Do Managers Grant Sales Price Reductions to Avoid Losses and Declines in Earnings and Sales?

Scott B. Jackson*
University of Texas at San Antonio

William E. Wilcox
Bradley University

The financial press is replete with examples of how companies purportedly manage earnings to meet short-tern financial reporting targets. In this study, we investigate whether managers grant sales price reductions in the fourth quarter to accelerate customer purchases and, as a result, avoid losses and declines in earnings and sales. While granting sales price reductions may allow firms to meet short-term financial reporting targets, it is arguably harmful to them in the long run. Consistent with expectations, the results of univariate and multivariate tests indicate that firm managers grant sales price reductions in the fourth quarter to meet annual financial reporting targets.

Introduction and Motivation

Empirical research suggests that managers sometimes make operating decisions to meet short-term financial reporting objectives, even though those decisions may be detrimental to the firm in the long run. For example, the results of Baber *et al.* (1991) and Bushee (1998) indicate that managers may cut investments in research and development (R&D) to reverse an earnings decline. Similarly, anecdotal evidence suggests that concern about short-term earnings may motivate managers to forego investments that have long-term payoffs such as advertising, employee training, and research and development (Cassidy, 1989; Jacobs, 1991; Laverty, 1996; Murray, 1988; Porter, 1992; Ritter, 1992). This study focuses on a situation in which managers can make an operating decision that results in the firm achieving short-term financial reporting objectives, but which may be detrimental to the firm in the long run. Specifically, we investigate whether managers grant sales price reductions

* The authors thank Cheryl Fulkerson, Jim Groff, Marshall Pitman, and Robin Radtke for helpful comments.

0747-5535/00/1500/0003/$2.00

to induce customer purchases and, as a result, avoid losses and declines in earnings and sales.[1]

This issue is of considerable importance because sales price reductions should be used in a manner consistent with the firm's pricing strategy and strategic objectives (Green, 1989; Marn and Rosiello, 1992; Smith and Nagle, 1994). To the extent that sales price reductions are used to achieve financial reporting objectives, several negative consequences may result. First, customers may develop buying habits in which they time purchases to coincide with the end of financial reporting periods to enhance their negotiating power and obtain lower prices (Ip, 1997). Second, customers may expect sales price reductions on all subsequent purchases. Third, customers who do not currently receive sales price reductions may become aware of reductions granted to their competitors and require equivalent treatment.

While the practice of granting sales price reductions to induce customer purchases and meet financial reporting targets is not a technical violation of generally accepted accounting principles (GAAP), it is nonetheless questionable. Certain industries have been roundly criticized for using sales price reductions to accelerate sales, and critics allege that this practice materially distorts the operating results of firms (Churback, 1989; Loomis, 1989).[2] Bruns and Merchant (1990) and Beaver (1995) suggest that operating manipulations are ethically questionable, particularly those relating to sales price reductions, because the quality of financial statement information is eroded and the firm is potentially damaged.

The empirical tests employed in this study rely on a simple observation about the effect of sales price reductions on the gross profit percent. If firms grant sales price reductions in the fourth quarter to meet annual earnings and sales targets, then the gross profit percent in that quarter should decline relative to benchmarks for what the gross profit percent would have been absent sales price reductions. Drawing upon this observation, we construct portfolios of firms that plausibly avoided losses and declines in earnings and sales by granting sales price reductions to customers in the fourth quarter. (These are the test portfolios.) We also construct portfolios of firms that have no obvious financial reporting objectives, which might motivate managers of those firms to grant sales price reductions in the fourth quarter. (These are the companion portfolios.) The companion portfolios serve as benchmarks against which the test portfolios are compared.

To test the hypotheses that managers grant sales price reductions to avoid losses and declines in earnings and sales, we conduct univariate tests and estimate cross-sectional regressions using firms in the test and companion portfolios. The univariate

[1] The phrase *sales price reductions* refers to reductions in the price of a company's products or services. These price reductions are unrelated to trade, cash, and sales discounts that are typically granted to customers in the ordinary course of business.

[2] The practice of offering sales price reductions to induce customer purchases is sometimes referred to as *trade loading* and *channel stuffing*.

tests reveal that firms in the test portfolios generally report lower gross profit percentages in the fourth quarter than they do in both the prior quarter and the corresponding quarter in the prior year. In addition, the decline in gross profit percent in the fourth quarter is larger for firms in the test portfolios than it is for firms in the companion portfolios.

Because changes in gross profit percent may be influenced by factors other than earnings management, we also estimate cross-sectional regressions that control for such factors. Regression results reveal that firms in the test portfolios experience significant declines in their fourth quarter gross profit percents relative to firms in the companion portfolios. Further, the results of logistic regressions reveal that firms in the test portfolios are significantly more likely to cut their gross profit percents in the fourth quarter than are firms in the companion portfolios. Collectively, these results suggest that managers grant sales price reductions in the fourth quarter in an effort to meet financial reporting targets.

Hypotheses

Articles in the financial press suggest that managers are preoccupied with earnings and sales and that they frequently make accounting and operating decisions to achieve financial reporting targets. For example, Fox (1997) alleges that managers aggressively manage earnings to report a smooth, increasing earnings trend, and Smith *et al.* (1994) claim that firms attempt to smooth profit growth by carefully timing the recognition of gains and losses. Ip (1997) claims that firms offer their customers sales price reductions at the end of financial reporting periods to induce purchases and meet earnings and sales targets.

In support of the latter claim, consider the documented case of the contact lens division (the division) of Bausch and Lomb.[3] Between 1988 and 1992, the division met or exceeded its financial reporting goals. In the fall of 1993, the division's performance was below expectations, and management began to offer, among other things, large price concessions to induce customer purchases. Ultimately, this practice, along with other questionable ones aimed at bolstering earnings and sales, came to the attention of investors and attracted the scrutiny of the Securities and Exchange Commission. Shortly thereafter, Bausch and Lomb put an end to the practice of granting sales price reductions to accelerate customer purchases.

There is also a perception among corporate executives that if they fail to produce consistently higher earnings, the value of their company's stock will suffer (Jacobs, 1991). This view seems to be consistent with the following excerpts from articles in the financial press.

[3] For elaboration on this matter see Plunkett and Rouse (1998) and Securities and Exchange Commission Accounting and Auditing Enforcement Release No. 988, November 17, 1997.

> A lower-than-expected profit rise at Motorola Inc. spooked investors. ... That news ... sent Motorola shares tumbling in heavy trading. ... Thomas Kurlak, who follows Motorola for Merrill Lynch & Co., said reduced earnings in the cellular telephone business are 'unacceptable' to investors (Rose, 1990).

> Aon Corp ... posted a 23% increase in net income, but warned that earnings growth for 1999 will be lower than expected. ... Shares of Aon fell 9.2%. ... Meanwhile, analysts were worried about whether Aon can approach the same level of earnings growth as it has in the past (Lohse, 1998).

> For a stock to be considered cheap when it sells for 30 times projected earnings ... it must be able to produce earnings growth with the relentlessness of a machine. Predictable earnings growth is precisely why Wall Street so loves the pharmaceutical companies (Langreth and McGough, 1998).

In addition, company officials often emphasize earnings and earnings and sales growth, as indicated by the following excerpts from annual reports to shareholders.

> In January 1994, we set our double/double objective, committing ourselves to doubling sales, earnings and earnings per share by the end of the year 2000. This year we expanded on that challenge, intensifying our drive and committing ourselves to a single, unifying goal: to be the number one company in growth of earnings per share year after year within our competitive universe (Charles A. Heimbold, Jr., Bristol-Myers Squibb Company, 1997 Annual Report).

> I must emphasize that all of our strategic actions are guided by and measured against the goal of delivering consistently high increases in earnings over the long-term (Dana Mead, Tenneco, Inc., 1994 Annual Report).

> Revenue of $22.6 billion, an increase of 4.7% over 1996, represented the Company's 65th consecutive year of sales increases. ... Growth through innovation remains our single most important objective, at the sales line and–most importantly–in net income and earnings per share. That's how you build shareowner value (Ralph S. Larsen, Johnson and Johnson, 1997 Annual Report).

Further, the results of empirical studies are consistent with the claim that managers try to avoid declines in earnings and sales. Burgstahler and Dichev (1997) find unusually low frequencies of small decreases in earnings and unusually high frequencies of small increases in earnings, suggesting that managers use accounting choices and operating decisions to avoid declines in earnings and sales. Examples of managers altering operating decisions in response to financial reporting objectives include firms reducing R&D expenditures to reverse an earnings decline (Baber *et al.*, 1991; Bushee, 1998) and timing asset sales to smooth earnings (Bartov, 1993).

Barth *et al.* (1997) report evidence that the market rewards firms that maintain histories of earnings increases, as evidenced by higher earnings multiples for those firms.

This discussion suggests that managers desire to avoid declines in earnings and sales and that they may grant sales price reductions to avoid those declines. The first two testable hypotheses are as follows.

Hypothesis 1: Managers grant sales price reductions to avoid declines in earnings.

Hypothesis 2: Managers grant sales price reductions to avoid declines in sales.

Evidence also indicates that managers attempt to avoid losses. The results of Burgstahler and Dichev (1997) and Hayn (1995) suggest that firms manage earnings and alter operating decisions to avoid losses, as evidenced by a concentration of firms reporting earnings just above zero and relatively few firms reporting earnings just below zero. The third hypothesis is as follows:

Hypothesis 3: Managers grant sales price reductions to avoid losses.

Methodology

Portfolios

This study uses all available observations on the annual and quarterly active and research Compustat database for the years 1989-1997 that (1) reports the required data items and (2) satisfies the requirements for inclusion in the test portfolios or their companion portfolios. Using these firms, we construct two types of portfolios: test and companion. Test portfolios contain firms that are reasonable candidates for having granted sales price reductions in an effort to achieve financial reporting targets, while companion portfolios contain firms that are unlikely candidates for having granted sales price reductions in an effort to achieve financial reporting targets. In the cross-sectional regressions, the companion portfolios serve as benchmarks against which the test portfolios are compared.

Earnings Increase Test and Companion Portfolios

In order to test hypothesis 1, we attempt to identify firms that could have reversed an earnings decline by granting sales price reductions in the fourth quarter. Candidate firms include those firms that report both positive earnings and small positive annual earnings increases because those firms plausibly achieved the increases by granting sales price reductions. These firms are captured within the earnings increase test portfolios. The earnings increase companion portfolio is constructed by identifying firms that report large earnings changes (both increases and decreases) in the current year. Such firms are unlikely to have granted sales price reductions in response to concerns about earnings changes because the changes are of such a magnitude that they cannot easily be reversed or achieved by offering sales

price reductions. The terms *large* and *small* are defined below, as is sensitivity analysis with respect to these definitions.

Sales Increase Test and Companion Portfolios

In order to test hypothesis 2, we attempt to identify firms that could have reversed a sales decline by granting sales price reductions in the fourth quarter. Candidate firms include those firms that report small positive annual sales increases, as those firms plausibly achieved the increases by granting sales price reductions. These firms are captured within the sales increase test portfolio. The sales increase companion portfolio is constructed by identifying firms that report large changes in sales (both increases and decreases) during the current year. Such firms are unlikely to have granted sales price reductions in response to concerns about changes in sales because the changes are of such a magnitude that they cannot easily be reversed or achieved by offering sales price reductions.

Positive Earnings Test and Companion Portfolios

In order to test hypothesis 3, we attempt to identify firms that could have avoided a loss by offering sales price reductions in the fourth quarter. Candidate firms include those firms that report small positive annual earnings per share amounts because those firms plausibly achieved that level of earnings by granting sales price reductions. These firms are captured within the positive earnings test portfolio. In addition to requiring that firms in this portfolio have positive earnings in the current year, we also require those firms to have positive earnings in each of the three prior years. This requirement is imposed because a short history of positive earnings may not provide a sufficiently compelling reason for managers to grant sales price reductions in the current year. The positive earnings companion portfolio is constructed by identifying firms that report large *absolute* earnings per share in the current year and positive earnings in each of the prior three years. Such firms are unlikely to have granted sales price reductions in response to concerns about avoiding a loss because earnings are of a substantial magnitude.

Other Issues

In constructing the above portfolios, we made judgments about what constitutes small and large amounts. While definitions of small and large are somewhat arbitrary, we define them to be five and 15 percent, respectively, for the earnings and sales increase portfolios and five cents per share and 25 cents per share, respectively, for the positive earnings portfolios. Because empirical results may hinge critically on these definitions, we perform sensitivity analyses as discussed below.

We exclude firms that report negative gross profit because such firms are not likely to be representative of the populations from which they are drawn. We also exclude firms from the earnings increase and positive earnings portfolios (sales

increase portfolios) if they report year-to-year changes in earnings (sales) in excess of 150 percent. Changes in earnings and sales in excess of this amount suggest that there may have been a structural change in the firm or its industry that makes statistical inferences less reliable.

Finally, inspection of the firms included in a given companion portfolio reveals that they also may be included in one or more test portfolios. For example, the sales increase companion portfolio contains some firms belonging to the earnings increase test portfolio. This means that while a particular firm within the sales increase companion portfolio may lack incentives to grant sales price reductions in response to the level of sales, they may nonetheless have incentives to grant sales price reductions in response to the level of earnings. To properly construct the companion portfolios, we require that firms in a given companion portfolio not be included in any test portfolios.

Variables Measurement and Model Specifications

The performance measure of interest is gross profit percent (GPP), which is defined as follows:

$$(1)\ GPP = \frac{\text{Net Sales - Cost of Goods Sold}}{\text{Net Sales}}.$$

Because we are interested in whether managers grant sales price reductions in the fourth quarter to avoid losses and declines in earnings and sales, the following differences are computed:

(2) GPPD_A = GPP(Quarter 3 of current year) - GPP(Quarter 4 of current year),

(3) GPPD_Q = GPP(Quarter 4 of prior year) - GPP(Quarter 4 of current year).

The first term in equations (2) and (3) serves as a benchmark for what GPP would have been absent unusual sales price reductions in the fourth quarter. If firms grant sales price reductions in the fourth quarter to induce customer purchases, GPP in the fourth quarter of the current year will decline relative to the benchmarks, and GPPD_A and GPPD_Q should be positive. Further, we expect GPPD_A and GPPD_Q to be larger for firms in the test portfolios than for firms in the companion portfolios. While it would be preferable to use sales price reductions directly rather than inferring that amount from the change in gross profit percent, companies do not provide that disclosure.

In order to test the hypotheses and control for factors that might influence the change in gross profit percent independent of earnings management, the following regressions are estimated using firms in the respective test and companion portfolios:

$$(4)\ GPPD\_A_{it} = \beta_0 + \beta_1 \Delta INV\_A_{it} + \beta_2 \Delta LIQ\_A_{it} + \beta_3 GPPD\_A_{it-1} + \beta_4 DISC_{it} + \varepsilon_{it},$$

$$(5)\ GPPD\_Q_{it} = \lambda_0 + \lambda_1 \Delta INV\_Q_{it} + \lambda_2 \Delta LIQ\_Q_{it} + \lambda_3 GPPD\_Q_{it-1} + \lambda_4 DISC_{it} + \varepsilon_{it},$$

where:

ΔINV_A = The percent change in inventory between quarters three and four;
ΔINV_Q = The percent change in third quarter inventory between the current and prior year;
ΔLIQ_A = The percent change in working capital (excluding inventory) between quarters three and four;
ΔLIQ_Q = The percent change in third quarter working capital (excluding inventory) between the current and prior year; and
DISC = An indicator variable coded as 1 for firms in the test portfolios and 0 for firms in the companion portfolios.

Expectations with respect to these variables and our rationale for including them in the regressions are discussed below.

Variations of equations (4) and (5) also are estimated using logistic regression that allows us to further assess whether managers grant sales price reductions to achieve financial reporting objectives. These regressions are specified as follows:

$$(6)\ \text{Prob}(GPPZ\_A_{it} = 1) = F(\alpha_0 + \alpha_1 \Delta INV\_A_{it} + \alpha_2 \Delta LIQ\_A_{it} + \alpha_3 GPPD\_A_{it-1} + \alpha_4 DISC_{it}),$$

$$(7)\ \text{Prob}(GPPZ\_Q_{it} = 1) = F(\delta_0 + \delta_1 \Delta INV\_Q_{it} + \delta_2 \Delta LIQ\_Q_{it} + \delta_3 GPPD\_Q_{it-1} + \delta_4 DISC_{it}),$$

where:

F(·) = The logistic cumulative density function; and
GPPZ_A and GPPZ_Q = Indicators for whether GPPD_A and GPPD_Q are positive.

The precise functional form of the relation between the dependent variable and independent variables is unknown. If the relation between the dependent variable and independent variables is monotonic, however, a higher ranked dependent variable will correspond to a higher ranked independent variable regardless of the precise functional form of the relation between the variables (Lang and Lundholm, 1993). Thus, we estimate equations (4) through (7) using decile ranks in place of the original data.[4]

ΔINV_A and ΔINV_Q are included in equations (4) through (7) because firms that have inventory build-ups may offer sales price reductions in the fourth quarter to avoid spoilage and inventory holding costs. The coefficients on ΔINV_A and ΔINV_Q are expected to be positive because increases in inventory may trigger sales

[4] See Iman and Conover (1979) for a discussion of this nonparametric regression technique. The rank transformation is implemented by replacing the original data values by their corresponding decile ranks. That is, the smallest observation for a variable is assigned a value of 1 and the largest observation is assigned a value of N. These ranks are then replaced by the decile value corresponding to their rank. Thus, rank transformed variables take on values ranging from 1 (lowest ten percent of the observations) to 10 (highest ten percent of the observations).

Table 1—Descriptive Statistics for Test and Companion Portfolios

	Earnings Increase		Sales Increase		Positive Earnings	
Variable[a]	Test	Comp.	Test	Comp.	Test	Comp.
SALES						
Mean	1,920.14	1,243.68	1,973.64	760.10	383.41	2,162.96
Median	409.21	137.49	297.32	91.09	26.51	378.67
ASSETS						
Mean	2,363.17	1,188.92	2,156.29	708.61	288.35	2,094.11
Median	358.52	105.03	230.43	74.79	22.66	307.61
GPP						
Mean	0.3621	0.3633	0.3414	0.3775	0.3851	0.3611
Median	0.3457	0.3414	0.3230	0.3554	0.3751	0.3353
Lagged GPP						
Mean	0.3662	0.3588	0.3413	0.3746	0.3962	0.3619
Median	0.3500	0.3367	0.3232	0.3538	0.3827	0.3360
Lagged GPPD_A[b]						
Mean	0.0108	0.0017	0.0068	0.0009	0.0022	0.0027
Median	0.0030	0.0005	0.0023	0.0001	0.0020	0.0001
Lagged GPPD_Q[b]						
Mean	-0.0095	-0.0511	-0.0129	-0.0737	0.0087	-0.0055
Median	-0.0020	-0.0018	-0.0015	-0.0024	0.0063	-0.0012
ΔINV_A						
Mean	0.0625	0.0741	0.0261	0.0845	0.0327	0.0589
Median	0.0163	0.0204	0.0043	0.0362	0.0125	0.0242
ΔINV_Q						
Mean	0.1539	0.2851	0.0430	0.3428	0.1600	0.2132
Median	0.0824	0.0919	0.0174	0.1867	0.0633	0.1130
ΔLIQ_A[c]						
Mean	0.0024	-0.0049	-0.0091	0.0090	-0.0734	-0.0023
Median	0.0036	0.0000	-0.0001	0.0000	-0.0023	0.0155
ΔLIQ_Q[c]						
Mean	0.0304	0.0048	-0.0374	0.0079	0.0144	0.0629
Median	0.0000	0.0003	0.0000	0.0021	0.0000	0.0293
n	812	11,507	3,280	9,435	312	7,247

[a]Variables are defined as follows:

SALES = Net sales
ASSETS = Total assets
GPP = Gross profit percent as defined in equation (1)
GPPD_A = Gross profit percent in the third quarter of the current year minus gross profit percent in the fourth quarter of the current year
GPPD_Q = Gross profit percent in fourth quarter of the prior year minus gross profit percent in the fourth quarter of the current year
ΔINV_A = Percent change in inventory between the third and fourth quarters of the current year
ΔINV_Q = Percent change in inventory between the third quarter of the current year and third quarter of the prior year
ΔLIQ_A = Percent change in working capital (excluding inventory) between the third and fourth quarters of the current year
ΔLIQ_Q = Percent change in working capital (excluding inventory) between the third quarter of the current year and the third quarter of the prior year

[b] The descriptive statistics for the lagged values of GPPD_A and GPPD_Q are shown in this table, while the contemporaneous values of GPPD_A and GPPD_Q are shown in Table 2 where they are subject to univariate tests

[c] Descriptive information for ΔLIQ_A and ΔLIQ_Q is reported in this table after imposing an upper and lower bound of 500 percent on the variables. This was done because some observations are extreme and severely distort the means. These variables are rank transformed in the cross-sectional regressions

price reductions independent of earnings management. ΔLIQ_A and ΔLIQ_Q are included in equations (4) through (7) because firms with liquidity problems may offer sales price reductions in the fourth quarter to convert inventory to a more liquid current asset. The coefficients on ΔLIQ_A and ΔLIQ_Q are expected to be negative because declines in liquidity may trigger sales price reductions independent of earnings management.

Equations (4) through (7) also contain lags of the dependent variables. Lagged GPPD_A is included in equations (4) and (6) to capture the seasonal pattern in gross profit percent. The change in gross profit percent from quarter three to quarter four is likely to be similar from year to year, so the coefficient on GPPD_A is expected to be positive. Lagged GPPD_Q is included in equations (5) and (7) because annual changes in fourth quarter gross profit are likely to be negatively autocorrelated. This expectation is supported by the results of Dechow (1994) who documents that earnings changes are negatively autocorrelated. Finally, DISC is the test variable and is expected to be positive in equations (4) through (7) because firms in the test portfolios are expected to grant sales price reductions in the fourth quarter to meet annual earnings and sales objectives, while firms in the companion portfolios are not.

Results

Descriptive Statistics

Table 1 provides descriptive statistics for the earnings increase, sales increase, and positive earnings test and companion portfolios. With respect to the earnings increase test and companion portfolios, they contain 812 and 11,507 observations, respectively. The sales increase test and companion portfolios contain 3,280 and 9,435 observations, respectively. The positive earnings test portfolio contains 312 observations, while its companion contains 7,247 observations. Means and medians are reported for net sales, total assets, contemporaneous and lagged gross profit percent, and the independent variables used in the cross-sectional regressions. Except for sales and assets, all of these variables are incorporated into the research design. Sales and assets differ considerably between the test and companion portfolios. As discussed below, we perform additional analyses that incorporate these variables in the cross-sectional regressions to control for firm size.

Univariate Tests of the Hypotheses

Table 2 reports univariate tests of the hypotheses. Information in the table is partitioned by portfolio type (earnings increase, sales increase, and positive earnings), test and companion portfolios, and test variable (GPPD_A and GPPD_Q). The first column lists the portfolios, and the second and third (sixth and seventh) columns provide descriptive information about GPPD_A (GPPD_Q) for the test and companion portfolios, respectively. The fourth and fifth (eighth and ninth) columns give

Table 2—Univariate Tests of Difference Between Means and Medians of Test and Companion Portfolios

Portfolios[b]	GPPD_A Test[a]	GPPD_A Companion	p-value for difference in Means[c]	p-value for difference in Medians	GPPD_Q Test[a]	GPPD_Q Companion	p-value for difference in Means[c]	p-value for difference in Medians
Earnings Increase Portfolios								
Mean	0.0128	0.0033	0.0001		0.0068	-0.0044	0.0001	
p-value[d]	0.0001	0.0001			0.0011	0.0001		
Median	0.0049	0.0004		0.0001	0.0018	-0.0017		0.0001
p-value	0.0001	0.2116			0.0427	0.0002		
# positive:# negative	469:343	5821:5686			431:381	5554:5953		
N	812	11,507			812	11,507		
Sales Increase Portfolios								
Mean	0.0095	0.0056	0.0045		0.0012	-0.0019	0.0402	
p-value	0.0001	0.0001			0.1878	0.0975		
Median	0.0028	0.0010		0.0001	-0.0012	-0.0010		0.8700
p-value	0.0001	0.0025			0.9554	0.1129		
# positive:# negative	1797:1483	4865:4570			1582:1698	4640:4795		
N	3,280	9,435			3,280	9,435		
Positive Earnings Portfolios								
Mean	0.0104	0.0037	0.0789		0.0150	0.0017	0.0161	
p-value	0.0132	0.0001			0.0075	0.0095		
Median	0.0044	0.0003		0.0540	0.0139	0.0003		0.0001
p-value	0.1172	0.2798			0.0054	0.3238		
# positive:# negative	167:145	3670:3577			179:133	3666:3581		
N	312	7,247			312	7,247		

[a] The variables GPPD_A and GPPD_Q are defined in the text

[b] Construction of the earnings increase, sales increase, and positive earnings portfolios are discussed in the text

[c] P-values for tests of differences between portfolio means and medians are one-tailed. Tests of differences between portfolio means are based on t-tests, while tests of differences between portfolio medians are based on Wilcoxon rank-sum tests

[d] P-values for tests of whether portfolio means and medians differ from zero are one-tailed for the test portfolio and two-tailed for the companion portfolios. Tests of whether portfolio means differ from zero are based on t-tests, while tests of whether medians differ from zero are based on Wilcoxon rank-sum tests

p-values for tests of differences in means and medians, respectively, between the test and companion portfolios for GPPD_A (GPPD_Q).

Hypotheses 1 through 3 all predict that GPPA_A and GPPD_Q will be positive for the test portfolios. Further, they predict that GPPD_A and GPPD_Q will be greater for the test portfolios than they will be for the companion portfolios. As shown in Table 2, mean values for GPPD_A for the earnings increase, sales increase, and positive earnings are 0.0128, 0.0095, and 0.0104, respectively, all of which are significantly positive ($p < 0.025$). Median values for the earnings and sales increase portfolios are 0.0049 and 0.0028, respectively, both of which are significantly positive ($p < 0.01$). The median value for the positive earnings portfolio is 0.0044, but is insignificant.

The mean values for GPPD_Q for the earnings increase, sales increase, and positive earnings are 0.0068, 0.0012, and 0.0150, respectively. The mean values are significant for the earnings increase and the positive earnings portfolios ($p < 0.01$). The mean value for the sales increase portfolio is insignificantly different from zero. Median values for the earnings increase and positive earnings portfolios are 0.0018 and 0.0139, respectively, both of which are significantly positive ($p < 0.01$). The median value of GPPD_Q for the sales increase portfolio is -0.0012 and is significant in the opposite direction of that predicted. Overall, tests of mean and median values of GPPD_A and GPPD_Q reveal that these values are generally positive and significant. These findings support hypotheses 1 through 3.

Finally, tests of differences between the means and medians of the test and companion portfolios for GPPD_A and GPPD_Q also are conducted. With respect to the earnings increase portfolios, the mean and median values of GPPD_A and GPPD_Q are significantly higher for the test portfolio than they are for the companion portfolio ($p < 0.0001$). Similar but less significant results are reported for the positive earnings portfolios ($p < 0.10$). With respect to the sales increase portfolios, means and medians for GPPD_A are significantly higher for the test portfolio than they are for the companion portfolio ($p < 0.01$). The mean value for GPPD_Q is significantly higher for the test portfolio than it is for the companion portfolio ($p = 0.0402$), but the median value is lower. With one exception, the mean and median values of GPPD_A and GPPD_Q are significantly higher for the test portfolios than they are for the companion portfolios. Overall, these results support hypotheses 1 through 3.

Multivariate Tests of the Hypotheses

Table 3 reports regression results relevant to testing hypothesis 1. In Panel A, the dependent variable is GPPD_A, while in panel B the dependent variable is GPPD_Q. Rank and logistic regression results are reported in each panel. In panel A, the control variables (ΔINV_A, ΔLIQ_A, and lagged GPPD_A) are all highly significant in the predicted direction ($p < 0.0005$). In panel B, two of the control variables (ΔINV_Q and lagged GPPD_Q) are significant in the predicted direction (p

Table 3—Estimation of Equations (4) through (7) Using the Earnings Increase Portfolio and Earnings Increase Companion Portfolio to Test Hypothesis 1[a]

Equation (4): $GPPD\_A_{it} = \beta_0 + \beta_1 \Delta INV\_A_{it} + \beta_2 \Delta LIQ\_A_{it} + \beta_3 GPPD\_A_{it-1} + \beta_4 DISC_{it} + \varepsilon_{it}$

Equation (5): $GPPD\_Q_{it} = \lambda_0 + \lambda_1 \Delta INV\_Q_{it} + \lambda_2 \Delta LIQ\_Q_{it} + \lambda_3 GPPD\_Q_{it-1} + \lambda_4 DISC_{it} + \varepsilon_{it}$

Equation (6): $Prob(GPPZ\_A_{it} = 1) = F(\alpha_0 + \alpha_1 \Delta INV\_A_{it} + \alpha_2 \Delta LIQ\_A_{it} + \alpha_3 GPPD\_A_{it-1} + \alpha_4 DISC_{it})$

Equation (7): $Prob(GPPZ\_Q_{it} = 1) = F(\delta_0 + \delta_1 \Delta INV\_Q_{it} + \delta_2 \Delta LIQ\_Q_{it} + \delta_3 GPPD\_Q_{it-1} + \delta_4 DISC_{it})$

	Exp.	Rank Regression (n=12,319)			Logistic Regression (n=12,319)		
Variable[b]	Sign	Coeff.	t-stat.	p-value[b]	Coeff.	χ^2	p-value[c]
Panel A: Estimation of Equations (4) and (6)							
Intercept	?	3.8815	43.79	0.0001	-0.9543	205.26	0.0001
ΔINV_A	+	0.0662	7.63	0.0001	0.0445	47.00	0.0001
ΔLIQ_A	-	-0.0353	-4.07	0.0001	-0.0259	16.04	0.0001
Lagged GPPD_A	+	0.2588	29.81	0.0001	0.1601	588.53	0.0001
DISC	+	0.3915	3.90	0.0001	0.2520	11.17	0.0004
Rank regression: F-statistic = 246.25 Adjusted R^2 = 0.0738							
Logistic regression: Model χ^2 = 691.68 Pseudo-R^2 = 0.0405							
Panel B: Estimation of Equations (5) and (7)							
Intercept	?	5.9644	66.99	0.0001	0.1705	6.79	0.0092
ΔINV_Q	+	0.1388	15.97	0.0001	0.0855	173.62	0.0001
ΔLIQ_Q	-	-0.0038	-0.44	0.3316	-0.0050	0.61	0.2178
Lagged GPPD_Q	-	-0.2237	-25.72	0.0001	-0.1249	365.83	0.0001
DISC	+	0.3568	3.56	0.0002	0.2031	7.53	0.0031
Rank regression: F-statistic = 248.30 Adjusted R^2 = 0.0743							
Logistic regression: Model χ^2 = 590.38 Pseudo-R^2 = 0.0346							

[a] See the text for a discussion of how the portfolios are formed

[b] Variables are defined as follows:

- GPPD_A = Gross profit percent in the third quarter of the current year minus gross profit percent in the fourth quarter of the current year
- GPPD_Q = Gross profit percent in fourth quarter of the prior year minus gross profit percent in the fourth quarter of the current year
- GPPZ_A = An indicator variable for whether GPPD_A is positive
- GPPD_Q = An indicator variable for whether GPPD_Q is positive
- ΔINV_A = The percent change in inventory between the third and fourth quarters of the current year
- ΔINV_Q = The percent change in inventory between the third quarter of the current year and third quarter of the prior year
- ΔLIQ_A = Percent change in working capital (excluding inventory) between the third and fourth quarters of the current year
- ΔLIQ_Q = Percent change in working capital (excluding inventory) between the third quarter of the current year and the third quarter of the prior year
- DISC = A dummy variable coded as 1 if the firm is a member of a test portfolio and 0 if the firm is a member of a companion portfolio
- F(·) = The logistic cumulative density function

[c] P-values are one-tailed

< 0.001), while the remaining control variable (ΔLIQ_Q) is insignificant. The test variable, DISC, is positive and significant in the rank and logistic regressions in both panels ($p < 0.005$). Thus, consistent with the univariate tests, the cross-sectional regressions indicate that managers grant sales price reductions in the fourth quarter to avoid declines in earnings. Hypothesis 1 is supported.

Table 4—Estimation of Equations (4) through (7) Using the Sales Increase Portfolio and Sales Increase Companion Portfolio to Test Hypothesis 2[a]

Equation (4): $GPPD\_A_{it} = \beta_0 + \beta_1 \Delta INV\_A_{it} + \beta_2 \Delta LIQ\_A_{it} + \beta_3 GPPD\_A_{it-1} + \beta_4 DISC_{it} + \varepsilon_{it}$

Equation (5): $GPPD\_Q_{it} = \lambda_0 + \lambda_1 \Delta INV\_Q_{it} + \lambda_2 \Delta LIQ\_Q_{it} + \lambda_3 GPPD\_Q_{it-1} + \lambda_4 DISC_{it} + \varepsilon_{it}$

Equation (6): $Prob(GPPZ\_A_{it} = 1) = F(\alpha_0 + \alpha_1 \Delta INV\_A_{it} + \alpha_2 \Delta LIQ\_A_{it} + \alpha_3 GPPD\_A_{it-1} + \alpha_4 DISC_{it})$

Equation (7): $Prob(GPPZ\_Q_{it} = 1) = F(\delta_0 + \delta_1 \Delta INV\_Q_{it} + \delta_2 \Delta LIQ\_Q_{it} + \delta_3 GPPD\_Q_{it-1} + \delta_4 DISC_{it})$

Variable[b]	Exp. Sign	Rank Regression (n=12,715) Coeff.	t-stat.	p-value[c]	Logistic Regression (n=12,715) Coeff.	χ^2	p-value[c]
Panel A: Estimation of Equations (4) and (6)							
Intercept	?	3.9051	43.86	0.0001	-0.8678	172.92	0.0001
ΔINV_A	+	0.0784	9.057	0.0001	0.0490	58.94	0.0001
ΔLIQ_A	-	-0.0282	-3.27	0.0006	-0.0183	8.39	0.0019
Lagged GPPD_A	+	0.2295	26.67	0.0001	0.1389	467.29	0.0001
DISC	+	0.2205	3.88	0.0001	0.1359	10.57	0.0006
Rank regression: F-statistic = 204.73 Adjusted R^2 = 0.0602							
Logistic regression: Model χ^2 = 558.85 Pseudo-R^2 = 0.0318							
Panel B: Estimation of Equations (5) and (7)							
Intercept	?	5.967465	.31	0.0001	0.2569	14.84	0.0001
ΔINV_Q	+	0.1280	14.39	0.0001	0.0771	137.74	0.0001
ΔLIQ_Q	-	-0.0214	-2.49	0.0065	-0.0197	9.68	0.0010
Lagged GPPD_Q	-	-0.2064	-23.97	0.0001	-0.1170	335.61	0.0001
DISC	+	0.3177	5.45	0.0001	0.0993	5.41	0.0100
Rank regression: F-statistic = 206.76 Adjusted R^2 = 0.0608							
Logistic regression: Model χ^2 = 509.46 Pseudo-R^2 = 0.0289							

[a] See text for a discussion of how the portfolios are formed

[b] Variables are defined as follows:

- GPPD_A = Gross profit percent in the third quarter of the current year minus gross profit percent in the fourth quarter of the current year
- GPPD_Q = Gross profit percent in fourth quarter of the prior year minus gross profit percent in the fourth quarter of the current year
- GPPZ_A = An indicator variable for whether GPPD_A is positive
- GPPD_Q = An indicator variable for whether GPPD_Q is positive
- ΔINV_A = Percent change in inventory between the third and fourth quarters of the current year
- ΔINV_Q = Percent change in inventory between the third quarter of the current year and third quarter of the prior year
- ΔLIQ_A = Percent change in working capital (excluding inventory) between the third and fourth quarters of the current year
- ΔLIQ_Q = Percent change in working capital (excluding inventory) between the third quarter of the current year and the third quarter of the prior year
- DISC = A dummy variable coded as 1 if the firm is a member of a test portfolio and 0 if the firm is a member of a companion portfolio
- F(·) = The logistic cumulative density function

[c] P-values are one-tailed

Table 4 reports regression results relevant to testing hypothesis 2. In panels A and B, the control variables are all highly significant in the predicted direction ($p < 0.01$). The test variable, DISC, is also significant in the rank and logistic regressions in both panels ($p \leq 0.01$). Thus, consistent with the univariate tests, the cross-sectional regressions indicate that managers grant sales price reductions in the fourth quarter to avoid declines in sales. Hypothesis 2 is supported.

Table 5—Estimation of Equations (4) through (7) Using the Positive Earnings Portfolio and Positive Earnings Companion Portfolio to Test Hypothesis 3[a]

Equation (4): $GPPD\_A_{it} = \beta_0 + \beta_1 \Delta INV\_A_{it} + \beta_2 \Delta LIQ\_A_{it} + \beta_3 GPPD\_A_{it-1} + \beta_4 DISC_{it} + \varepsilon_{it}$

Equation (5): $GPPD\_Q_{it} = \lambda_0 + \lambda_1 \Delta INV\_Q_{it} + \lambda_2 \Delta LIQ\_Q_{it} + \lambda_3 GPPD\_Q_{it-1} + \lambda_4 DISC_{it} + \varepsilon_{it}$

Equation (6): $Prob(GPPZ\_A_{it} = 1) = F(\alpha_0 + \alpha_1 \Delta INV\_A_{it} + \alpha_2 \Delta LIQ\_A_{it} + \alpha_3 GPPD\_A_{it-1} + \alpha_4 DISC_{it})$

Equation (7): $Prob(GPPZ\_Q_{it} = 1) = F(\delta_0 + \delta_1 \Delta INV\_Q_{it} + \delta_2 \Delta LIQ\_Q_{it} + \delta_3 GPPD\_Q_{it-1} + \delta_4 DISC_{it})$

	Exp.	Rank Regression (n=7,559)			Logistic Regression (n=7,559)		
Variable[b]	Sign	Coeff.	t-stat.	p-value[c]	Coeff.	χ^2	p-value[c]
Panel A: Estimation of Equations (4) and (6)							
Intercept	?	3.2698	29.97	0.0001	-1.3508	232.57	0.0001
ΔINV_A	+	0.0680	6.41	0.0001	0.0499	34.08	0.0001
ΔLIQ_A	-	-0.0441	-4.15	0.0001	-0.0331	15.22	0.0001
Lagged GPPD_A	+	0.3797	35.79	0.0001	0.2341	699.74	0.0001
DISC	+	0.2568	1.68	0.0468	0.1395	1.26	0.1309
Rank regression: F-statistic = 336.70 Adjusted R^2 = 0.1509							
Logistic regression: Model χ^2 = 817.83 Pseudo-R^2 = 0.0781							
Panel B: Estimation of Equations (5) and (7)							
Intercept	?	5.9956	53.22	0.0001	0.2398	8.49	0.0018
ΔINV_Q	+	0.1415	12.71	0.0001	0.0890	116.27	0.0001
ΔLIQ_Q	-	-0.0357	-3.21	0.0007	-0.0190	5.35	0.0104
Lagged GPPD_Q	-	-0.2023	-18.17	0.0001	-0.1100	176.51	0.0001
DISC	+	0.8617	5.36	0.0001	0.3891	10.52	0.0006
Rank regression: F-statistic = 131.89 Adjusted R^2 = 0.0648							
Logistic regression: Model χ^2 = 310.65 Pseudo-R^2 = 0.0296							

[a] See the text for a discussion of how the portfolios are formed

[b] Variables are defined as follows:

GPPD_A = Gross profit percent in the third quarter of the current year minus gross profit percent in the fourth quarter of the current year

GPPD_Q = Gross profit percent in fourth quarter of the prior year minus gross profit percent in the fourth quarter of the current year

GPPZ_A = An indicator variable for whether GPPD_A is positive

GPPD_Q = An indicator variable for whether GPPD_Q is positive

ΔINV_A = The percent change in inventory between the third and fourth quarters of the current year

ΔINV_Q = Percent change in inventory between the third quarter of the current year and third quarter of the prior year

ΔLIQ_A = Percent change in working capital (excluding inventory) between the third and fourth quarters of the current year

ΔLIQ_Q = Percent change in working capital (excluding inventory) between the third quarter of the current year and the third quarter of the prior year

DISC = A dummy variable coded as 1 if the firm is a member of a test portfolio and 0 if the firm is a member of a companion portfolio

F(·) = Logistic cumulative density function

[c] P-values are one-tailed

Table 5 reports regression results relevant to testing hypothesis 3. In panels A and B, the control variables are all highly significant in the predicted direction ($p < 0.02$). In panel A, the test variable, DISC, is significant in the rank regression ($p < 0.05$), but it is insignificant in the logistic regression ($p > 0.10$). In panel B, the test variable is highly significant in both regressions ($p < 0.001$). Thus, consistent with the univariate tests, the cross-sectional regressions generally indicate that managers

grant sales price reductions in the fourth quarter to avoid losses. Hypothesis 3 is supported.

Supplemental Analyses

In this section, we perform the following supplemental analyses. First, we assess whether the results are sensitive to the cut-off points used to form the test and companion portfolios. Second, because gross profit percent may vary systematically across industries and time periods and there may be clustering in the samples by industry and time period, we incorporate industry and time-fixed effects into the regressions as additional control variables. In addition, because Smith and Pourciau (1988) document that firms with December year-ends have different risk and financial profiles than firms that have non-December year-ends, we also incorporate fixed effects for year-end as an additional control variable. Third, because the test and companion firms differ significantly in terms of net sales and total assets, we incorporate these two variables into the regressions as additional control variables.

The earnings and sales increase test portfolios are formed by identifying firms that report small increases in earnings and sales, respectively, where *small* is defined to be between zero and five percent. The earnings and sales increase companion portfolios are defined by identifying firms that report large changes in earnings and sales, respectively, where *large* is defined to be 15 percent or more. In order to assess the sensitivity of the results to these bounds, we redefine small and large and perform the univariate and multivariate tests. To begin, we define small to be 2.5 percent and then 7.5 percent (increments of 2.5 percent above and below the original bound) and perform the univariate and multivariate tests. Then we define large to be ten percent and then 20 percent (increments of five percent above and below the original bound) and perform the univariate and multivariate tests. The results are strongest when small is defined to be 2.5 percent and large is defined to be 20 percent and the weakest when small is defined to be 7.5 percent and large is defined to be ten percent. The overall tenor of the results, however, is unaffected by these changes. Thus, we conclude that the results are not a function our definitions of large and small.

Next, we incorporate a sequence of dummy variables into the regressions for time period and one-digit SIC code. In addition to these dummy variables, we also create a dummy variable for whether the firm has a December or non-December year-end. The inferences drawn from the regressions reported in Tables 3 through 5 are unaffected by the inclusion of these additional control variables. Finally, net sales and total assets are incorporated into the regressions (including those regressions containing dummy variables for time, industry, and year-end). The conclusions are unaffected by the inclusion of these additional control variables.

Summary and Conclusions

This study is distinguished from most prior studies on earnings management in that it focuses on an operating decision rather than an accounting choice. The consequences of granting sales price reductions in an effort to meet financial reporting targets may be harmful to the firm in the long run, even though granting sales price reductions may help the firm meet its short-term financial reporting objectives. The results of this study suggest that firm managers grant sales price reductions to avoid losses and declines in earnings and sales. While this practice is not a technical violation of GAAP, it may be ethically questionable.

References

1. Baber, W., P. Fairfield, and J. Haggard, "The Effect of Concern About Reported Income on Discretionary Spending Decisions: The Case of Research and Development," *The Accounting Review*, 66 (October 1991), pp. 818-829.

2. Barth, M., J. Elliott, and M. Finn, "Market Rewards Associated with Patterns of Increasing Earnings," working paper, Stanford University (1997).

3. Bartov, E., "The Timing of Asset Sales and Earnings Manipulation," *The Accounting Review*, 68 (October 1993), pp. 840-855.

4. Beaver, W., "Corporations' Misguided Obsession with Shareholder Wealth," *Business and Society Review*, 95 (Fall 1995), pp. 49-53.

5. Bruns, W.J., and K. Merchant, "The Dangerous Morality of Managing Earnings," *Management Accounting*, 72 (1990), pp. 22-25.

6. Burgstahler, D., and I. Dichev, "Earnings Management to Avoid Earnings Decreases and Losses," *Journal of Accounting and Economics*, 24 (December 1997), pp. 99-126.

7. Bushee, B., "The Influence of Institutional Investors on Myopic R&D Investment Behavior," *The Accounting Review*, 73 (July 1998), pp. 305-333.

8. Cassidy, R., "Research Funding for 1989 Won't Even Reach $131 Billion," *Research & Development*, 31 (January 1989), pp. 46-50.

9. Churback, D., "Software's Dirty Little Secret," *Forbes*, 143 (May 15, 1989), p. 128.

10. Dechow, P., "Accounting Earnings and Cash Flows as Measures of Firm Performance: The Role of Accounting Accruals," *Journal of Accounting and Economics*, 18 (July 1994), pp. 3-42.

11. Fox, J., "Learn to Play the Earnings Game (and Wall Street Will Love You)," *Fortune* (March 31, 1997), pp. 77-80.

12. Green, C., "Strategic Pricing," *Small Business Reports*, 14 (August 1989), pp. 27-33.

13. Hayn, C., "The Information Content of Losses," *Journal of Accounting and Economics*, 20 (September 1995), pp. 125-153.

14. Iman, L., and W. Conover, "The Use of the Rank Transform in Regression," *Technometrics*, 21 (November 1979), pp. 499-509.

15. Ip, G., "Growth Companies Feel Pressure to Book Sales," *The Wall Street Journal* (September 16, 1997), p. C1.

16. Jacobs, M., *Short-Term America: The Causes and Cures of Our Business Myopia*. (Boston, MA: Harvard Business School Press, 1991).

17. Lang, M., and R. Lundholm, "Cross-sectional Determinants of Analysts Ratings of Corporate Disclosures," *Journal of Accounting Research*, 31 (Autumn 1993), pp. 246-271.

18. Langreth, R., and R. McGough, "Drug Makers' Juggernaut Could Weaken," *The Wall Street Journal* (December 15, 1998), p. C1.

19. Laverty, K., "Economic 'Short-Termism': The Debate, the Unresolved Issues, and the Implications for Managerial Practice and Research," *Academy of Management Review*, 21 (July 1996), pp. 825-860.

20. Lohse, D., "Aon's Earnings Miss Estimates Despite Surge," *The Wall Street Journal* (November 4, 1998), p. A13.

21. Loomis, C., "The $600 Million Cigarette Scam," *Fortune*, 120 (December 4, 1989), pp. 89-104.

22. Marn, M., and R. Rosiello, "Managing Price, Gaining Profit," *Harvard Business Review*, 70 (September-October 1992), pp. 84-94.

23. Murray, A., "Brady to Study Business's Profit Strategies--Treasury Chief Hopes to Encourage Long-Term Competitiveness," *Wall Street Journal* (December 16, 1988), p. A1.

24. Plunkett, L., and R. Rouse, "Revenue Recognition and the Bausch and Lomb Case," *The CPA Journal*, 68 (September 1998), pp. 54-56.

25. Porter, M., "Capital Disadvantage: America's Failing Capital Investment System," *Harvard Business Review*, 71 (September-October 1992), pp. 65-82.

26. Ritter, D., "The Curse of the Quarterly Report," *Directors and Boards*, 16 (Spring 1992), pp. 36-39.

27. Rose, R., "Motorola Profit Report Depresses Stock," *Wall Street Journal* (October 10, 1990), p. A8.

28. Smith, D., and S. Pourciau, "A Comparison of the Financial Characteristics of December and non-December Year-end Companies," *Journal of Accounting and Economics*, 10 (December 1988), pp. 335-344.

29. Smith, G., and T. Nagle, "Financial Analysis for Profit-Driven Pricing," *Sloan Management Review* (Spring 1994), pp. 71-84.

30. Smith, R., S. Lipin, and A. Naj, "How General Electric Damps Fluctuations in its Annual Earnings," *The Wall Street Journal* (November 3, 1994), pp. A1, A11.