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# Supermarket Promotions and Food Prices

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## **Abstract**

Using a sample comprising nearly a quarter of a million weekly prices from the largest seven supermarket chains in the UK, we present statistical evidence on two pricing practices that have attracted public interest. Analysing price dynamics before and after periods of promotional discounting the investigation finds first, no evidence of a general tendency for sales to disguise rises in the regular price, and second, some evidence for prices to rise prior to sales in a manner that is consistent with the exaggeration of the discount. As such, the results parallel the competition authority's view of supermarkets use of promotions and also point to the useful contribution that retail price microdata might play in keeping prices in check.

Keywords: supermarket promotion, food prices

JEL classification: L16; L66; E30.

# 1 Introduction

Like many European economies, UK food retailing is dominated by a small number of national supermarket chains. With a CR4 of 76% (Kantar WorldPanel, 2013) the UK's food sector has attracted unparalleled levels of scrutiny by the competition authorities in recent years - two statutory inquiries by the Competition Commission (2000, 2008) and a raft of investigations by the Office of Fair Trading (2010, 2011 and 2012). Similar issues and anti-trust activity is on-going elsewhere, as documented by the OECD Competition Roundtable and in the work of the EU's European Competition Network (see OECD, 2014 and ECN, 2014 respectively). One key area of focus to emerge has been the use of promotional activity or 'sales' in supermarkets; 68% of consumers always look out for sales and almost 40% of all groceries purchased in UK supermarkets are on sale (Wisson, 2012).

Against this background, this note evaluates two aspects of supermarket pricing that have caught media attention. The first involves using sales to disguise price rises, whereby sales precede price rises, thereby distancing the new higher regular price from its previous level in consumers' minds (Guardian, 2010). The second concerns artificially inflating prices prior to a promotion, thereby exaggerating the depth of a subsequent discount (Sunday Times, 2013). The OFT recently found that supermarkets had not broken consumer law, although they did find ' . . . that there was a variety of approaches to interpreting and applying relevant legislation across the food/drink retail sector' (OFT, 2012). A set of principles setting out fair practice has subsequently been agreed by eight national UK food retailers.

Using a sample comprising nearly a quarter of a million weekly prices, this note presents findings relevant to these issues in a period prior to the establishment of these principles. While prices alone say nothing about the intention to 'disguise' a price rise or 'exaggerate' the depth of a subsequent sale, the price movements that give rise to such accusations are easily investigated. Mindful of this caveat, we proceed to outline the microdata and following a brief discussion of the price dynamics involved, test them empirically.

## 2 A Dataset of Scanner Prices

We use the dataset detailed in Lloyd et al. (2012). While not constructed specifically to address the issues raised in this Note, it is well suited to do, being one of the largest and most comprehensive panels of weekly supermarket food prices ever assembled in the UK. Prices derive from laser barcode scanners as products pass through the checkouts at the largest seven supermarkets during 137 weeks from 8th September 2001 to 17th April 2004, giving some 231,069 prices in all. The dataset contains the prices of 507 products in 15 categories of grocery spending. Products are identified at a highly detailed (barcode) level; two products are distinct if they have different barcodes. Each retailer-product combination is assigned a Unique Item Code (UIC) so that the 100 gram jar of *Nescafe Gold Blend* sold in Tesco is one such item. There are 1,704 items in the sample so on average each product is stocked in just over three supermarkets; 92 products are stocked in all seven. Products are in 15 categories across a range of formats. Private label products account for nearly one-fifth of the items.<sup>1</sup>

Prices are average revenues at the barcode level by retail chain in each week and neatly represent each retailer's national price. By their construction, prices fluctuate by small amounts week-on-week (indeed half of the price changes observed in the raw data are 1p), although national pricing strategies are the norm in UK retailing (Competition Commission, 2000). Most importantly, prices incorporate the effect of promotional activity, whether these are in the form of price reductions ('50% off') or quantity promotions ('buy one, get one free'). Sale prices are identified as x% price reductions lasting no longer than 12 weeks. Given that all such definitions are to some extent arbitrary, thresholds of 10%, 25% and 35% are considered.

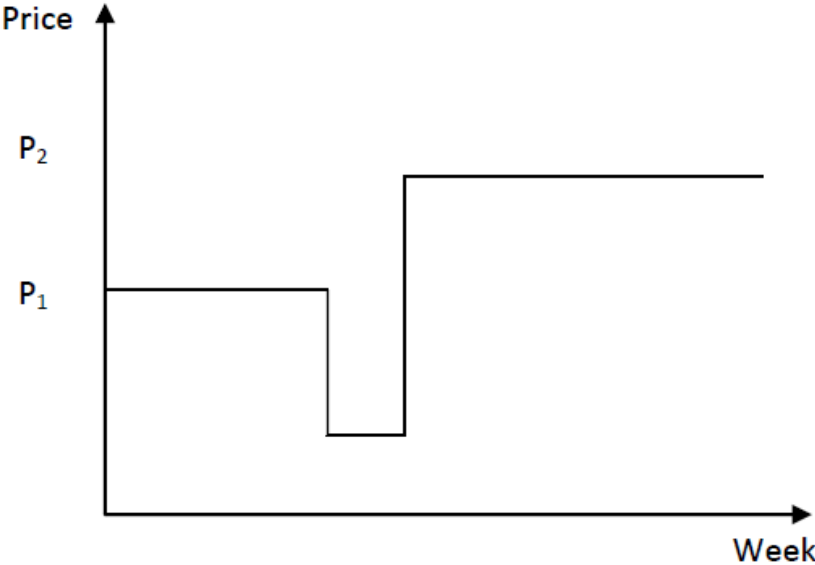
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<sup>1</sup>The 15 categories are: orange juice, instant coffee, breakfast cereals, teabags, yoghurt, wrapped bread, tinned tuna, tinned tomatoes, tinned soup, corned beef, fish fingers, frozen peas, frozen chips, jam and frozen pizza. Retailers are anonymised in this paper but include both prestige and mainstream chains and soft discounters.

### 3 Do Sales Disguise Price Rises?

One specific practice that has attracted attention is the use of sales to mask increases in the regular (non-sale) price of an item. The premise is that by acting as a barrier to the recollection of the previous regular price, a sale makes the price rise less noticeable in the consumer’s memory, so ‘disguising’ the price rise. Such a situation is shown in Figure 1, where the price rises from  $P_1$  to  $P_2$ .

Figure 1: A sale disguising an increase in the regular price



A comparison of prices in the weeks prior to and following sales of 10%, 25% and 35% is presented in Table 1. It turns out that around one-fifth of prices are higher after a sale. Interestingly, almost twice as many prices are actually lower after a sale than before a sale, so that the remainder (around 30 to 40%) of prices are the same either side of a sale.

Table 1: Comparison of prices before and after a sale, by sales threshold

	Percent		
	10% Sale	25% Sale	35% Sale
Prices after a sale are higher	21.98	20.68	21.59
Prices after a sale are lower	38.25	42.45	48.29
Prices are the same	39.76	36.86	30.12

Since the average revenue nature of scanner prices induces noise in the data, the simple frequencies in Table 1 may present a misleading picture because they take no account of the size of price changes. Using estimates of the percentage change between pre- and post-sale prices for various classifications of the dataset yields the figures in Table 2. The key finding, which holds for all depths of sales and across supermarkets, formats and brand status is that far from masking price increases, sales had a tendency to herald lower regular food prices during the sample frame.<sup>2</sup> It is noteworthy that while general (all items) CPI inflation was low and stable over the period, food CPI inflation was more volatile and frequently negative (particularly in many of the categories considered here) a feature that our results would appear to reflect.

<sup>2</sup>To check whether prices were lower owing to a staggered return to their non-sale level following a sale, all tests were repeated using prices two weeks after the sale. Findings remain the same.

Table 2: Estimates of the percentage change in price (t ratio) following a sale

	Estimates	t ratio
<b>Sale Depth</b>		
10%	-0.39***	(-6.88)
25%	-0.71***	(-7.41)
35%	-1.26***	(-6.53)
<b>Retailer</b>		
Retailer A	-0.34***	(-3.68)
Retailer B	-0.31***	(-3.04)
Retailer C	-3.08***	(-6.24)
Retailer D	-0.14	(-0.94)
Retailer E	-0.20*	(-1.75)
Retailer F	-0.78***	(-6.46)
Retailer G	-0.23**	(-2.05)
<b>Format</b>		
Tinned	-0.40***	(-5.33)
Ambient	-0.71***	(-5.67)
Frozen	-0.71***	(-4.04)
Chilled	0.13	(0.50)
Fresh	-0.27***	(-2.72)
<b>Brand</b>		
National brand	-0.38***	(-6.79)
Private label	-0.48*	(-1.91)

Note: \*\*\*, \*\* and \* denote that the null hypothesis is rejected at the 1% , 5% and 10% level.

## 4 Do Price Rises Exaggerate Sales?

The second hypothesis we wish to test, and one of the principal concerns raised in the OFT 2012 investigation into supermarket promotions, relates to the artificial inflation of prices prior to a sale, thereby exaggerating the discount and thus reducing the true cost of the promotion to the retailer. Figure 2 illustrates this pattern.



Figure 2: Price rises exaggerate a subsequent sale

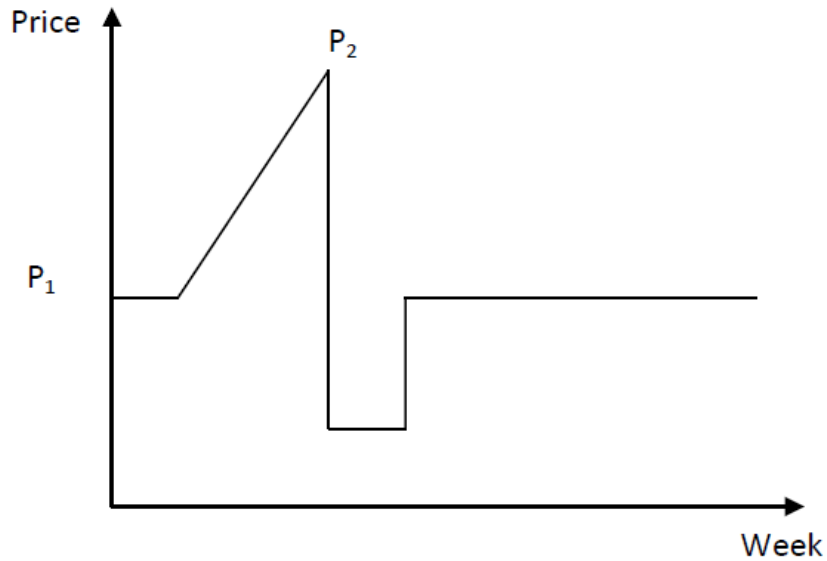


Table 3 reports the average percentage change in price of items in the three weeks leading up to 10%, 25% and 35% sales. Notice that the price changes are typically positive and tend to be larger the deeper the sale. For example, one week prior to 10% (35%) sales, prices grew on average by 0.39% (1.86%) more than prices in spells of regular prices as a whole. The results also suggest that prices increase two and three weeks prior to a 10% sale but thereafter, no statistically significant changes can be detected. While the figures in the table are small, they are averages and as such may reflect moderate price growth in some products and little or no change in others. The  $t$  statistics reported in the table evaluate the null of no difference between the percentage change in price in each of the weeks prior to a sale compared to the average percentage change in regular prices over the sample as a whole in each classification. While one price change is negative, it is statistically insignificant and small in magnitude, so that overall we find that the growth in prices prior to a sale is higher than at other times, a result that is statistically significant at conventional levels.

Table 3: Percentage change in price prior to sales

Week	10% sale	25% sale	35% sale
1	0.39*** (8.94)	0.82*** (9.44)	1.86*** (8.38)
2	0.15*** (3.38)	0.83*** (6.50)	2.64*** (8.02)
3	0.12** (2.55)	0.44*** (3.83)	-0.06 (-0.20)

Note: \*\*\*, \*\* and \* denote that the null hypothesis is rejected at the 1% , 5% and 10% level. t statistics is in ().

To investigate this in more detail, Table 4 reports results by retailer in the three weeks prior to a 10% sale. <sup>3</sup> While there is some evidence that most retailers had a tendency to increase prices prior to sales, the magnitude and statistical significance appears stronger for Retailers D, E and F (which were the soft discounters in the UK during the sample) rather than the others (which are either mainstream or premium retailers), with one discounter (Retailer D) displaying marked increases in prices in the run-up to sales.

<sup>3</sup>Results for 25% and 35% offer a very similar picture and are available upon request.

Table 4: The average percentage change in price in the weeks prior to 10% sales across supermarkets

Week	Retailer A	Retailer B	Retailer C	Retailer D	Retailer E	Retailer F	Retailer G
1	0.11* (1.81)	-0.05 (-1.05)	-0.01 (-0.13)	0.78*** (5.66)	0.39*** (4.42)	0.57*** (5.98)	0.12 (1.28)
2	-0.03 (-0.46)	0.13** (2.53)	-0.05 (-0.48)	0.44*** (2.79)	-0.00 (-0.04)	0.14 (1.31)	0.17* (1.66)
3	0.13 (1.60)	0.04 (0.52)	0.11 (0.69)	0.64*** (4.54)	-0.08 (-0.73)	-0.09 (-0.67)	-0.11 (-1.16)

Note: \*\*\*, \*\* and \* denote that the null hypothesis is rejected at the 1% , 5% and 10% level.  $t$  statistics are in ().

## 5 Conclusion

In an attempt to shed light on two allegations about supermarket pricing, this note has investigated the dynamics of food prices before and after promotions using a large panel of micro price data from UK food retailing. Results can at best point to simple associations in the data and as such actually say nothing about the behavioural motivations that underlie the pattern of prices. Notwithstanding this caveat, we find no evidence supporting the view that sales ‘disguise’ price rises during the sample frame. In fact, results indicate that post-sale prices tended to be lower than those immediately prior to a sale, a result that most probably reflects the deflationary environment of the time. We find some evidence supporting the view that prices are inflated to make subsequent discounts more attractive, although the strongest evidence is found in a single discount chain. To the extent that evidence has been found at all, it seems entirely appropriate that the UK’s OFT sought to obtain agreement within the sector to outlaw such conduct. Furthermore the advent of retail price micro data makes it that much easier to scrutinise pricing in what are often highly concentrated retail markets.

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