Z -statistics for the industry-by-industry regressions following Defond and Jiambalvo (1994).

TABLE 4
Analysis of SG&A Signal Based on Proportional Cost Model by Industry
(Coefficient estimates of industry pooled regression from 1983 to 2002)

Panel A: One-year-ahead earnings changes
(Mean and median coefficient estimates of industry-by-industry regressions from 1983 to 2002)

$$CEPS1_{i,t} = \alpha + \beta_1 SG\&A^+_{i,t} + \beta_2 SG\&A^-_{i,t} + \delta CHGEPSt_{i,t} + \sum_{j=1}^{12} \gamma_j \text{Other Signals}_{j,t} + \epsilon_{i,t}$$

Coefficients	Other Signals												Asset Intensity	Employee Intensity			
	INT	SG&A ⁺	SG&A ⁻	CHGEPSt	INV	AR	CAPX	GM	ETR	EQ	AQ	LF			LEV	GROWTH	
Predicted sign	?	?	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	0.004	-0.094	0.281	-0.190	-0.343	-0.104	0.076	0.032	-0.064	0.003	0.003	0.003	0.013	0.014	0.014	0.007	1.140
Median	0.006	-0.075	0.222	-0.158	-0.373	-0.098	-0.324	-0.016	-0.087	0.003	0.000	0.001	0.018	0.021	0.021	-0.005	0.278
Industries positive	9	2	11	0	3	4	2	4	2	7	5	6	8	8	8	2	10
(Significant)	(2)	(1)	(8)	(0)	(1)	(0)	(1)	(3)	(1)	(1)	(2)	(2)	(6)	(6)	(6)	(0)	(4)
Industries negative	2	9	0	11	8	7	9	7	9	4	6	5	3	2	2	9	1
(Significant)	(1)	(5)	(0)	(11)	(7)	(7)	(2)	(4)	(6)	(0)	(1)	(0)	(1)	(1)	(1)	(7)	(0)
(Aggregate Z-statistic)	(0.95)	(-3.05)	(7.74)	(-21.76)	(-7.39)	(-3.09)	(-1.17)	(-1.15)	(-4.86)	(0.39)	(0.62)	(0.61)	(7.51)	(7.51)	(7.51)	(-5.01)	(2.86)
Mean adjusted R ²	9.4%																

Note: Table 4 shows the descriptive statistics of coefficient estimates from 11 industry-specific regressions with at least 30 observations for each industry. Industries definitions are the same as in Table 1.

Aggregate Z-statistics are computed from *t*-statistics in the industry regressions, assuming cross-sectional independence among industries (Patell [1976]; Dechow, Huxon, & Sloan [1994]; DeFond & Jimbalvo [1994]), $Z = \frac{1}{\sqrt{N}} \sum_{j=1}^N \frac{t_j}{\sqrt{k_j/(k_j-2)}}$, where *t_j* is the *t*-statistic for industry *j*, *k_j* is the degree of freedom in regression for industry *j*, and *N* is the number of industries in the sample. The Z-statistic is distributed asymptotically as standard normal.

$$\text{Asset Intensity}_{i,t} = \frac{\text{Asset}_{i,t}}{\text{SALES}_{i,t}}, \quad \text{Employee Intensity}_{i,t} = \frac{\text{Number of Employees}_{i,t}}{\text{SALES}_{i,t}}$$

TABLE 5
Analysis of SG&A Signal Based on Proportional Cost Model Partitioned on Magnitude of SG&A/SALES, Ratio

Panel A: One-year-ahead earnings changes
(Mean coefficient estimates of year-by-year regressions from 1983 to 2002)

$$CEPS1_{i,t} = \alpha + \beta_1 SG\&A^+_{i,t} + \beta_{1H} (SG\&A^+_{i,t}) + \beta_2 SG\&A^-_{i,t} + \beta_{2H} (SG\&A^-_{i,t}) + \delta CHGEPS_{i,t} + \sum_{j=1}^{10} \gamma_j \text{Other Signals}_{j,t} + \varepsilon_{i,t}$$

Coefficients	Other Signals															
	INT	SG&A ⁺	SG&A ⁺ _H	SG&A ⁻	SG&A ⁻ _H	CHGEPS	INV	AR	CAPX	GM	ETR	EQ	AQ	LF	LEV	GROWTH
Predicted sign	?	?	?	?	+	-	-	-	-	-	-	-	-	-	-	-
Mean across years (Fama-MacBeth <i>t</i> -statistic)	0.002 (0.30)	0.039 (0.90)	-0.128 (-3.16)	-0.222 (-1.49)	0.367 (2.25)	-0.198 (-8.83)	-0.256 (-6.49)	-0.024 (-1.20)	-0.159 (-2.01)	-0.006 (-0.18)	-0.081 (-2.92)	-0.001 (-0.23)	-0.003 (-1.16)	-0.004 (-0.65)	0.018 (6.08)	0.012 (3.33)
Years positive (Significant)	10 (5)	12 (6)	6 (1)	10 (2)	15 (9)	1 (1)	1 (0)	8 (2)	5 (0)	11 (5)	4 (3)	11 (2)	10 (1)	9 (5)	18 (14)	15 (9)
Years negative (Significant)	10 (3)	8 (3)	14 (9)	10 (8)	5 (3)	19 (19)	19 (13)	12 (5)	15 (2)	9 (5)	16 (12)	9 (3)	10 (4)	11 (5)	2 (0)	5 (1)
Mean adjusted R ²																

TABLE 5 (continued)

Panel B: Returns on portfolios formed on SG&A signal when sales decrease

$\frac{SG\&A_{i,t}}{SALES_{i,t}}$ Group	SG&A portfolio rank	Mean value of SG&A signal of year t	Mean value of size and book-to-market adjusted returns of year t + 1	T-value of returns
Low	Lowest	0.004	-1.9%	-1.79
	2	0.013	-0.1%	-0.08
	3	0.030	1.0%	0.65
	Highest	0.102	0.1%	0.03
High	Lowest	0.007	1.3%	1.30
	2	0.023	3.5%	2.52
	3	0.056	5.9%	3.04
	Highest	0.186	7.1%	3.92

Note: Table 5 shows value implications of SG&A signal partitioned based on the magnitude of $\frac{SG\&A_{i,t}}{SALES_{i,t}}$.

Panel A shows coefficient estimates from year-by-year regressions of partitioned SG&A signal interacted with relative magnitude of $\frac{SG\&A_{i,t}}{SALES_{i,t}}$.

$SG\&A_H^+ = SG\&A^+$ if $\frac{SG\&A_{i,t}}{SALES_{i,t}}$ for year t lies in the upper half of $\frac{SG\&A_{i,t}}{SALES_{i,t}}$ distribution of firm i, and 0 otherwise.

$SG\&A_H^- = SG\&A^-$ if $\frac{SG\&A_{i,t}}{SALES_{i,t}}$ for year t lies in the upper half of $\frac{SG\&A_{i,t}}{SALES_{i,t}}$ distribution of firm i, and 0 otherwise.

Panel B shows cumulative one-year-ahead size and book-to-market adjusted returns for portfolios formed annually based on $\frac{SG\&A_{i,t}}{SALES_{i,t}}$ for low and high

$\frac{SG\&A_{i,t}}{SALES_{i,t}}$ groups, where low (high) $\frac{SG\&A_{i,t}}{SALES_{i,t}}$ group contains firm-year observations lie in the bottom

(top) half of $\frac{SG\&A_{i,t}}{SALES_{i,t}}$ distribution for each individual firm.

firm's SG&A cost ratio is likely to be greater during periods in which the observed SG&A cost ratio is higher. We evaluate whether the association between future earnings and the SG&A signal (under the proportional cost model) is more pronounced when the magnitude of the SG&A signal is higher. We assign firm-year observations into two groups based on the time-series distribution of the SG&A cost to sales ratio for each firm. We put firm-year observations that lie in the top (bottom) half of the time-series distribution of SG&A to sales ratio for an individual firm in the high (low) group. We set the high SG&A to sales dummy to one if a firm-year belongs to the high SG&A to sales group, and zero otherwise. We estimate the following model that includes interactions

between the high SG&A dummy and the SG&A signals for revenue-increasing and revenue-decreasing periods.

$$CEPS1 = \alpha + \beta_1 SG\&A_{i,t}^+ + \beta_{1H} (SG\&A_H^+)_{i,t} + \beta_2 SG\&A_{i,t}^- + \beta_{2H} (SG\&A_H^-)_{i,t} + \delta CHGEP S_{i,t} + \sum_{j=1}^{12} \gamma_{ij} \text{Other Signals}_{ij} + \varepsilon_{i,t} \quad (5)$$

where $SG\&A_H^+$ is the interaction term of the SG&A signal with the high SG&A to sales dummy when sales increase and $SG\&A_H^-$ is the interaction term of the SG&A signal with the high SG&A to sales dummy when sales decrease. We estimate this model (eq. 5) on a year-by-year basis as we did in Table 2 and present the results in Table 5.

Consistent with the notion that fixity and stickiness would be more salient when the SG&A signal is higher, we find that the mean value of the estimated coefficients for the interaction term of the SG&A signal with the high SG&A to sales dummy is significantly positive (mean coefficient is 0.367 and Fama-MacBeth t -statistic is 2.25) for the sales-decreasing group, whereas the mean value of the estimated coefficients for the low SG&A cost ratio is not significantly positive (mean coefficient is -0.222 and t -statistic is -1.49) for this group.¹⁰ Conversely, we find that the mean value of the estimated coefficients on the interaction term of the SG&A signal and high SG&A to sales ratio dummy is significantly negative (mean coefficient is -0.128 and Fama-MacBeth t -statistic is -3.16) for the sales-increasing group, while the mean value of the estimated coefficients for the low SG&A cost ratio is not significantly different from zero (mean coefficient is 0.039 and t -statistic is 0.90) for this group. These results indicate that both the positive association between future earnings and the SG&A cost ratio when sales decrease and the negative association between future earnings and the SG&A cost ratio when sales increase are stronger for those observations that have a relatively higher SG&A cost ratio.

In Panel B of Table 5, we report the abnormal returns that would have been earned for portfolios formed based on the positive SG&A signal when sales declined for the high and low SG&A groups. Consistent with the future earnings results in Panel A, the returns on the high SG&A group are significantly positive (both statistically and economically) while the returns earned on the low SG&A group are not significantly different from zero. For the high SG&A group, the one-year-ahead size and book-to-market adjusted return for the highest SG&A signal portfolio is 7.1 percent with a t -statistic of 3.92. For the low SG&A group, the one-year-ahead size and book-to-market adjusted return for the highest

10. We estimated the sticky costs model specified in Anderson, Banker, and Janakiraman (2003) with interaction terms for high and low SG&A firm-year observations. The coefficient on the sticky costs term when interacted with the high SG&A dummy was significantly negative in all 20 periods, but it was not significantly negative when interacted with the low SG&A dummy, indicating that stickiness is more salient for high SG&A cost ratio observations.

SG&A portfolio is 0.1 percent with a *t*-statistic of 0.03. These results indicate that high SG&A signals provide positive information about future earnings and returns in periods when revenue declines.

5.2 Discretionary Accruals

The portfolio returns presented in Table 2 were adjusted for size and book-to-market risk factors to control for the effects of size and the value-glamour anomaly described in previous literature (Chan & Chen [1991]; Fama & French [1992, 1993]). Because SG&A costs may be directly affected by discretionary accruals, we test whether the positive returns earned on the high SG&A cost ratio portfolio in revenue-decreasing years were sustained after controlling for the effects of the accrual anomaly observed in the accounting literature (Sloan [1996]; Xie [2001]). Under the accrual anomaly, the market apparently fails to see through income-increasing discretionary accruals so that positive abnormal returns may be earned by investing long in stocks with low discretionary accruals and short in stocks with high discretionary accruals. Because SG&A costs may increase with income-decreasing discretionary accruals, it is possible that the observed abnormal returns to the high SG&A portfolios are associated with discretionary accruals.

Following Xie (2001), we estimate discretionary accruals using the cross-sectional Jones (1991) model (see DeFond & Jiambalvo [1994]). We interact the SG&A signal (under the random walk assumption) with discretionary accruals in an unconditional test and a conditional test. We focus on the sample reported on in Panel B of Table 2 in which the SG&A signal is positive in revenue-decreasing periods. Based on the yearly distribution of discretionary accruals and SG&A signals, we partition the sample into four groups—(1) low discretionary accrual and low SG&A signal, (2) low discretionary accrual and high SG&A signal, (3) high discretionary accrual and low SG&A signal, and (4) high discretionary accrual and high SG&A signal (Desai, Rajgopal, & Venkatachalam [2004]).

In Panel A of Table 6, we document that the hedge return based on the SG&A signal exists even after controlling for the level of discretionary accruals. Specifically, within the low discretionary accrual group, the hedge return earned from the SG&A strategy is 5.9 percent and statistically significant. Similarly, within the high discretionary accrual group, the hedge return from the SG&A strategy is 5.4 percent and statistically significant.

In Panel B of Table 6, we present hedge returns from the SG&A strategy after randomizing over discretionary accruals. We first partition the sample into low and high discretionary accrual groups based on the yearly distribution of discretionary accruals. Within each discretionary accrual group, we then classify observations into quartiles based on the magnitude of the SG&A signal. Finally, we combine the same SG&A quartiles from the discretionary accrual groups and report the abnormal returns for each of the combined quartile groups. After our randomization, the mean values of discretionary accruals for all combined

TABLE 6
Returns on Portfolios Formed Based on SG&A Signal Controlling
for Level of Discretionary Accruals

Panel A: One-year-ahead returns on portfolios formed based on discretionary accruals and SG&A signal value when sales decrease

		Discretionary accruals portfolio		Discretionary accruals portfolio hedge return (low-high)
		Low	High	
SG&A portfolio	Low	3.4%**	0.6%	2.8%*
	High	9.3%**	6.0%**	3.3%**
	SG&A portfolio hedge return (high-low)	5.9%**	5.4%**	

Panel B: One-year-ahead returns on portfolios formed based on SG&A signal value when sales decrease after randomizing on discretionary accruals

SG&A portfolio rank	Mean value of SG&A signal of year t	Mean value of discretionary accruals of year t	Mean value of size and book-to-market adjusted returns of year $t + 1$	T -value of returns
Lowest	0.005	0.000	1.5%	1.19
2	0.016	0.000	2.5%	1.96
3	0.036	-0.004	5.5%	1.65
Highest	0.127	-0.008	10.3%	2.46

Note: Table 6 shows portfolios formed based on the SG&A signal when sales decrease after controlling for the level of discretionary accruals. In Panel A, low and high portfolios represent stocks that belong to the groups in the bottom or upper half based on independent sort of the SG&A signal and the discretionary accruals signal. The mean size and book-to-market adjusted returns for firms that belong to each group are reported. In Panel B, firm-year observations are first sorted into low and high discretionary accruals groups. Within the low and high discretionary accruals groups, firm-year observations are then grouped into quartiles based on their SG&A signal. Finally, we form portfolios by combining firm-year observations that fall into the same quartiles for low and high discretionary accruals groups and report the mean size and book-to-market adjusted returns for each quartile.

quartile groups are close to zero. The abnormal return earned on the highest quartile group is 10.3 percent and statistically significant (Fama-MacBeth t -statistic = 2.46), while the abnormal return earned on the lowest quartile group is 1.5 percent and statistically insignificant (Fama-MacBeth t -statistic = 1.19). We conclude that the abnormal returns that would have been earned by following the SG&A strategy were significantly positive even after controlling for discretionary accruals.

6. Conclusion and Implications

If all costs moved proportionately with sales revenue, earnings would be a sufficient measure with respect to the information in components of earnings. Fundamental analysis of components of earnings is only meaningful if those components do not move in lockstep with earnings. The traditional application of fundamental analysis has recognized that SG&A costs do not necessarily move proportionately with revenue and has sought to obtain information by evaluating differences between the observed SG&A costs and the SG&A costs that would have been realized under a proportional cost assumption. This traditional application has focused on the SG&A cost ratio as an efficiency measure and has interpreted increases in the observed SG&A cost ratio in a year relative to the ratio in the previous year as evidence of managers' lack of control of SG&A costs.

Although traditional analysis has been concerned with the change in the SG&A cost ratio, we consider a second dimension of the relationship between SG&A costs and earnings—the influence of cost behavior. Specifically, we ask how the influence of cost behavior would affect interpretation of a change in the SG&A cost ratio and whether this interpretation would differ with the direction of the change in sales revenue. We document that SG&A costs do change differently for revenue-increasing and revenue-decreasing periods and demonstrate that an increase in the SG&A cost ratio when revenue declines is positively associated with future earnings, whereas an increase in the SG&A cost ratio when revenue increases is negatively associated with future earnings. The positive association between future earnings and an increase in the SG&A cost ratio during periods in which revenue declines is consistent with our hypothesis that fixed and sticky costs cause the SG&A cost ratio to increase during these periods. These results are robust over time and across industries. We also find that the positive association between future earnings and SG&A costs is higher during periods in which the influence of fixed and sticky costs is likely to be greater (when the ratio of SG&A costs is higher) and is not distorted by discretionary accruals.

Previous research had documented a significantly negative association between excess returns and changes in the SG&A cost ratio, which is consistent with the fundamental analysis interpretation of changes in the SG&A cost ratio as evidence of cost control (Lev & Thiagarajan [1993]). But this interpretation was not strongly supported by the analysis of the association between future earnings and changes in the SG&A cost ratio (Abarbanell & Bushee [1997]). Our analysis reconciles these findings by demonstrating that positive abnormal returns may have been earned by investing in portfolios formed in revenue-decreasing years that were long in stocks of firms that experienced high increases in the SG&A cost ratio and short in stocks of firms that experienced low increases in the SG&A cost ratio. These results are consistent with the market initially interpreting increases in the SG&A cost ratio when revenue declined as evidence of poor cost control and a subsequent correction in prices when future

earnings were realized. This indicates that the market did not appropriately consider the influence of cost behavior on the SG&A cost ratio.

We estimate an alternative model of SG&A costs that considers the influence of fixed and sticky costs on SG&A costs. When expected SG&A costs are estimated using this alternative model, we find that there is no significant relationship between future earnings and the SG&A signal formed after taking out the impact of fixed and sticky cost behavior. Also, portfolios formed based on this alternative signal in revenue-decreasing periods would not have earned abnormal returns. This evidence indicates that differences between actual and expected SG&A costs, when the effects of cost fixity and stickiness are removed, are simply white noise that are not useful for predicting future earnings. Although this may be an unsatisfying result in terms of fundamental analysis, it does provide encouraging evidence that inefficient use of SG&A resources is not a persistent problem at publicly traded companies in our sample.

REFERENCES

- Abarbanell, J., and B. Bushee. 1997. "Fundamental Analysis, Future Earnings, and Stock Prices." *Journal of Accounting Research* 35 (Spring): 1–24.
- Abarbanell, J., and B. Bushee. 1998. "Abnormal Returns to a Fundamental Analysis Strategy." *The Accounting Review* 73 (January): 19–45.
- Anderson, M., R. Banker, and S. Janakiraman. 2003. "Are Selling, General and Administrative Costs 'Sticky'?" *Journal of Accounting Research* 41 (March): 47–63.
- Balakrishnan, R., M. Petersen, and N. Soderstrom. 2004. "Does Capacity Utilization Affect the 'Stickiness' of Cost?" *Journal of Accounting, Auditing and Finance* 19 (Summer): 283–299.
- Banker, R., and L. Chen. 2006. "Predicting Earnings Using a Model Based on Cost Variability and Cost Stickiness." *The Accounting Review* 81 (March): 285–307.
- Banker, R., and J. Hughes. 1994. "Product Costing and Pricing." *The Accounting Review* 69 (July): 479–494.
- Barber, B., and J. Lyon. 1997. "Detecting Long-run Abnormal Stock Returns: The Empirical Power and Specification of Test Statistics." *Journal of Financial Economics* 43 (March): 341–372.
- Belsley, D., E. Kuh, and R. Welsch. 1980. *Regression Diagnostics: Identifying Influential Data and Collinearity*. New York: Wiley.
- Bernard, V., and J. Noel. 1991. "Do Inventory Disclosures Predict Sales and Earnings?" *Journal of Accounting, Auditing and Finance* 6 (Spring): 145–179.
- Chan, K., and N. Chen. 1991. "Structural and Return Characteristics of Small and Large Firms." *Journal of Finance* 46 (September): 1467–1484.
- Chen, E., and W. Dixon. 1972. "Estimates of Parameters of a Censored Regression Sample." *Journal of the American Statistical Association* 67 (September): 664–671.
- Cooper, R., and R. Kaplan. 1992. "Activity Based Cost Systems: Measuring the Cost of Resource Usage." *Accounting Horizons* 6 (September): 1–13.
- Cooper, R., and R. Kaplan. 1998. *The Design of Cost Management Systems: Text, Cases and Readings*. Upper Saddle River, NJ: Prentice Hall.
- Dechow, P., M. Huson, and R. Sloan. 1994. "The Effect of Restructuring Charges on Executives' Cash Compensation." *The Accounting Review* 69 (January): 138–156.
- Defond, M., and J. Jiambalvo. 1994. "Debt Covenant Violation and Manipulation of Accruals: Accounting Choices in Troubled Companies." *Journal of Accounting and Economics* 17 (January): 145–176.
- Desai, H., S. Rajgopal, and M. Venkatachalam. 2004. "Value-Glamour and Accruals Mispricing: One Anomaly or Two?" *The Accounting Review* 79 (April): 355–385.
- Fama, E., and K. French. 1992. "The Cross-section of Expected Stock Returns." *Journal of Finance* 47 (June): 427–465.

- Fama, E., and K. French. 1993. "Common Risk Factors in the Returns on Stocks and Bonds." *Journal of Financial Economics* 33 (February): 3–56.
- Fama, E., and K. French. 1997. "Industry Cost of Equity." *Journal of Financial Economics* 43 (February): 153–193.
- Fama, E., and J. MacBeth. 1973. "Risk, Return, and Equilibrium: Empirical Tests." *Journal of Political Economy* 81 (May/June): 607–636.
- Fairfield, P., R. Sweeney, and T. Yohn. 1996. "Accounting Classification and the Predictive Content of Earnings." *The Accounting Review* 71 (July): 337–355.
- Horngrén, C., G. Sundem, and W. Stratton. 1996. *Introduction to Management Accounting*. Upper Saddle River NJ: Prentice-Hall.
- Jones, J. 1991. "Earnings Management During Import Relief Investigations." *Journal of Accounting Research* 29 (Autumn): 193–228.
- Lev, B., and S. Thiagarajan. 1993. "Fundamental Information Analysis." *Journal of Accounting Research* 31 (Autumn): 190–215.
- Mintz, S. 1994. "Spotlight on SG&A." *CFO*: 10–12.
- Palepu, K., P. Healy, and V. Bernard. 2000. *Business Analysis and Valuation Using Financial Statements*. Mason, OH: South-Western.
- Patell, J. 1976. "Corporate Forecasts of Earnings Per Share and Stock Price Behavior: Empirical Tests." *Journal of Accounting Research* 14 (Autumn): 246–276.
- Sloan, R. 1996. "Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings." *The Accounting Review* 71 (July): 289–316.
- Subramanyam, K. 1996. "The Pricing of Discretionary Accruals." *Journal of Accounting and Economics* 22 (August–December): 249–281.
- White, H. 1980. "A Heteroskedasticity-consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity." *Econometrica* 48 (May): 817–838.
- Wild, J., K. Subramanyan, and R. Halsey. 2003. *Financial Statement Analysis*. New York: McGraw-Hill Irwin.
- Xie, H. 2001. "The Mispricing of Abnormal Accruals." *The Accounting Review* 76 (July): 357–373.