

**The Hangover Effects of Year End Price Reductions  
and Real Earnings Management**

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**1. Introduction**

Prior research hypothesizes that managers strategically time ‘real actions’ to manage reported earnings and generally assumes that actions taken in one period to boost earnings have a negative effect on subsequent periods. However, it is difficult to observe weak subsequent performance due to, in part, the possibility that firms may repeat earnings management behavior.

The economic conditions involving an increase in many input prices and general slowdown in demand during 2008 suggest that firms which previously engaged in real earnings management may be less able to repeat successfully these actions during the economic slowdown and will report less positive earnings subsequently. As such, it is more likely that poor subsequent performance will be observable in 2008 and 2009 for firms previously managing their earnings than in periods of steady economic growth permitting observation of predicted weak subsequent performance.

In this paper, I show a relation between the use of price promotions and subsequent firm performance, in terms of both earnings and stock prices. In a period of economic slowdown, these effects vary depending on the timing of the retail price promotions consistent with fiscal year-end price reductions being beneficial initially but subsequently being related to weaker earnings performance. Further, these effects differ depending on the severity of prior-year price changes as well as the price elasticity of demand for each individual product.

The remainder of this paper is organized as follows: Section 2 provides background, describes prior research and develops testable hypotheses about the timing and effects of price discounting behavior. Section 3 describes the sample selection procedure and research methodology. Section 4 presents empirical results and section 5 contains concluding remarks.

## **2. Hypothesis Development**

### **2.1. The relation of year-end product prices to subsequent performance**

Degeorge, Patel and Zeckhauser (1999) propose that earnings management behavior can be divided into two distinct categories:

- “misreporting” earnings management – involving merely the discretionary accounting of decisions and outcomes already realized; and

- “direct” or “real” earnings management - the strategic timing of investment, sales, expenditures and financing decisions.

Although the first category has received much attention since Healy (1985), the real earnings management has received greater recent attention and appears to be widespread in practice. As noted by Douglas R. Conant, President and Chief Executive Officer of Campbell Soup Company during a recent quarterly earnings conference call “We then managed our marketing plans to manage our [earning]<sup>1</sup>....to ensure that we were supporting the business but also delivering our earnings and at the same time competition was more competitively successful than they had been in prior years.” (Campbell Soup Company, 2008).

Gunny (2005) seeks to categorize ‘real earnings management’ behavior and describes four real activities that research shows firms use to manage earnings:

- cutting Research and Development (“R&D”) to increase income;<sup>2</sup>
- changing Sales, General and Administration (“SG&A”) expenditure to increase income;<sup>3</sup>
- timing income (and loss) recognition from the disposal of long-lived assets and investments;<sup>4</sup>
- discounting prices to boost sales in the current period and/or overproducing to decrease Cost of Goods Sold (“COGS”).<sup>5</sup>

This paper focuses on firms that use price discounts around the end of the fiscal year to shift sales intertemporally across fiscal years

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<sup>1</sup> The word “earning” can be clearly heard at time 33:40 in the audio version of the conference call but has been redacted from the call transcript available at <http://seekingalpha.com/article/77913-campbell-soup-f3q08-qtr-end-4-27-08-earnings-call-transcript?page=-1>

<sup>2</sup> See Baber et al (1991), Dechow and Sloan (1991), Bushee (1998), Bens, Nagar and Wong (2002) and Cheng (2004) for further discussions of the role of changing R&D expenditure in various earnings management contexts.

<sup>3</sup> See Mizik and Jacobsen (2007) and Chapman and Steenburgh (2009) for further discussion of the role of marketing expenditure in this context.

<sup>4</sup> See Bartov (1993) and Herrmann, Inoue and Thomas (2003) for further discussions on the use of asset sales or McNichols and Wilson (1988) on the use of opportunistic provisioning in this context.

<sup>5</sup> See Thomas and Zhang (2002) on the use of overproduction and Roychowdhury (2006) or Chapman (2010) for further discussion on the role of price discounting.

In a similar manner to the concept that accruals should reverse in time for Accounting Earnings Management, Real Earnings Management leads to an assumption that income-increasing behaviors are costly overall. If it were not so, we should observe firms undertaking such actions at all times. For example, in the case of non-perishable goods, some of the incremental sales garnered when prices are reduced are due to consumer stockpiling.<sup>6</sup> When the promotion stops, sales volumes are reduced in subsequent periods as consumers consume their stockpiles/inventory. The ‘post-promotion dip’ in sales volumes can be seen clearly within my sample in the weeks following a promotion as shown in Figure 1 and is consistent with the findings of multiple authors including van Heerde, Leeflang, and Wittink (2000, 2004), Macé and Neslin (2004), Chapman and Steenburgh (2009) and Chapman (2010). For products where consumption is not closely linked to product pricing, this reduces profits overall with subsequent profits reductions exaggerated if customers learn to purchase more when product is on sale.<sup>7</sup>

This is consistent with both Stein’s (1989) analytic model of myopic behavior and the “borrowing of earnings” discussed by Degeorge, Patel and Zeckhauser (1999).<sup>8</sup> However, prior research has not identified subsequent poor performance at the firm level associated with real earnings management activities. In contrast to the idea that using real activities manipulation to just meet earnings benchmarks is costly, Gunny (2009) finds such behaviors to be positively associated with future performance compared to firms that do not use real activities manipulation and miss their earnings benchmark by more than 1%.

As proposed in the extension of Stein’s model, firms may be able to repeat, or even increase, the earnings management behavior in subsequent periods to mask the true costs, making it almost impossible to observe subsequent poor performance. This is shown empirically by Chapman (2010) who shows that

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<sup>6</sup> See Gupta (1988) and Hendel and Nevo (2003, 2004, 2006a and 2006b)

<sup>7</sup> See Medeiros (2007)

<sup>8</sup> In contrast to the idea that real earnings management is costly, Chapman (2010) identifies circumstances where price reductions at the fiscal year-end may not be as costly in terms of relative performance as previously thought. In response to a competitor price cut, total firm profits may no different in a scenario of taking no action compared to reducing prices. Figures 1 and 2 show examples of how contribution margin may be no worse for a firm which discounts compared to one which does not when faced with competitors who reduce their prices.

price reductions associated with a single earnings management target are persistent over multiple reporting periods.<sup>9</sup> Similarly, anecdotal evidence of such repeating behavior was provided to the author by a management consultant who admitted to accelerating the client billing of one week's work at the end of each quarter (with the client's agreement) repeatedly for a period of three years. When asked why he stopped the accelerated billing, his response was that he had met his annual target in the fourth year due to the internal accounting system recording being based upon a 53-week year.

These observations raise the question as to whether poor subsequent performance associated with earnings management behavior will be observable, especially in an economy that is growing. Fortunately, for the research design used here, economic conditions during late 2007 and early 2008 represent a significant slowdown and general reduction in retail sales.<sup>10</sup> This suggests that firms which previously engaged in real earnings management behavior may be less able to repeat successfully such actions during this time-period resulting in reduced earnings for these firms as consumers reduce purchases and consume stockpiled product. As such, it is more likely that subsequent poor performance will be observed during this time period for firms managing their earnings than in periods of steady economic growth.

This leads to the hypothesis *H1: Firms exhibiting potential earnings management behavior (by way of price reductions) at their fiscal year-end are more likely to experience deteriorating performance in 2008 and 2009 than those firms which do not.*

## **2.2. The relation of repeating year-end product prices to subsequent performance**

As mentioned above, firms may have the ability to repeat or increase earnings management promotion in sequential periods. On the one hand, firms which have previously used price reductions to boost earnings

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<sup>9</sup> See figure 3 for a graphical representation of the year-end price evolution over several years around a single period where the firm had incentive to boost earnings.

<sup>10</sup> See figure 4 which shows some evidence of reduced spending at the sample stores which may relate to the beginning of the economic slowdown.

implies that these firms can benefit from this technique. However, on the other, firms which have previously reduced prices may have less “slack” remaining and may therefore suffer more following additional fiscal year-end price reductions. This raises the question as to whether firms which are ‘first time’ year-end price reducers are more or less able to repeat the behavior in subsequent years – a factor which may confound tests of the previous hypothesis.<sup>11</sup> This leads to the hypothesis *H2: Firms reducing prices from a lower starting point are more likely to experience weaker subsequent performance.*

### **2.3. The effect of price elasticity of demand**

In order for a firm to use price reductions as a successful earnings management tool, it needs a product which has a material increase in sales volumes (in terms of intertemporal shifting of purchase) resulting from a small price reduction. This suggests that products with high price elasticity of demand will provide stronger results for tests of the hypotheses discussed above since firms with low price elasticity of demand are less able to use price reductions at the year-end as earnings management tools.

## **3. Data and Methodology**

For this study, I use a new dataset collected between October 2005 and September 2007 from a leading US supermarket chain. The dataset contains information on all purchases by consumers using the customer loyalty card made at 7 stores in New Hampshire. This represents more than 20 million individual purchases of over 89,000 different UPC codes by over 79,000 households. The dataset is similar to the one used in Chapman (2010) but, instead of being restricted to soup products, it contains data about all products sold in the store including the location within the store (equivalent to the aisle number). Furthermore, when combined with a separate UPC identification dataset, the specific products and their manufacturers can be readily identified.

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<sup>11</sup> Based upon the current research design, I am unable to differentiate between firms being unable to repeat the earnings management behaviors due to anticipated consumer disaffectedness and the alternative hypothesis that the firm chooses not to run the promotion due to their willingness to take a ‘big bath’ in the current period. Any suggestions on how to differentiate these would be appreciated.

For each individual UPC code, the dataset is expanded by identifying the product producer and ultimate parent company. This represents approximately 8.6 million (42%) of the transactions representing 72 different companies which can be identified by their gvkey in the CRSP/COMPUSTAT dataset. For each of the parent companies for which information is available, fiscal year-end, financial performance and stock prices were retrieved from the CRSP/COMPUSTAT merged database with firm performance data for 2008 and 2009.

Summary statistics and dependent variable correlations of this dataset over the two years of observation are shown in tables 1 and 2. Table 1 shows that data availability does not materially change the mean values of any of the variables used in subsequent regression analyses.

Firms operate in competitive markets and have been shown to respond to competitor earnings management.<sup>12</sup> More specifically, Chapman (2010) shows that competitors reduce prices when other firms within their industry are expected to discount prices to meet earnings targets, as opposed to when firms within their industry actually discount prices. Given this, and the potential for seasonality effects, monthly fixed effect are incorporated into each of the regression estimations with model identification coming from the cross-sectional variation in fiscal year-end of the sample firms.<sup>13</sup>

To eliminate any bias which might be caused by the inclusion of multiple purchases of the same product at similar prices in the same week, the mean price observed for each UPC-week pair is used. Only products which have sales observations in more than 26 different weeks are included in the sample to eliminate seasonal or low volume products from the analysis.<sup>14</sup> All regression models are estimated using

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<sup>12</sup> See Beatty, Karaoglu and Sandino (2006)

<sup>13</sup> A similar approach is used in Oyer (1998) and Chapman and Steenburgh (2009)

<sup>14</sup> Sales volumes are consolidated to a single observation per UPC-week when used. Where no sales are observed in a specific week, it is assumed that sales volumes are zero and that prices are the same as the prior week.

Huber-White Standard errors to allow for any lack of independence between observations for the same UPC within the sample. Use of two-way clustering<sup>15</sup> does not materially change the conclusions.

A caveat to any conclusions drawn using these data is that only retail prices are observed, not the manufacturer sale price. Therefore, this interpretation of results requires that the supermarket chain passes through manufacturer price changes as opposed to selectively targeting manufacturers' performance or fiscal calendar with their own pricing activities.<sup>16</sup> Discussion with representatives of several manufacturing companies contained in the sample confirmed that trade funding<sup>17</sup> is usually structured so that the bulk of the units shipped to the supermarket at a discount must also be sold to the consumers at a discount. However, a small percentage "slip" through the system and are sold to consumers at or near full-price. If the supermarket does not pass on the price discounts from the manufacturers, this would bias my tests against finding results.

## **4. Results and Discussion**

### **4.1 The relation of year-end product prices to subsequent performance**

To measure the general effect of retail prices on subsequent firm performance, three measures of subsequent firm performance are used. The first relates to the change in quarterly earnings per share (EPS) relative to the same quarter one year earlier. The second measures whether EPS increased relative to the same quarter in the prior year (measured for each quarter from Q1 2008 through Q4 2009). The third measures the cumulative number of quarterly earnings increases over this period and the fourth relates to quarterly changes in stock price.

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<sup>15</sup> See Gow, Ormazabal and Taylor (2009)

<sup>16</sup> This is consistent with the approach used by Chintagunta, Kadiyali and Vilcassim (1996, 1999) who assume the retailer is non-strategic and charges an exogenous constant margin.

<sup>17</sup> Money given to supermarkets to temporarily reduce prices, display product in prime merchandising space, or feature product in circulars.

This permits estimation of variants of the following regression to test Hypothesis *H1*, that *Firms exhibiting potential earnings management behavior (by way of price reductions) at their fiscal year-end are more likely to experience deteriorating performance in 2008 and 2009 than those firms which do not.*

$$DepVar_{it} = \beta_0 + \beta_1 PriceChange_{it} + \beta_2 Fiscal_{it} + \beta_3 Fiscal_{it} * PriceChange_{it} + \sum_{j=1}^{11} \gamma_j Month_{ijt} + \varepsilon_{it}$$

where  $DepVar_{it}$  equals a) the change in quarterly earnings from the prior year as measured by  $(EPS_q - EPS_{q-4})/|EPS| - 1$ , b) a dummy variable which equals one if  $(EPS_q - EPS_{q-4})/|EPS_{q-4}| - 1 > 0$ , c) the sum of dummy variables which equal one if  $(EPS_q - EPS_{q-4})/|EPS_{q-4}| - 1 > 0$  representing the number of quarters that the firm reported increasing quarterly earnings per share from Q1 2008 through Q4 2009 and d)  $(Price\ per\ Share_q - Price\ per\ Share_{q-1})/Price\ per\ Share_{q-1} - 1$ .  $q$  represents each of the fiscal quarters from Q1 2008 through Q4 2009.  $PriceChange$  is the ratio of the price of product  $i$  sold in week  $t$  as compared to the same week one year earlier in the sample period minus 1.  $Fiscal$  is a dummy variable if the transaction occurs in the last month of the manufacturer's fiscal year, and zero otherwise.  $Month$  represents dummy variables for each calendar month. The error term  $\varepsilon_{it}$  contains information on performance changes not contained in prices.<sup>18</sup>

Based upon Chapman and Steenburgh (2009) and Chapman (2010), firms which change prices in the last month of their fiscal year appear to be doing so, in part, to manipulate reported earnings. If non-fiscal year-end price reductions result in improvements in subsequent performance, we should observe a negative coefficient on  $PriceChange$  ( $\beta_1$ ). Similarly, if fiscal year-end price reductions result in improvements in subsequent performance, we should observe a negative coefficient on  $Fiscal*PriceChange$  ( $\beta_3$ ). If short-term gains associated with fiscal year-end price reductions are reversed in subsequent periods, we should observe a positive coefficient on  $\beta_3$ .

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<sup>18</sup> The dependent variables used in different regression estimations may be mechanically correlated due to the variable definition used. Use of Seemingly Unrelated Regressions or redefining the 2009 variables as a change in EPS (share price) since the matching quarter of 2007 reduces the magnitude of the  $\beta_3$  coefficients slightly but does not materially change the interpretation of the results.

The results of these estimations are shown in tables 3, 4 and 5. Table 3 shows the estimations relating to changes in quarterly earnings per share. Table 4 shows the estimations relating to the binary increase/decrease in quarterly earnings per share as well as the count variable relating to the number of increases in quarterly EPS. Table 5 shows the estimations relating to the changes in stock prices.

First consider Table 3 which tests how quarterly EPS changes following retail price changes at different points of the fiscal year. The coefficients on *PriceChange* ( $\beta_1$ ) are mixed suggesting that although there is a statistically significant relation between non-fiscal year-end prices on subsequent quarterly earnings per share performance, there is no obvious pattern in time of this. In contrast, these results show a clear pattern of negative coefficients on *Fiscal\*PriceChange* ( $\beta_3$ ) over the first three quarters of 2008 consistent with the hypothesis that firms are able to boost earnings per share performance by reducing prices. The magnitude of this effect is that a firm which reduces prices by 10% at the fiscal year end has quarterly EPS 1%, 2% and 3% higher in the first three quarters of 2008 than a firm which reduced prices by 10% at a different time of the year. However, consistent with the theory that real earnings management is costly (and in contrast to Gunny's (2009) result that real earnings management is used to allow better future performance or signaling), we observe positive coefficients on *Fiscal\*PriceChange* ( $\beta_3$ ) over the last three quarters of 2009 with quarterly EPS 6%, 4% and 6% lower in the last three quarters of 2009 than for a firm which reduced prices by 10% at a different time of the year..

Considering Table 4 which tests the frequency of positive changes in quarterly EPS changes following retail price changes at different points of the fiscal year. The coefficients on *PriceChange* ( $\beta_1$ ) are generally not significantly different from zero. Again suggesting no obvious relation between the frequency of increases in subsequent quarterly EPS and non fiscal year-end retail price changes. However, when considering the coefficients on *Fiscal\*PriceChange* ( $\beta_3$ ) during the first quarter of 2008, there is no significant difference from zero which prevents the claim that fiscal year-end retail price changes the number of firms reporting increases in quarterly EPS. Combining this with the significant coefficient on  $\beta_3$  in Column 1 of Table 3 is consistent with the hypothesis that firms generally use price

reductions to increase EPS although not solely due to beat the prior year EPS figure. However, as before, negative coefficients on *Fiscal\*PriceChange* ( $\beta_3$ ) do appear for second and third quarters of 2008 consistent with the hypothesis that retail price reductions at the fiscal year end are associated with an increase in the number of firms reporting increased quarterly EPS over the following six to nine months. This trend is reversed for each of the next three quarters suggesting that retail price reductions at the fiscal year end are associated with a decrease in the number of firms reporting increased quarterly EPS over the following 12-18 months.<sup>19</sup>

Column 9 of Table 4 shows the cumulative effect of these changes and shows that firms which cut prices during the observation period increased EPS in more quarters than firms which increased prices. However, there appears no significant effect of year-end price changes over and above retail price changes during the rest of the fiscal year.

Table 5 reports analysis of how end of subsequent quarter ending stock prices change relative to the end of the previous quarter. The negative coefficient on *PriceChange* ( $\beta_1$ ) in column 1 suggests that non-fiscal year-end price decreases are associated with increases in short-term stock prices. This perhaps counter intuitive relationship may be associated with the beginning of the economic downturn and associated increase in some raw materials during which time firms with good cost control may have been more successfully perceived by the market. However, any response to a fiscal year-end price reduction was not perceived in this manner with a negative coefficients on *Fiscal\*PriceChange* ( $\beta_3$ ) in column 1. Interestingly, the sign of these coefficients reverses in the following two quarters suggesting that any short term stock market effects were reversed in a relatively short timeframe.<sup>20</sup>

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<sup>19</sup> Note that the dependent variables used in these regressions may be correlated.

<sup>20</sup> Results relating to stock price changes here are all relatively weak. I would welcome input from seminar participants as to alternative specifications which might assist in determining whether markets are able to see through earnings management related behaviors.

## 4.2 The relation of subsequent earnings and stock prices to multi-year price changes

As mentioned above, it is possible that firms are able to repeat and even increase the magnitude of earnings management price reductions. On the one hand, firms which have previously used price reductions to boost earnings implies that these firms can benefit from this technique. However, on the other, firms which have previously reduced prices may have less “slack” remaining and may therefore suffer more following additional fiscal year-end price reductions. To determine whether prior year price discounting affects the effectiveness of current year activity, I estimate variants of the following regression to test Hypothesis H2, that *Firms reducing prices from a lower starting point are more likely to experience weaker subsequent performance.*

$$DepVar_{it} = \beta_0 + \beta_1 PriceChange_{it} + \beta_2 Fiscal_{it} + \beta_3 Fiscal_{it} * PriceChange_{it} + \beta_4 PriorYearPrice_{it} + \beta_5 Fiscal_{it} * PriorYearPrice_{it} + \sum_{j=1}^{11} \gamma_j Month_{ijt} + \varepsilon_{it}$$

where  $DepVar_{it}$  equals a) the change in quarterly earnings from the prior year as measured by  $(Earnings\ per\ Share_q - Earnings\ per\ Share_{q-4}) / (Earnings\ per\ Share_{q-4} - 1)$ , and b) the sum of dummy variables which equal one if  $(EPS_q - EPS_{q-4}) / (EPS_{q-4} - 1) > 0$  representing the number of quarters that the firm reported increasing quarterly earnings per share from Q1 2008 through Q4 2009.<sup>21</sup>  $PriceChange$  is the ratio of the price of product  $i$  sold in week  $t$  as compared to the same week one year earlier in the sample period minus 1.  $Fiscal$  is a dummy variable if the transaction occurs in the last month of the manufacturer’s fiscal year, and zero otherwise.  $PriorYearPrice$  is the ratio of the price charged in the same week one year before divided by the highest price observed for that specific UPC code in the sample.  $Month$

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<sup>21</sup> I also consider other specifications relating to stock price changes and the frequency of EPS increases. However, these do not offer meaningful results.

represents dummy variables for each calendar month. The error term  $\varepsilon_{it}$  contains information on performance changes not contained in prices.<sup>22</sup>

The results of these estimations are shown in Table 6. One key finding here is that the coefficients on *Fiscal\*PriceChange* ( $\beta_3$ ) in the left hand columns are no longer significant (compare to Table 3) suggesting that year-on-year fiscal year-end retail price changes do not explain future performance when controlling for prior year price reductions. However, the coefficient on *Fiscal\*PriorYearPrice* ( $\beta_5$ ) is positive and significant in columns 1 and 2 consistent with firms that cut prices at their fiscal year-end in the prior year are suffering in this year's change in quarterly EPS measure (possibly as a result of the increased EPS which they achieved in the prior year). Another possible interpretation is that once firms begin price discounting at their fiscal year-end, they are forced to discount even more deeply in the following year to sustain the same performance.

The idea that prior behavior is more meaningful than current behavior alone appears unusual unless associated with an argument relating to competitors anticipating price reductions based on prior performance and earnings management as discussed in Chapman (2010). I therefore re-estimate the previous models including an additional interaction term  $\beta_6 \text{PriorYearPrice}_{it} * \text{PriceChange}_{it}$ . For ease of presentation and to avoid the need for an additional term relating to  $\text{PriorYearPrice}_{it} * \text{PriceChange}_{it} * \text{Fiscal}_{it}$ , I present results of estimations of the following regression using only observations where  $\text{Fiscal}_{it} = 1$  in Table 7.<sup>23</sup>

$$\text{DepVar}_{it} = \beta_0 + \beta_3 \text{PriceChange}_{it} + \beta_5 \text{PriorYearPrice}_{it} + \beta_6 \text{PriorYearPrice}_{it} * \text{PriceChange}_{it} + \sum_{j=1}^{11} \gamma_j \text{Month}_{ijt} + \varepsilon_{it}$$

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<sup>22</sup> The dependent variables used in different regression estimations may be mechanically correlated due to the variable definition used. Use of Seemingly Unrelated Regressions or redefining the 2009 variables as a change in EPS (share price) since the matching quarter of 2007 does not materially change the interpretation of the results.

<sup>23</sup> Estimation using the entire sample gives similar results.

where  $DepVar_{it}$  equals a) the change in quarterly earnings from the prior year as measured by  $(Earnings\ per\ Share_q - Earnings\ per\ Share_{q-4}) / |Earnings\ per\ Share_{q-4}| - 1$ , and b) the sum of dummy variables which equal one if  $(EPS_q - EPS_{q-4}) / |EPS_{q-4}| - 1 > 0$  representing the number of quarters that the firm reported increasing quarterly earnings per share from Q1 2008 through Q4 2009.<sup>24</sup>  $PriceChange$  is the ratio of the price of product  $i$  sold in week  $t$  as compared to the same week one year earlier in the sample period minus 1.  $Fiscal$  is a dummy variable if the transaction occurs in the last month of the manufacturer's fiscal year, and zero otherwise.  $PriorYearPrice$  is the ratio of the price charged in the same week one year before divided by the highest price observed for that specific UPC code in the sample.  $Month$  represents dummy variables for each calendar month. The error term  $\varepsilon_{it}$  contains information on performance changes not contained in prices.<sup>25</sup> The use of  $\beta_3$  and  $\beta_5$  here is that the regression is estimated for the fiscal year end only so these are most similar to the previous  $\beta_3$  and  $\beta_5$  coefficients

The results to note here is the relation between the coefficients on  $PriceChange$  ( $\beta_3$ ) and  $PriorYearPrice * PriceChange$  ( $\beta_6$ ). For the first quarter of 2008 (Column 1), fiscal year end price reductions are beneficial for products which were not discounted one year earlier ( $PriorYearPrice$  close to 1) but become less effective as an earnings boosting tool if the product was previously discounted. In contrast, fiscal year-end price reductions are associated with greater earnings per share increases in the following three quarters (Columns 2, 3 and 4) for firms which had previously reduced prices with a similar result relating to the number of quarters of increasing EPS (Column 9).

### 4.3 Variation in results due to differences in product price elasticity of demand

This section considers how the earlier results vary based upon cross-sectional variation in the price elasticity of demand. Demand for products with low price elasticity of demand does not change

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<sup>24</sup> I also consider other specifications relating to stock price changes and the frequency of EPS increases. However, these do not offer meaningful results.

<sup>25</sup> The dependent variables used in different regression estimations may be mechanically correlated due to the variable definition used. Use of Seemingly Unrelated Regressions or redefining the 2009 variables as a change in EPS (share price) since the matching quarter of 2007 does not materially change the interpretation of the results.

materially when prices are changed. As such, any observed price reductions for these products are more likely due to competitive pricing strategies or changes in input prices as opposed to attempts by the firm to manage short term earnings. This leads to the prediction that any effects observed for tests of the earlier hypotheses will be weaker for low elasticity products.

To test this, I estimate variants of the following regression. Again, for ease of interpretation, I present results of estimations of the following regression using only observations where  $Fiscal_{it} = 1$

$$\begin{aligned}
 DepVar_{it} = & \beta_0 + \beta_3 PriceChange_{it} + \beta_5 PriorYearPrice_{it} + \beta_6 PriorYearPrice_{it} * PriceChange_{it} \\
 & + \beta_7 Elasticity_i + \beta_8 PriceChange_{it} * Elasticity_i + \beta_9 PriorYearPrice_{it} * Elasticity_i \\
 & + \sum_{j=1}^{11} \gamma_j Month_{ijt} + \varepsilon_{it}
 \end{aligned}$$

where  $DepVar_{it}$  equals a) the change in quarterly earnings from the prior year as measured by  $(Earnings\ per\ Share_q - Earnings\ per\ Share_{q-4}) / |Earnings\ per\ Share_{q-4}| - 1$ , and b) the sum of dummy variables which equal one if  $(EPS_q - EPS_{q-4}) / |EPS_{q-4}| - 1 > 0$  representing the number of quarters that the firm reported increasing quarterly earnings per share from Q1 2008 through Q4 2009.<sup>26</sup>  $PriceChange$  is the ratio of the price of product  $i$  sold in week  $t$  as compared to the same week one year earlier in the sample period minus 1.  $Elasticity$  is estimated for each product individually in the sample by regressing demand on price for each of the 104 weeks in the sample.<sup>27</sup>  $Fiscal$  is a dummy variable if the transaction occurs in the last month of the manufacturer's fiscal year, and zero otherwise.  $PriorYearPrice$  is the ratio of the price charged in the same week one year before divided by the highest price observed for that specific

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<sup>26</sup> I also consider other specifications relating to stock price changes and the frequency of EPS increases. However, these do not offer meaningful results.

<sup>27</sup> A small number of products from one pet food manufacturer are excluded due to unusually high estimates of elasticity. Further consideration of the data suggests that this occurs in a period where certain types of pet food were found to be contaminated.

UPC code in the sample. *Month* represents dummy variables for each calendar month. The error term  $\varepsilon_{it}$  contains information on performance changes not contained in prices.<sup>28</sup>

Results are shown in Table 8. Again I restrict the regressions to sales during the last month of the fiscal year for ease of presentation. The coefficients on *PriceChange* ( $\beta_3$ ) and *PriorYearPrice\* PriceChange* ( $\beta_6$ ) remain consistent with the prior table suggesting that the results are unchanged when holding the elasticity of the product under consideration constant. However, coefficients on  $\beta_8$  and  $\beta_9$  (the interactions of price change and prior year price with elasticity) are also of interest here. These coefficients are negative for the first quarter of 2008 and steadily increase for the next three quarters becoming positive before becoming insignificant in 2009. Noting that high elasticity means a high negative value of the variable, the high elasticity firms appear to increase the effect of the both price reductions and prior year price in terms of being used to boost short term (Q1 2008) earnings at the expense of subsequent earnings.

## 5. Conclusion

Using a new dataset of supermarket scanner data, this paper considers the effects of price changes at different times of the fiscal year for products with varying price elasticity of demand on subsequent firm level performance metrics.

Initial results are consistent with fiscal year-end price reductions being associated with short term improvements in EPS. However, in a period of economic slowdown, these effects reverse over the following 18-24 months. In both scenarios, these results are amplified for products with high price elasticity of demand.

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<sup>28</sup> The dependent variables used in different regression estimations may be mechanically correlated due to the variable definition used. Use of Seemingly Unrelated Regressions or redefining the 2009 variables as a change in EPS (share price) since the matching quarter of 2007 does not materially change the interpretation of the results.

When considering prior year discounting behavior in conjunction with current period pricing, results are consistent with first-time fiscal year-end price discounters increasing earnings in the short term but experiencing subsequent weaker performance in earnings. In contrast, firms which had previously discounted and increase fiscal year-end discounts appear to maintain positive earnings momentum into late 2008.

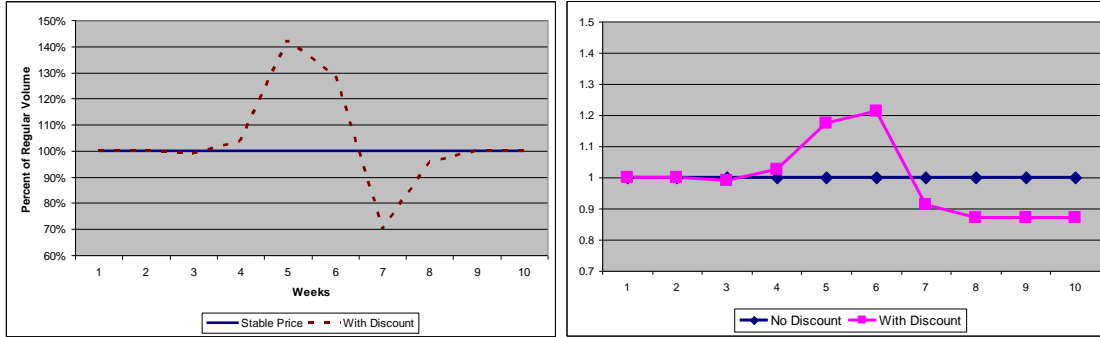
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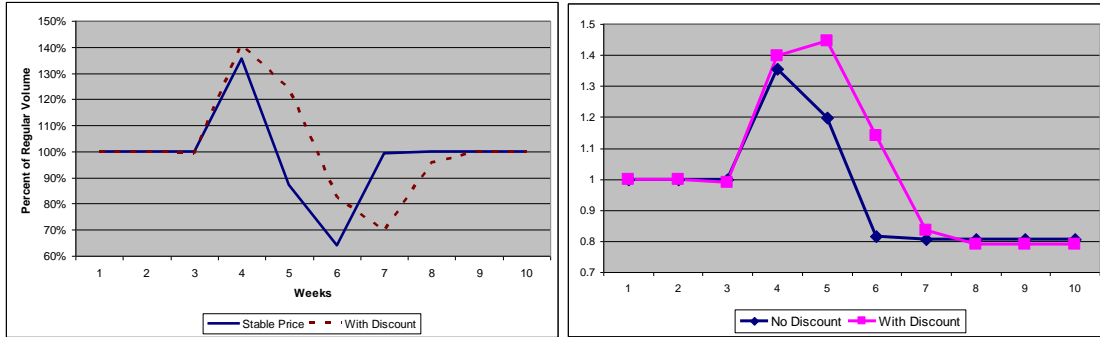
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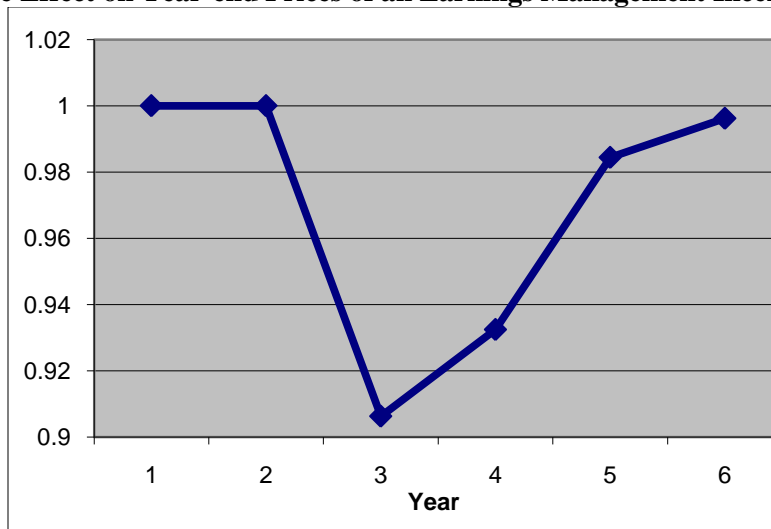
**Figure 1: The Effect on Sales Volumes (Left) and Contribution (Right) of a Two-Week Promotion in Weeks 5 & 6 with Competitors Maintaining Stable Prices<sup>29</sup>**



**Figure 2: The Effect on Sales Volumes (Left) and Contribution (Right) of a Two-Week Promotion in Weeks 5 & 6 with Competitors Reducing Prices in Weeks 5&6**



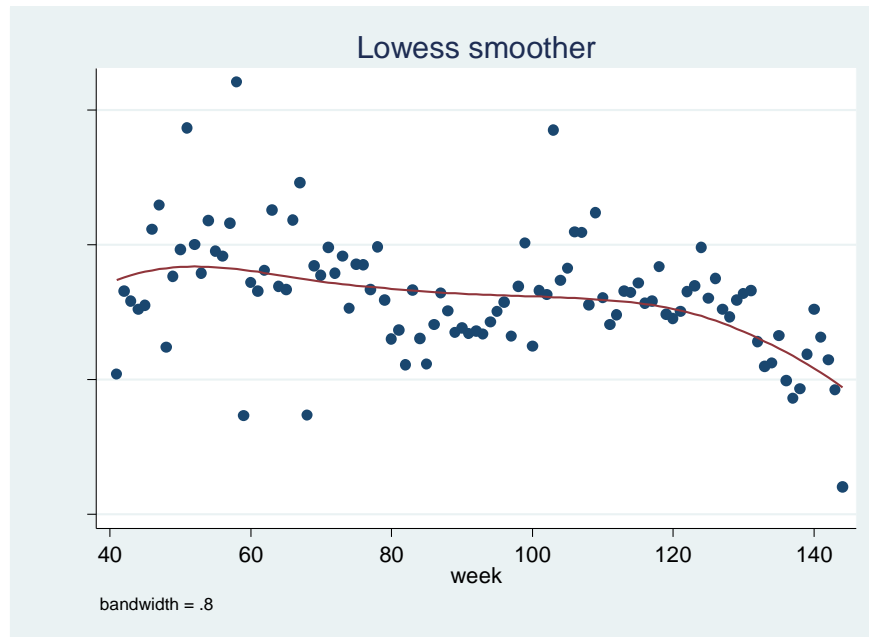
**Figure 3: The Effect on Year-end Prices of an Earnings Management Incentive in Year 3**



Regular Price scaled to One.

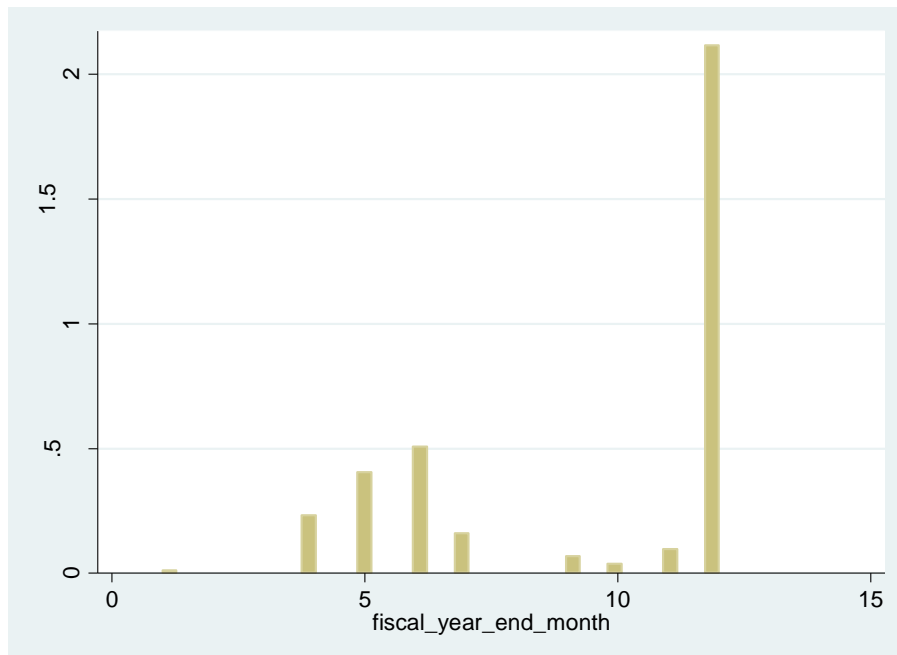
<sup>29</sup> The source of data for Figures 1, 2 and 3 is Chapman (2010)

**Figure 4: Sales Revenues by Week**



Graph of weekly sales in dollars. Week 44 is the first week in the sample.

**Figure 5: Fiscal Year-End Frequency Distribution for Companies in Sample (by UPC)**



January is Month 1

**Table 1: Summary Statistics Across Different Model Specifications**

	Q1 2008	Q2 2008	Q3 2008	Q4 2008	Q1 2009	Q2 2009	Q3 2009	Q4 2009	Cumulative
Change in Earnings per Share									
Mean	0.074	0.196	0.244	-0.919	-0.253	0.078	0.167	0.983	
Standard Deviation	0.445	1.486	1.233	1.187	2.701	2.476	1.798	3.622	
Frequency of Positive Change in EPS									
Mean	0.629	0.721	0.659	0.394	0.597	0.564	0.639	0.745	3.444
Standard Deviation	0.483	0.449	0.474	0.489	0.491	0.496	0.480	0.436	2.540
Change in Stock Price at end of quarter									
Mean	-0.064	-0.037	0.061	-0.151	-0.094	0.096	0.119	0.054	
Standard Deviation	0.070	0.105	0.136	0.114	0.162	0.169	0.088	0.051	
Change in Retail Prices									
Mean	0.005								
Standard Deviation	0.161								
Price Elasticity of Demand									
Mean	-0.377								
Standard Deviation	0.568								

**Table 2a: Correlation of Quarterly Change in EPS Variables**

	Q1 2008	Q2 2008	Q3 2008	Q4 2008	Q1 2009	Q2 2009	Q3 2009
Q2 2008	-0.3222						
Q3 2008	-0.0822	0.0823					
Q4 2008	0.0661	0.1705	-0.1369				
Q1 2009	0.2872	0.0952	0.0094	0.3994			
Q2 2009	-0.0075	0.0045	0.0701	-0.0532	-0.2930		
Q3 2009	0.2731	0.0732	-0.5497	0.3400	0.5436	0.0850	
Q4 2009	0.1904	-0.4737	0.1309	-0.1492	-0.0105	0.4265	0.0561

**Table 2b: Correlation of Frequency of Positive Change in EPS Variables**

	Q1 2008	Q2 2008	Q3 2008	Q4 2008	Q1 2009	Q2 2009	Q3 2009
Q2 2008	-0.1331						
Q3 2008	-0.2768	0.4312					
Q4 2008	0.2291	0.2635	0.2192				
Q1 2009	-0.1393	0.6118	0.1538	0.4019			
Q2 2009	-0.2658	-0.3091	-0.0506	-0.0036	0.081		
Q3 2009	0.4896	-0.1188	-0.4405	0.4412	0.1878	0.0115	
Q4 2009	-0.2734	-0.2704	-0.334	-0.6795	-0.2626	0.3108	-0.2138

**Table 3: The relation of subsequent EPS performance to price changes at the fiscal year-end**

Dependent Variable	Change From the Same Quarter in the Prior Year							
	Q1 2008 EPS	Q2 2008 EPS	Q3 2008 EPS	Q4 2008 EPS	Q1 2009 EPS	Q2 2009 EPS	Q3 2009 EPS	Q4 2009 EPS
Column #	1	2	3	4	5	6	7	8
Ordinary Least Squares								
Price Change $\beta_1$	-0.082** (-5.91)	0.373** (6.92)	-0.287** (-5.98)	0.178** (5.88)	-0.444** (-4.59)	0.359** (3.04)	0.395** (4.90)	-0.761** (-4.07)
Fiscal Year-End $\beta_2$	-0.022** (-10.03)	0.017* (2.15)	-0.021* (-2.18)	0.023** (3.50)	-0.057* (-2.57)	-0.044* (-2.04)	-0.007 (-0.53)	-0.065** (-3.22)
Price Change * Fiscal Year-End $\beta_3$	-0.105** (-4.44)	-0.203* (-2.25)	-0.323** (-4.47)	-0.032 (-0.59)	-0.139 (-0.67)	0.614** (3.75)	0.423** (3.34)	0.609* (2.31)
Constant	0.086** (14.55)	0.160** (7.46)	0.292** (16.90)	-0.106** (-7.44)	-0.293** (-6.86)	0.117** (3.13)	0.151** (5.39)	1.165** (19.91)
Observations	239,835	239,835	239,835	239,835	239,835	239,183	229,782	229,100
Adjusted R-squared	0.2%	0.1%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%
Fixed Effects for Calendar Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

\* Significant at the 5% level (two tail) \*\* Significant at the 1% level (two tail)

Note: Models are estimated using Huber-White<sup>30</sup> standard errors to allow for any lack of independence between observations for the same UPC within the sample.

<sup>30</sup> See Huber (1967), White (1980) and Froot (1989).

**Table 4: The likelihood of positive change in subsequent EPS performance relating to price changes at the fiscal year-end**

Dependent Variable	Likelihood of EPS being Higher than the Same Quarter in the Prior Year								
	Q1 2008	Q2 2008	Q3 2008	Q4 2008	Q1 2009	Q2 2009	Q3 2009	Q4 2009	Cumulative
Column #	1	2	3	4	5	6	7	8	9
Logistic									
Price Change $\beta_1$	0.052 (0.74)	-0.040 (-0.50)	-0.039 (-0.51)	0.518** (7.09)	0.028 (0.39)	-0.061 (-0.86)	0.231** (3.21)	0.155 (1.87)	-0.445** (-6.14)
Fiscal Year-End $\beta_2$	-0.076** (-6.13)	0.004 (0.33)	0.057** (4.36)	0.121** (9.23)	0.073** (5.70)	0.045** (3.36)	-0.105** (-8.44)	-0.057** (-3.59)	0.036** (2.97)
Price Change * Fiscal Year-End $\beta_3$	0.159 (1.29)	-0.190 (-1.46)	-0.464** (-3.66)	0.592** (4.59)	0.574** (4.65)	0.856** (6.92)	0.134 (1.08)	0.147 (0.98)	-0.140 (-1.02)
Constant	0.425** (14.31)	0.955** (29.43)	0.646** (21.13)	-0.661** (-21.70)	0.350** (11.87)	0.433** (14.56)	0.322** (10.71)	1.381** (37.42)	4.142** (143.90)
Observations	239,835	239,835	239,835	239,835	239,835	239,183	229,782	229,100	287,108
Pseudo R-squared	0.1%	0.1%	0.3%	0.1%	0.1%	0.2%	0.1%	0.1%	0.2%
Fixed Effects for Calendar Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

\* Significant at the 5% level (two tail) \*\* Significant at the 1% level (two tail)

Note: Models are estimated using Huber-White<sup>31</sup> standard errors to allow for any lack of independence between observations for the same UPC within the sample.

<sup>31</sup> See Huber (1967), White (1980) and Froot (1989).

**Table 5: The relation of subsequent stock price performance to price changes at the fiscal year-end**

Dependent Variable Column # Ordinary Least Squares	Change From the Prior Quarter							
	Q1 2008 Stock Price 1	Q2 2008 Stock Price 2	Q3 2008 Stock Price 3	Q4 2008 Stock Price 4	Q1 2009 Stock Price 5	Q2 2009 Stock Price 6	Q3 2009 Stock Price 7	Q4 2009 Stock Price 8
Price Change $\beta_1$	-0.015** (-6.55)	0.015** (3.99)	-0.018** (-3.62)	0.007 (1.55)	0.048** (8.42)	-0.036** (-6.96)	0.014** (4.08)	-0.001 (-0.41)
Fiscal Year-End $\beta_2$	0.000 (0.74)	-0.005** (-7.48)	0.002 (1.95)	0.003** (3.47)	-0.000 (-0.30)	-0.000 (-0.29)	0.002** (3.25)	-0.003** (-10.01)
Price Change * Fiscal Year-End $\beta_3$	0.025** (6.16)	-0.022** (-3.46)	-0.015 (-1.72)	-0.018* (-2.47)	0.025* (2.52)	0.047** (5.49)	-0.013* (-2.42)	0.005 (1.88)
Constant	-0.067** (-70.20)	-0.026** (-17.38)	0.054** (26.07)	-0.147** (-89.11)	-0.087** (-38.15)	0.085** (41.64)	0.116** (93.05)	0.057** (78.90)
Observations	239,835	239,835	239,835	239,835	239,835	239,183	229,782	229,100
Adjusted R-squared	0.1%	0.1%	0.1%	0.0%	0.2%	0.2%	0.1%	0.1%
Fixed Effects for Calendar Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

\* Significant at the 5% level (two tail) \*\* Significant at the 1% level (two tail)

Note: Models are estimated using Huber-White<sup>32</sup> standard errors to allow for any lack of independence between observations for the same UPC within the sample.

<sup>32</sup> See Huber (1967), White (1980) and Froot (1989).

**Table 6: The relation of subsequent EPS performance to price changes at the fiscal year-end controlling for prior year pricing**

Dependent Variable	Change From the Same Quarter in the Prior Year								
	Q1 2008 EPS	Q2 2008 EPS	Q3 2008 EPS	Q4 2008 EPS	Q1 2009 EPS	Q2 2009 EPS	Q3 2009 EPS	Q4 2009 EPS	Cumulative freq. of increase
Column # Ordinary Least Squares	1	2	3	4	5	6	7	8	9
Price Change $\beta_1$	-0.194** (-8.58)	0.591** (7.90)	-0.024 (-0.37)	0.124* (2.00)	-0.738** (-4.94)	0.090 (0.56)	-0.225* (-2.43)	-0.545* (-2.30)	-0.367** (-3.32)
Fiscal Year-End $\beta_2$	-0.195** (-7.10)	-0.228* (-2.07)	0.405** (4.45)	-0.160* (-2.35)	0.665** (3.66)	-0.068 (-0.46)	0.057 (0.45)	0.901** (3.46)	0.188 (1.30)
Price Change * Fiscal Year-End $\beta_3$	-0.011 (-0.37)	-0.074 (-0.74)	-0.554** (-6.48)	0.067 (1.00)	-0.523 (-1.91)	0.630** (3.66)	0.395** (2.62)	0.086 (0.36)	-0.223 (-1.34)
Prior Year Price $\beta_4$	-0.248** (-7.21)	0.483** (4.28)	0.582** (5.92)	-0.118 (-1.12)	-0.653* (-2.49)	-0.597** (-2.61)	-1.370** (-8.75)	0.476 (1.56)	0.171 (1.01)
Prior Year Price * Fiscal Year-End $\beta_5$	0.207** (6.35)	0.287* (2.17)	-0.510** (-4.63)	0.218* (2.57)	-0.852** (-3.87)	0.033 (0.18)	-0.065 (-0.44)	-1.150** (-3.67)	-0.182 (-1.06)
Constant	0.292** (10.05)	-0.242** (-2.78)	-0.192* (-2.26)	-0.007 (-0.09)	0.249 (1.25)	0.613** (3.54)	1.291** (9.59)	0.769** (3.20)	3.999** (27.94)
Observations	239,835	239,835	239,835	239,835	239,835	239,183	229,782	229,100	287,108
Adjusted R-squared	0.6%	0.3%	0.4%	0.1%	0.1%	0.1%	0.8%	0.1%	0.1%
Fixed Effects for Calendar Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

\* Significant at the 5% level (two tail) \*\* Significant at the 1% level (two tail)

Note: Models are estimated using Huber-White<sup>33</sup> standard errors to allow for any lack of independence between observations for the same UPC within the sample.

<sup>33</sup> See Huber (1967), White (1980) and Froot (1989).

**Table 7: The relation of subsequent EPS performance to price changes at the fiscal year-end interacting with prior year pricing**  
**Regressions estimated using data from the last month of the fiscal year for each manufacturer**

Dependent Variable	Change From the Same Quarter in the Prior Year								
	Q1 2008 EPS	Q2 2008 EPS	Q3 2008 EPS	Q4 2008 EPS	Q1 2009 EPS	Q2 2009 EPS	Q3 2009 EPS	Q4 2009 EPS	Cumulative freq. of increase
Column # Ordinary Least Squares	1	2	3	4	5	6	7	8	9
Price Change $\beta_3$	0.411** (4.48)	-1.635** (-2.98)	-0.616* (-2.02)	-0.367 (-1.76)	0.059 (0.11)	-1.840* (-2.15)	0.462 (0.90)	7.236** (3.67)	-1.987** (-3.31)
Prior Year Price $\beta_5$	0.015 (0.43)	0.392* (2.33)	-0.281* (-2.04)	0.182 (1.41)	0.046 (0.16)	-1.541** (-3.91)	-0.419 (-1.95)	-0.587 (-1.48)	0.019 (0.08)
Price Change * Prior Year Price $\beta_6$	-0.585** (-5.47)	2.536** (3.82)	0.414 (1.13)	0.774** (3.22)	-0.314 (-0.47)	3.044* (2.55)	-0.270 (-0.41)	-8.992** (-3.68)	1.666* (2.24)
Constant	-0.160** (-5.75)	0.002 (0.02)	0.315** (2.91)	-0.129 (-1.30)	0.066 (0.30)	1.490** (4.54)	0.267 (1.54)	-4.540** (-13.21)	3.983** (20.82)
Observations	20,807	20,807	20,807	20,807	20,807	20,755	19,938	19,895	24,788
Adjusted R-squared	0.503	0.116	0.238	0.106	0.418	0.154	0.314	0.115	0.129
Fixed Effects for Calendar Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

\* Significant at the 5% level (two tail) \*\* Significant at the 1% level (two tail)

Note: Models are estimated using Huber-White<sup>34</sup> standard errors to allow for any lack of independence between observations for the same UPC within the sample.

<sup>34</sup> See Huber (1967), White (1980) and Froot (1989).

**Table 8: The relation of subsequent EPS performance to price changes at the fiscal year-end interacting with prior year pricing and price elasticity of demand. Regressions estimated using data from the last month of the fiscal year for each manufacturer**

Dependent Variable	Change From the Same Quarter in the Prior Year								
	Q1 2008 EPS	Q2 2008 EPS	Q3 2008 EPS	Q4 2008 EPS	Q1 2009 EPS	Q2 2009 EPS	Q3 2009 EPS	Q4 2009 EPS	Cumulative freq. of increase
Column #	1	2	3	4	5	6	7	8	9
Ordinary Least Squares									
Price Change $\beta_3$	0.460** (4.91)	-1.632** (-2.88)	-0.946** (-2.81)	-0.572* (-2.48)	-0.051 (-0.09)	-1.415 (-1.67)	0.375 (0.72)	7.787** (3.87)	-1.232* (-2.01)
Prior Year Price $\beta_5$	0.121* (2.52)	0.473 (1.58)	-0.943** (-3.36)	-0.064 (-0.34)	0.153 (0.32)	-1.296* (-2.34)	-0.414 (-1.29)	0.568 (0.88)	0.308 (0.85)
Price Change * Prior Year Price $\beta_6$	-0.586** (-5.46)	2.556** (3.84)	0.425 (1.15)	0.826** (3.41)	-0.180 (-0.27)	3.130** (2.61)	-0.093 (-0.14)	-9.104** (-3.71)	1.277 (1.76)
Elasticity $\beta_7$	-0.203** (-3.43)	-0.020 (-0.06)	1.123** (3.16)	0.420* (2.18)	-0.118 (-0.18)	-0.008 (-0.02)	0.212 (0.57)	-1.678** (-2.63)	-0.358 (-0.80)
Price Change * Elasticity $\beta_8$	0.100* (1.97)	0.094 (0.40)	-0.671* (-2.49)	-0.325 (-1.71)	0.074 (0.12)	0.772 (1.67)	0.073 (0.22)	0.776 (1.19)	0.869* (2.24)
Prior Year Price * Elasticity $\beta_9$	0.222** (3.21)	0.218 (0.56)	-1.348** (-3.16)	-0.468* (-1.97)	0.404 (0.50)	-0.284 (-0.51)	-0.138 (-0.31)	1.753* (2.31)	0.330 (0.64)
Constant	-0.266** (-6.40)	0.023 (0.09)	0.910** (3.78)	0.112 (0.72)	0.095 (0.24)	1.153* (2.46)	0.332 (1.21)	-5.669** (-10.24)	3.659** (11.55)
Observations	20,535	20,535	20,535	20,535	20,535	20,483	19,675	19,632	24,495
Adjusted R-squared	0.504	0.119	0.242	0.113	0.421	0.161	0.329	0.114	0.141
Fixed Effects for Calendar Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

\* Significant at the 5% level (two tail) \*\* Significant at the 1% level (two tail). Models are estimated using Huber-White<sup>35</sup> standard errors to allow for any lack of independence between observations for the same UPC within the sample.

<sup>35</sup> See Huber (1967), White (1980) and Froot (1989).