Market definition: details of analysis

1. Introduction

1. Section 4 of our report deals with market definition. This appendix presents the analysis referred to in that section of our report.

2. This appendix is organized as follows. Section 2 discusses our analysis of price-based evidence for ketchup, brown sauce and barbecue sauce, including LECG's econometric model. Section 3 discusses our analysis of price-based evidence for tinned baked beans and tinned pasta meals. Section 4 discusses evidence on the characteristics and intended uses of ketchup and brown sauce. There are two annexes with some technical analysis.[1]

2. Analysis of price-based evidence for ketchup, brown sauce and barbecue sauce

Ketchup

3. Analysing promotional activity can provide an insight into market definition, especially for fast-moving consumer goods like ketchup, which often may be characterized by frequent, deep-price promotions like BOGOF, 'three for two', or some percentage extra free (typically one-third to one-half in our data).[2] One would expect (say) a BOGOF promotion (for which the price reduction is 50 per cent) to significantly reduce the sales of products that are close substitutes for the promoted product, as consumers switch their purchases to the promoted product.[3]

4. Heinz provided us with information on promotional activity for its ketchup at the major grocery retailers,[4] which we cross-referenced to the same information from the retailers (included in their responses to our customer questionnaire).[5] We applied this to information on the volume and value of ketchup and brown sauce sales for each of these retailers, which they included in their responses to our customer questionnaire.

5. Major retailers tended not to promote branded ketchup and branded brown sauce at the same time (see Table 1), so promotions of one shifted its relative price to the

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[1]Appendix G summarizes information given by parties to the inquiry on the general sales, pricing and promotion background in respect of the relevant products in the context of the inquiry.
[2]See, for example, paragraph 2.16 of *Merger References: Competition Commission Guidelines* (CC2, June 2003).
[3]Care must be taken in any such analysis to consider the possibility of 'larder loading'. Larder loading arises when households stock up on a product when it is promoted rather than increasing consumption, causing an increase in sales when the product is promoted, followed by depressed sales volume (compared with pre-promotion levels) when the promotion ceases. We saw no evidence that this had invalidated our analysis, not least because larder loading is more of an issue when estimating elasticities, which our analysis did not estimate. A further issue is that a (say) 50 per cent fall in the price of one product on BOGOF promotion would lead to a short-term change in its relative price to a potential substitute of much more than the 5 per cent that the SSNIP test is concerned with. So finding that customers switched from one product to another in response to a large, transitory increase in price is not the same as finding that they switched in response to a small, non-transitory increase in price.
[4]Heinz submitted that 'retailers treat the products separately: ketchup and brown sauce are not regarded as substitutes for one another, and each is stocked separately'.
[5]The 'Big 4' major grocery retailers (Asda, Morrisons, Sainsbury's and Tesco) accounted for around [✂] per cent of the value of Heinz's wholesale sales of sauces and baked beans and pasta through the retail channel in the financial year 2005. The other major grocery retailers (Co-op, Iceland, Netto, Somerfield/Kwik Save and Waitrose) accounted for a further [✂] per cent (approximately). We sent questionnaires to all except Co-op (which has a decentralized corporate structure). No other retailer had more than [✂] per cent of Heinz's business in the financial year 2005.

other. Our analysis used this large shift in relative price by looking at the introduction of Heinz's 570g top-down ketchup, which has been heavily promoted[6] and became the biggest-selling (in value, kg and unit terms) ketchup SKU in the period we examined.[7] In order to isolate this event-analysis from the effects of product introductions in brown sauce (see paragraph 12 for an example[8]), we focused on the effect of the introduction of the 570g top-down bottle of Heinz ketchup on one of the best-selling variants of HP brown sauce, sold in large quantities continually throughout the period but not heavily promoted, the 850g plastic bottle.[9]

6. We recognized that looking at two such different size bottles of ketchup and brown sauce may not be comparing like with like, even if they do appear to be drivers of movements in aggregate sales of branded ketchup and brown sauce. To allow for this, therefore, we also looked at the effect on HP's heavily-promoted 425g bottle of brown sauce (which was the UK's biggest-selling brown sauce in the period we examined) of the introduction of Heinz's 570g top-down ketchup and—because Heinz submitted serving sizes for ketchup are up to three times larger than for brown sauce[10]—the 198g Daddies brown sauce glass bottle[11] (which was not promoted).

7. Our results are given in Figure 1. The solid red line in Panel A clearly shows the significant decrease in the price of Heinz's 570g top-down ketchup as a result of the Retailer A's promotional activity. However, the solid brown line in Panel A also shows that sales of HP's popular 850g brown sauce did not fall in response to this large adverse movement in its relative price (of some [✂] per cent), although—as Panel B illustrates—the price promotion had a positive effect (ie [✂]) on Retailer A's sales of Heinz's 570g top-down ketchup (again given by a solid red line).[12]

8. The same is apparent from Panels C and D of Figure 1, which show that sales of HP's best-selling 425g brown sauce (dashed brown line) and Daddies 198g brown sauce (dotted brown line) also did not react adversely to the significant worsening in their prices relative[13] to Heinz's 570g top-down ketchup.[14] This lack of contemporaneous reaction[15] of all types of brown sauce volumes to ketchup prices was a feature of every ketchup promotion we examined, not just those for the 870g top-down bottle (Retailer A also promoted Heinz's [✂] and [✂] ketchups in the period). Qualitatively the same story emerged when we examined sales and

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[6]For example, of 11 promotions since October 2003 (when the 570g top-down Heinz ketchup first appears in its sales data) on Heinz ketchup that Retailer A told us about, five were for the 570g top-down variety. Similarly, of 31 promotions of all branded and own-label ketchup that another major retailer (that we refer to below as Retailer D) told us about, 11 were for the 570g top-down Heinz bottle. Promotions data in other retailers' questionnaire responses was not sufficiently disaggregated to separately identify promotions only on the 570g top-down Heinz ketchup bottle.

[7]Heinz submitted the 570g top-down bottle was 'successful'. The 570g top-down Heinz ketchup bottle was the UK's biggest selling ketchup by value, weight and units sold in the period we examined.

[8]There are others: HP introduced plastic bottles of brown sauce in 700g and 1kg sizes in this period.

[9]The 850g bottle was the UK's second biggest seller in terms of value and third biggest in terms of volume in the period we examined.

[10]The ketchup serving size came from the US Food and Drug Administration and the brown sauce serving size from an Australian website, however, which may mean they were not comparable. Further, the Australian information was for a product that has been discontinued. There did not appear to be official UK serving sizes for ketchup and brown sauce (the bottles give nutritional information per 100g).

[11]This should have had a comparable number of servings to the 570g top-down Heinz ketchup as 570/3 = 190, if consumers think about price per serving rather than (say) price per 100g (the measure that we understand supermarkets display alongside their sauce bottle prices).

[12]The large spike in sales of HP's 850g bottle of brown sauce in Panel A coincided with a promotion by Retailer A, which reduced the price by 20 per cent.

[13]The worsening in the relative price of each brown sauce to the promoted 570g top-down ketchup was of the same magnitude as that of the 850g HP brown sauce; some 25 to 35 per cent.

[14]The peaks and troughs in the volume sold of the 425g HP brown sauce in Panel C may make it look more like its sales were reacting to changes in the price of the Heinz 570g top-down ketchup but the peaks were associated with frequent promotional activity on the 425g HP brown sauce. Moreover, the correlation between the two series was positive, albeit weak (0.3).

[15]We saw no evidence to suggest that we should consider lagged reactions of sales volumes to price changes, rather than contemporaneous (ie four-weekly) ones. For example, LECG's econometric analysis looked at contemporaneous reactions, as did much of the other empirical evidence submitted by Heinz.

promotion data for other major retailers. (For reasons of brevity, examples of some of these results are given in Annex B.)

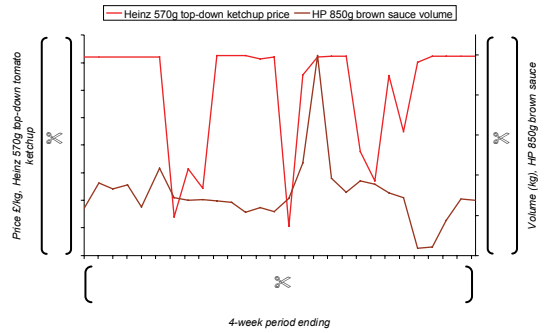
9. As well as the incidence of promotional activity examined above, several major retailers submitted that HP increased its wholesale price (by between 4 and 8 per cent) for brown sauce in July/August 2005, which HP justified in terms of input cost increases. A major retailer, which we refer to as Retailer B, submitted an analysis of the effect of this wholesale price increase on retail prices,[16] which, it said, showed 'no evidence of any switching into Heinz as a result'. Given this improvement in the relative price of Heinz ketchup to HP brown sauce at Retailer B did not appear to occasion any switching to ketchup, this is consistent with the results of our analysis of promotional activity above.

[16]Retailer B submitted that its retail price of HP's 255g brown sauce increased from [✂] on [✂], and HP's 425g brown sauce increased from [✂] on [✂].

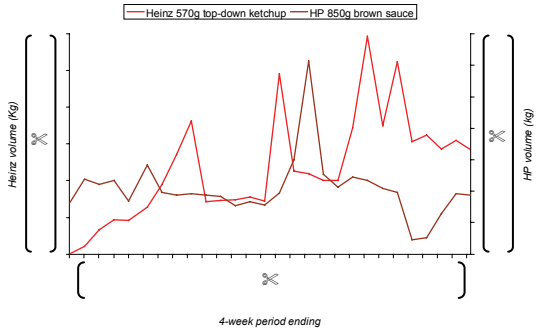
FIGURE 1

Effect of Retailer A's promotion of Heinz 570g top-down ketchup on sales of HP brown sauce, [✂]

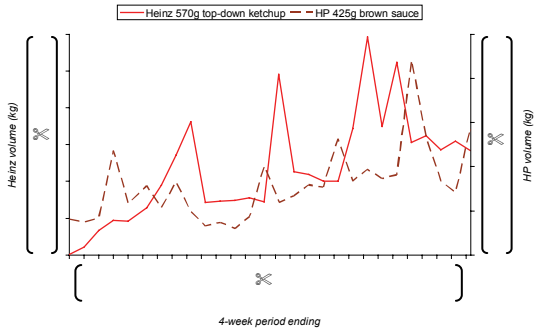
Panel A: Heinz 570g top-down price and HP 850g volume



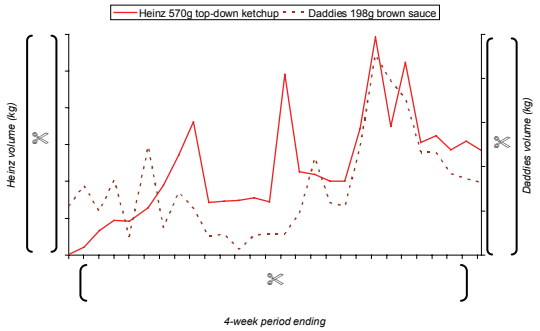
Panel B: Heinz 570g top-down and HP 850g volumes



Panel C: Heinz 570g top-down and HP 425g volumes



Panel D: Heinz 570g top-down and Daddies 198g volumes



Source: Retailer A and CC calculations.

Asymmetry in market definition

10. We noted HP internal documents, which suggested that there was evidence of high levels of switching to ketchup following the replacement of a 255g glass bottle of HP brown sauce with a 285g plastic bottle, on the basis of research conducted for HP by AC Nielsen, which concluded that 'the most significant competitive loss is to Heinz ketchup (570g top-down), and this was a theme seen across the HP brown sauce range'. This could point to Heinz ketchup imposing a material constraint on HP brown sauce.[17]

11. However, AC Nielsen's conclusions on switching to ketchup were based on analysis of aggregate, market-level data[18] and, although the aggregate IRI data at our disposal did support this conclusion (see Annex A), Heinz submitted that it captured only the fact that the top-down 570g ketchup bottle was selling faster than brown

[17]We also noted that a two-year tracking study for HP specifically considered the relationship between Heinz ketchup and HP brown sauce, which could indicate that Heinz ketchup may impose a material constraint on HP brown sauce. However, Heinz submitted that, given there are no other branded brown sauces that HP's study could have tracked, the observation that it benchmarked itself against the leading brand of ketchup (and other brands) in terms of brand awareness, purchasing patterns, brand image, usage and popularity could indicate nothing more than that leading sauce (and other) brands are comparable, rather than substitutable.
[18]AC Nielsen's Homescan database.

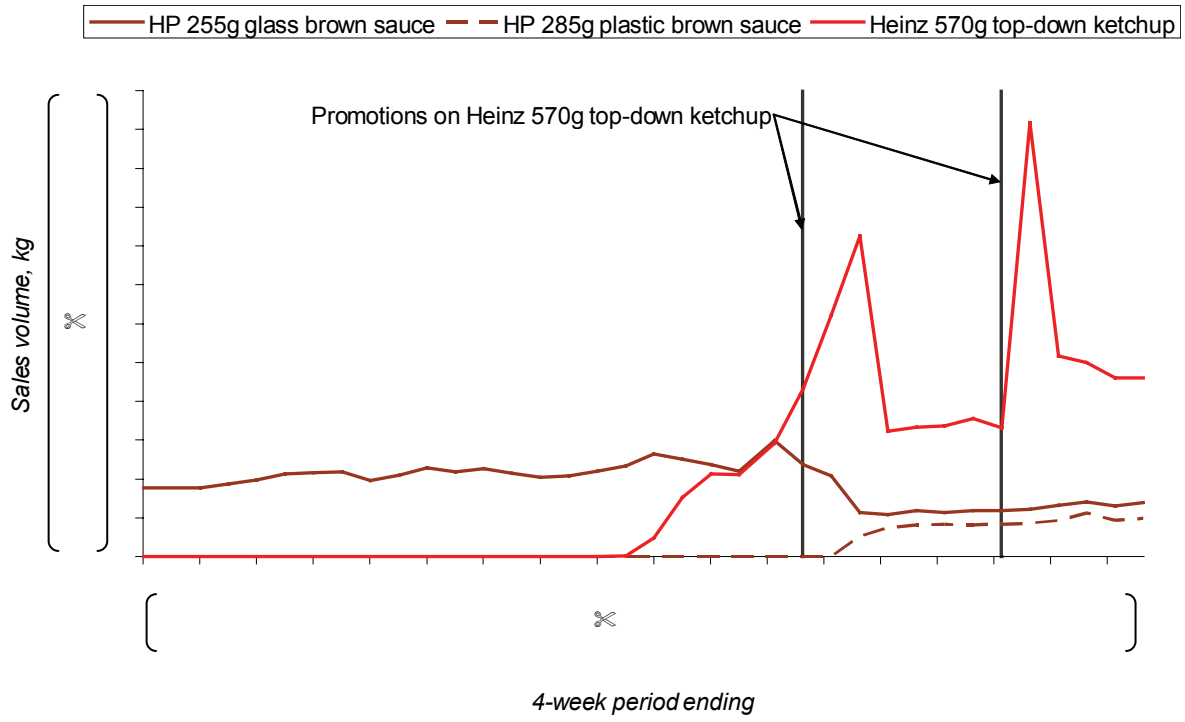
sauce products and provided no evidence of consumer switching, a conclusion that was supported by our analysis of more disaggregated (by retailer) data.

12. Specifically, HP initially replaced the 255g glass brown sauce bottle in half of one major retailer's estate from [✂]. This major retailer's sales data suggested the volume of HP brown sauce sold in the 255g glass bottle fell as a consequence by [✂] (ie around [✂], as might be expected). This is shown in Figure 2, which also indicates that much of the lost sales volume (ie around [✂]) appeared to go to the new 285g plastic HP bottle.

13. Figure 2 also shows that the major retailer's sales of the Heinz 570g top-down bottle of ketchup increased dramatically in the period ([✂][19]) but that this was driven by two periods of promotional activity on the 570g top-down Heinz bottle, the start of which are shown as the vertical lines in Figure 2.[20] Consequently, the AC Nielsen analysis did not appear to provide any evidence of switching between ketchup and brown sauce.[21]

FIGURE 2

A major retailer's sales volume of HP 255g brown sauce glass bottle, HP 285g brown sauce plastic bottle and Heinz 570g top-down ketchup bottle, [✂]



Source: A major retailer and CC calculations.

Brown sauce

14. As well as the incidence of promotional activity for ketchup examined above, Heinz also submitted that its wholesale ketchup prices increased by [✂] per cent in August

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[19] [✂]

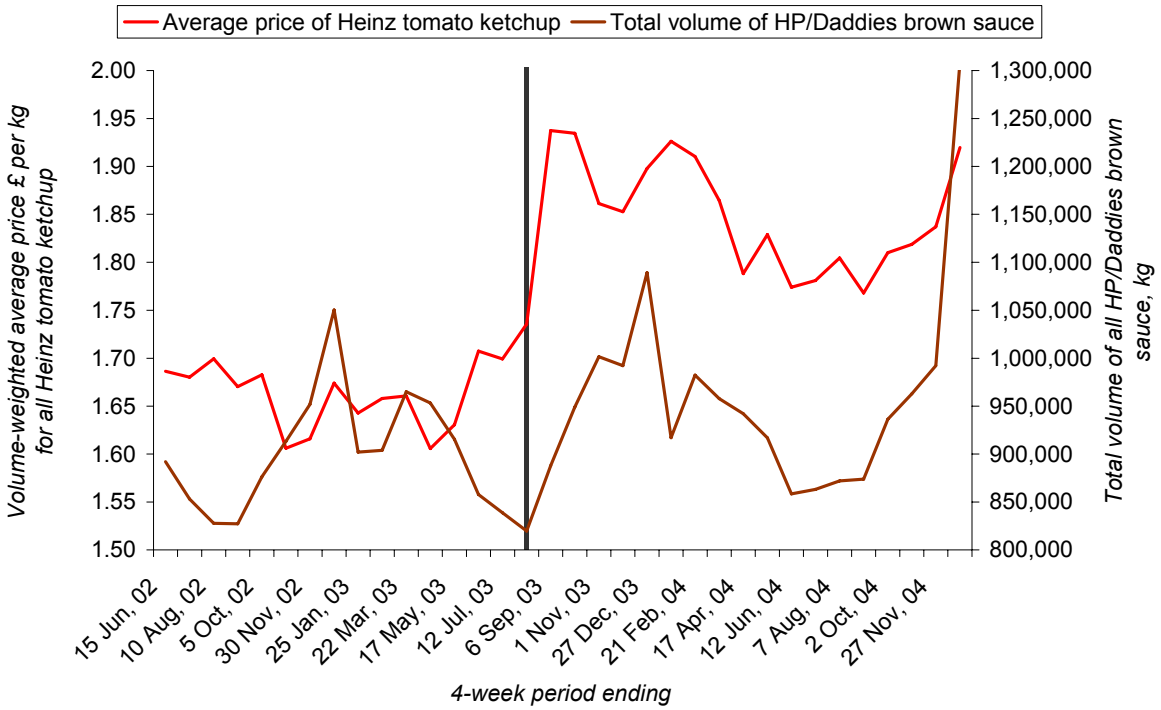
[20] To the closest four-week period in this major retailer's sales data. Both promotions were [✂]. The major retailer did not promote any HP brown sauce in this period, so the relative price per kg of Heinz 570g top-down ketchup to HP 255g glass brown sauce (which was around £[✂] per kg) fell by about [✂] per cent at the major retailer as a result of these promotions.

[21] Retailer A also told us that it was unaware of any causal link between the introduction of the 285g plastic bottle of HP sauce across its estate and lost sales from HP to Heinz ketchup.

2003, which Heinz justified in terms of adverse movements in the spot market prices for tomato paste and sugar.[22] Major retailers' questionnaire responses confirmed the timing of this wholesale price increase and that it was passed-through into retail prices (see paragraph 29 et seq). However, their responses suggested HP's wholesale brown sauce prices did not increase at that time, in spite of the fact that tomato paste and sugar are also input costs to brown sauce. Therefore, we considered the wholesale-price increase of Heinz ketchup was useful for market definition, inasmuch as it may have represented a worsening of all ketchup prices relative to brown sauce that could be informative about whether ketchup prices are constrained by brown sauce prices (ie whether brown sauce is in the ketchup market, even though the converse is not true).

FIGURE 3

Volume-weighted average price of Heinz ketchup and total volume of HP/Daddies brown sauce sold, June 2002–December 2004



Source: IRI data from Heinz and CC calculations.

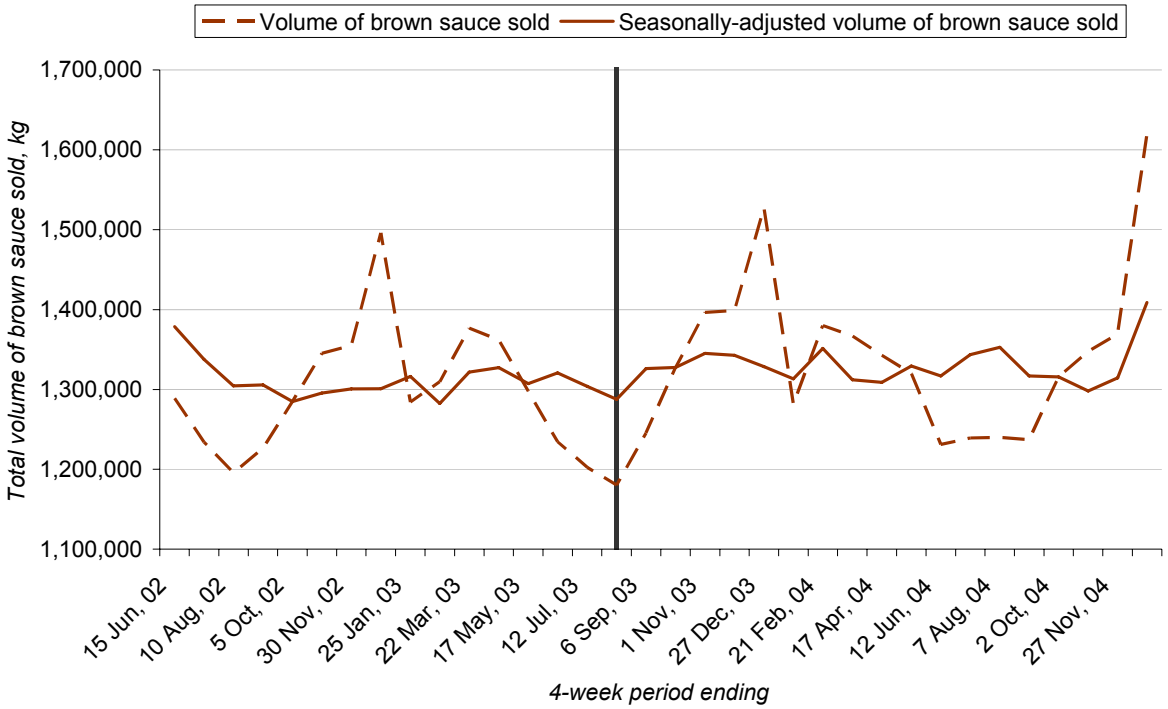
15. Figure 3 clearly shows the impact of Heinz's [✂] per cent wholesale ketchup price increase in August 2003 (marked with a vertical line) on the average retail price of Heinz ketchup.[23] Figure 3 also shows that the total volume sold of HP/Daddies brown sauce increased (by 16 per cent two periods later) possibly in response to the improvement in the relative price of brown sauce (of some 12 per cent) given the average price of HP/Daddies brown sauce remained fairly constant in this period.[24]

[22]Heinz submitted that it is a 'small buyer' of tomato paste on the spot market but we did not know how spot and contract prices for tomato paste were related, nor what proportion of the cost of producing Heinz's ketchup was represented by the cost of tomato paste and sugar.
[23]The average retail price of Heinz ketchup increased by 12 per cent.
[24]At £2.55 to £2.60 per kg, which indicated that there was not much retail promotional activity at the time for HP/Daddies brown sauce, an indication confirmed by the major retailers' questionnaire responses, which tended not to show promotion of HP/Daddies brown sauce at this time (eg see Table 1).

Considered in isolation, this could suggest branded brown sauce and branded ketchup are in the same market.

FIGURE 4

Seasonally-adjusted total volume of brown sauce (branded and own label) sold, June 2002–December 2004



Source: IRI data from Heinz and CC calculations.

16. However, aggregate sales of brown sauce (and those of HP in Figure 3 to a lesser extent) show a strong seasonal component[25] and the peak in August 2003 evident in Figure 3 appears to be seasonal and not a consequence of the increase in Heinz's average ketchup price. This is shown by the seasonally-adjusted aggregate sales data in Figure4 (plotted alongside the aggregate volume of brown sauce sold, for comparison; the vertical line shows the timing of the increase in Heinz's wholesale price of ketchup).[26] In light of this seasonality, we could not conclude that the increase in brown sauce sales was a consequence of the improvement in its price relative to ketchup.[27]

[25]Heinz submitted that brown sauce sales display a seasonal pattern.
[26]We seasonally-adjusted the data by subtracting a moving average trend/cycle component from the underlying data, which is the standard method used, for example, by the Office of National Statistics in reporting seasonally-adjusted official statistics.
[27]In this regard, we also noted that Heinz submitted the seasonality in sales of barbecue sauce was evidence that it was in a separate market to ketchup and brown sauce. Presumably, the same reasoning, if correct, might have suggested brown sauce and ketchup were in separate markets. The apparent seasonality in brown sauce sales made it difficult to unpick the effects of promotional activity from seasonal increases in sales as they were correlated, which limited the usefulness of an analysis of major retailers' brown sauce promotions as a tool of market definition.

Barbecue sauce

17. Three major retailers (Retailer A plus two others, which we call Retailers C and D) submitted that HP increased its barbecue sauce prices in July/August 2005,[28] which was justified by HP by reference to increased energy and raw material costs.[29] This price increase was across the HP sauce range (certainly for HP brown sauce[30] and possibly for Daddies brown sauce[31] and ketchup), however, which limited its usefulness as a tool for market definition (especially since not all major retailers sold HP barbecue sauce in the period).

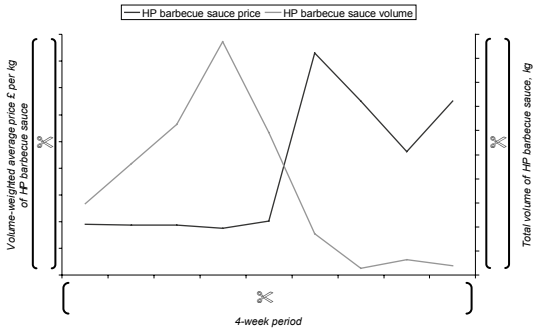
18. Nonetheless, Panel A of Figure 5 shows that sales of HP barbecue sauce (given by the solid grey line) at one major retailer for which we had data (Retailer C)[32] declined dramatically following the increase of some 11 per cent in the retail price of its HP barbecue sauce (given by the solid black line), as would be expected.[33] Conversely, Panel B of Figure 5 shows that Retailer C's sales of Heinz ketchup (given by the solid red line) did not increase in response to the improvement in the relative price of its Heinz ketchup, such as we would expect were ketchup and barbecue sauce in the same market.

[28]Two other major retailers (Retailer B and one other that we refer to as Retailer E), however, submitted HP did not increase its prices.
[29]Retailer A submitted the increase was [✂] per cent. Retailer D submitted it was [✂] to [✂] per cent.
[30]For example, see paragraph 29 et seq.
[31]For example, Retailer C's volume-weighted average price per kg for Daddies brown sauce increased dramatically at the same time as its HP barbecue sauce price in Figure 5.
[32]The fall in Retailer C's sales of HP barbecue sauce in Figure 5 was not a product of the seasonal component of barbecue sauce sales, given period six of 2005 was around July/August which is the peak time for sales of barbecue sauce, though it was hard to be sure because Retailer C did not specify what dates its periods referred to.
[33]The correlation between Retailer C's volume-weighted average price per kg of HP barbecue sauce and the volume sold over the whole period for which we have sales data for Retailer C (ie period [✂] to period [✂]) was –0.67.

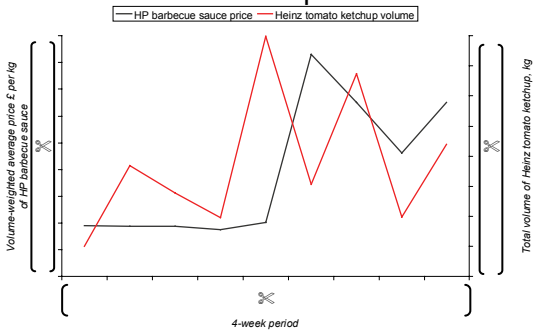
FIGURE 5

Volume-weighted average price per kg of HP barbecue sauce and volumes of HP barbecue sauce and Heinz ketchup sold at Retailer C, [✂]

Panel A: HP barbecue sauce price and volume



Panel B: HP barbecue sauce price and Heinz ketchup volume



Source: Retailer C and CC calculations.

Branded and own label

19. To include supermarkets' own label sauces in the separate markets for branded sauces that we have examined, it is necessary that own label prices constrain branded prices and not that branded prices constrain own label (which would put branded in the own-label market[34]).

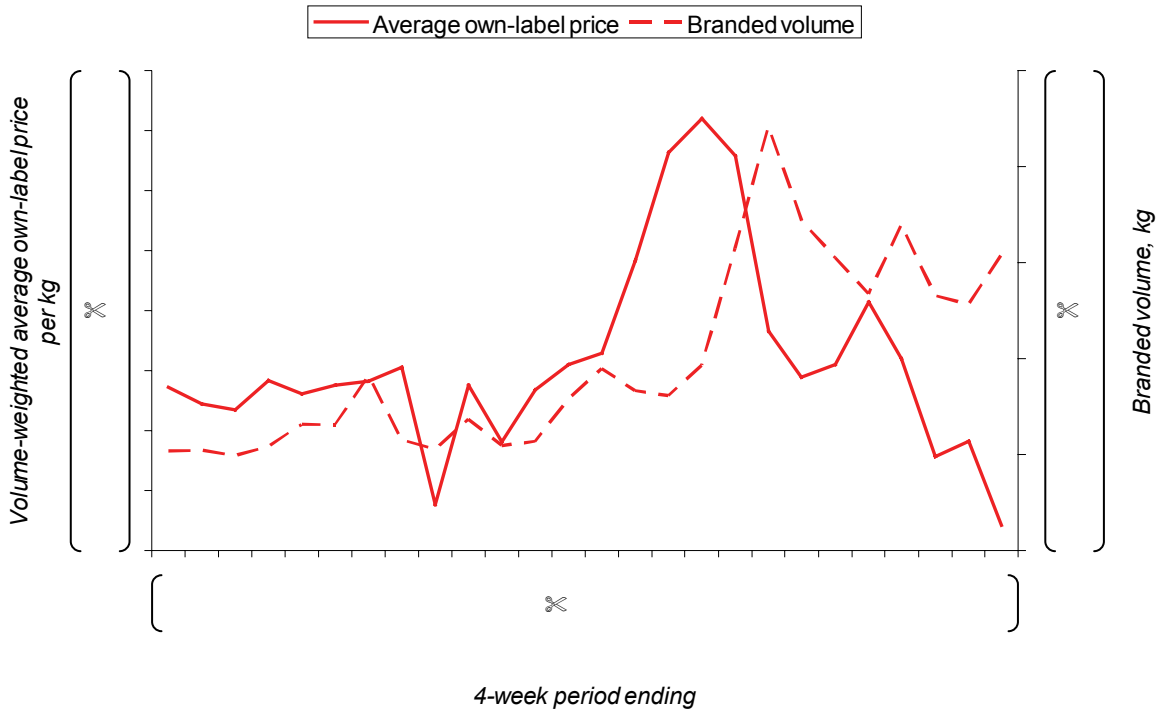
20. Only Retailer D provided us with promotional data for own-label sauces but it only promoted own-label ketchup. However, it seemed plausible that if Retailer D's own-label ketchup acted as a constraint on branded ketchup, then so did the own-label ketchup of the major retailers that are larger than it (given that the power of their own-label brands, as measured by their respective market shares, would appear to be that greater than Retailer D's).[35]

[34]In any event, the qualitative and quantitative evidence we received suggested that branded ketchup and brown sauce constrained their own-label counterparts. See, for example, LECG's analysis of the effect of the fire at Premier Foods' factory (own label supplier to Tesco, Morrisons, Somerfield and Waitrose), which led to an increase in the consumption of branded products roughly in proportion to their market shares. Likewise, Heinz submitted that one-quarter of the sales volume won following the introduction of it 342g plastic bottle of Green Tomato Ketchup came from switching from own-label and other branded ketchup (with one-quarter from other Heinz ketchup and half from new customers). Heinz also submitted an analysis of TNS SuperPanel data which it interpreted as showing that from May 1998 to June 2001, the retail price of Heinz ketchup was held down as multiple retailers focused on EDLP pricing strategies (every day low pricing). With a reduced gap between Heinz ketchup and own label, Heinz submitted, consumers 'traded up' to Heinz. (Our sales data did not go back far enough to examine this.) We noted, however, that this evidence was not informative on whether own-label prices constrained branded prices.

[35]Heinz submitted that the direct, inverse correlation of Heinz and own-label sales of ketchup at Sainsbury's and Tesco was evidence of the same. Conversely, Heinz submitted there was no clear relationship in sales of Daddies ketchup and either Heinz or own-label ketchup, although Daddies appeared to track own-label ketchup more closely than it tracked Heinz.

FIGURE 6

Volume-weighted average price in £ per kg for Retailer D's own label ketchup and total volume of branded ketchup sales, [✂]



Source: Retailer D and CC calculations.

21. Figure 6 shows the effect that Retailer D's promotional activity had on reductions in its own-label ketchup price around [✂]. These reductions in the own-label price were more informative about whether own label was in the branded market than was the increase in the own-label price in the Spring of 2005 (which appears to have been a consequence of the fire at the Premier Foods factory at Bury St Edmunds in October 2004, as Premier supplies Retailer D with own-label ketchup). The reductions in the own-label price in Figure 6 led to a significant reduction in the sales volume of branded ketchup, which suggested that Retailer B's own label is in the same market as branded.

22. Unlike the results of no switching for the branded sauces, however, care must be taken in interpreting such evidence of 'switching' because the worsening in the relative price of branded to own label that caused it is much higher—at [✂] per cent—than the 5 per cent relevant for market definition. Moreover, Figure 6 shows a possible lack of contemporaneous reaction of branded volume to own-label price that was not a feature of our analysis of promotional activity for branded ketchup, which might mean the dips in branded ketchup volumes sold by Retailer D in [✂] were not a consequence of Retailer D's own label promotions at that time.[36]

23. Heinz also submitted a report prepared for it by Research International to help set the price of Heinz's top-down offering, which suggested that the buyer share of top-down

[36]Against this, however, we noted that the possible lack of contemporaneous reaction of branded volume to own-label price occurred when the own-label price increased because of a supply restriction after the Premier fire (ie because the product was unavailable) and not because of promotional activity on branded ketchup.

declined gradually (by 5 percentage points from 38 per cent buyer share to 33 per cent) as top-down prices increased from 20 per cent less than the mid-point to 20 per cent more. According to that analysis, consumers switching away from the top-down ketchup would have switched equally to other Heinz ketchup and to own-label ketchup, which suggested a constraint from own label to branded.

24. Further, Retailer B told us that customers switched from one type of Heinz ketchup towards other types of Heinz ketchup and own label. Retailer B said that, as a consequence and to capture the effects of this switching, Heinz usually did not increase one price in isolation but all of them together and the remaining switching was towards own label.

25. The qualitative evidence we received from Heinz and others also suggested own label constrains branded.[37] Precedent also seems to suggest that own label and branded are in the same market. However, we note that this precedent and qualitative evidence appears to concern own label in fast-moving consumer goods generally, rather than for thick sauces specifically, which may not be an appropriate yardstick for brands as apparently powerful as Heinz ketchup and HP brown sauce.[38]

Other price-based evidence for thick, cold table sauces: LECG's analysis

26. LECG analysed average price and aggregate quantities sold of 323 thick and thin table sauce SKUs, on a four-week period basis, for three years from June 2002 to May 2005.[39] The data was provided by IRI, a supplier of point-of-sale scanner data, and captured the volume and value of all table sauce (ie thick and thin) sales at all formats of store (eg convenience, mid-range, one-stop shop) for Asda, Co-op, Iceland, Sainsbury's, Morrisons (including Safeway where applicable), Tesco, Waitrose and other minor multiples.[40] LECG implemented the SSNIP test for market definition[41] using estimates of marginal cost provided by Heinz and concluded that:

- the ketchup and brown sauce product categories were separate markets;
- the thick chilli sauce segment also appeared to constitute a separate market, although the results were marginal;
- barbecue and other thick sauces did not constitute a separate market (being part of a market with thin sauces); and
- customers strongly preferred branded products to own-label products.[42]

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[37]For example, Heinz submitted a report by AC Nielsen *The Power of Private Label 2002*. Also, Retailer A told us that Heinz sets prices for branded ketchup with an eye on own label prices.
[38]For example, Heinz's 2005 Annual Review says that 'Heinz remains the top brand in the UK' (source: www.heinz.com/2005annualreport/review.html).
[39]Not every SKU was present in LECG's sample in every period. There were 400 SKUs in total in the underlying data used by LECG. Some SKUs had no sales in LECG's sample period and others were dropped for other reasons.
[40]Alldays, Balfours, Bells, Booths, Botterills, Budgens, D Sands, Europa, GT Smiths & Sons, Jacksons, Leathleys Quality Fayre, Morning Noon & Nite, Right Choice, Smile News, T&S, TM Retail and Whistle Stop.
[41]See, for example, *Merger References: Competition Commission Guidelines*, CC2, June 2003, part 2 (Market Definition). As well as the demand-side substitution discussed here, supply-side substitution also can define the boundaries of the relevant market. See section 4 for a discussion.
[42]LECG did not examine whether own-label sauces might be in separate markets to their branded counterparts. The strong, negative estimated price-effect for own-label sauces could have been consistent with own-label sauces being in a separate market, however.

27. There were three issues in evaluating LECG's analysis. First, LECG's analysis used scanner data, which tracked consumer behaviour among retailers. However, Heinz and HP are upstream manufacturers and therefore the substitution pattern of interest was at the wholesale, not retail, level. The wholesale elasticity of demand derived by grocery retailers will, in general, be less elastic than the elasticity estimated at the consumer-retail level, essentially provided the rate of pass-through by retailers from wholesale prices into retail prices for consumers is less than unity.[43]

28. LECG submitted that it did not expect its conclusions on market definition to change if the SSNIP test were conducted using the wholesale elasticity of demand, since the pass-through rate would typically be less than one[44] and the hypothetical monopolist would be able profitably to raise price by even more given the less elastic demand therefore implied.[45] Indeed our analysis also exploited retail price events and their effect on consumers' behaviour, rather than wholesale price events and their effect on retailers' behaviour, so we also expected the wholesale elasticity of demand to be derived closely from the retail elasticity of demand, even though our analysis—unlike LECG's—did not attempt to estimate the elasticity of demand.[46]

29. In evaluating this, we noted that Heinz submitted its wholesale ketchup prices increased by [✂] per cent in August 2003 following adverse movements in the spot market prices for tomato paste and sugar.[47] Also, Retailers A and C submitted that HP increased its wholesale brown sauce prices by [✂] because of increased energy and raw material costs (Retailer D submitted HP increased its prices by [✂] per cent at this time, and Retailer B submitted that the retail price of HP's [✂] brown sauce increased by [✂] per cent and the [✂] by [✂] per cent). We were not aware of any other increases in the wholesale prices of Heinz and HP products.[48] We traced the effects of these wholesale price increases through into the retail prices of Heinz ketchup and HP brown sauce charged by the relevant retailers, which suggested, however, that the rate of pass-through did not appear to be significantly less than unity. We noted, however, that assuming that the rate of pass-through was unity would not have overturned LECG's findings.

30. This is shown in Figures 7 to 9, which give the volume-weighted average price per kg for all bottle sizes of Heinz ketchup and HP brown sauce (calculated from major retailers' responses to our customer questionnaire), as well as the timing of the wholesale price increases by Heinz and HP of which we were aware (the timing of which is indicated by the vertical lines in each chart[49]). Our results indicated that:

    - Retailer A's Heinz ketchup prices increased by [✂] per cent[50] and Retailer E's by [✂] per cent;[51] and

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[43]For a discussion see, for example, Hosken, D, D O'Brien, D Scheffman and M Vita (2005) 'Demand System Estimation and its Application to Horizontal Merger Analysis' in J Harkrider (ed) *Use of Econometric Analysis in Antitrust Investigation before the DoJ and FTC*, American Bar Association Section on Antitrust.
[44]LECG cited in support Blattberg, R, R Briesch and E Fox (1995) 'How promotions work', *Marketing Science*, 14:3, G122-G132.
[45]We also note that if the effect of short-term, deep price promotions (eg BOGOFs) on sauces were to encourage household inventory behaviour (larder loading), this would also have meant LECG's estimated elasticities of final consumer demand were biased upwards, which again would have reinforced their conclusions on market definition, other things being equal.
[46]Our analysis of the timing of major retailers' promotional activity was an exception to this, since it looked at major retailers' views of what they consider to be substitutable and complementary products.
[47]This was confirmed in questionnaire responses from Retailers B, C and E.
[48]Heinz submitted that it had not [✂].
[49]To the closest four-week period in each retailers' underlying sales data.
[50]The sharp dip in the average price of Heinz ketchup sold at Retailer A in [✂] coincided with a [✂] per cent price promotion on the [✂] bottle of Heinz ketchup, which was the second-biggest selling Heinz ketchup at Retailer A around that time.
[51]The data provided by Retailer D did not go back far enough to estimate its rate of pass-through for Heinz ketchup.

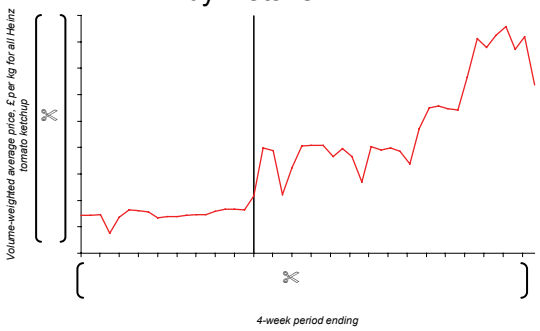
- both Retailer A's and C's HP brown sauce prices increased by [✂] per cent,[52] Retailer D's increased by [✂] per cent[53] and Retailer F's by [✂] per cent.

[52]The sharp dip in the average price of HP and Daddies brown sauce sold at Retailer A from [✂] coincided with two promotions [✂] on the [✂] bottle of HP brown sauce, which was the biggest selling HP brown sauce at Retailer A around that time.
[53]The sharp dips in the average price of HP and Daddies brown sauce sold at Retailer D in September and November 2005 coincided with two multi-buy promotions (3-for-2) on the 255g and 425g bottles of HP brown sauce, which were the two biggest selling HP brown sauces at Retailer D around that time.

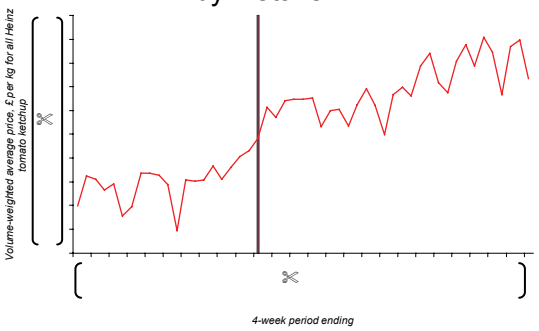
FIGURE 7

Pass-through of [✂] per cent increase in wholesale price of Heinz ketchup in August 2003 into average retail price charged by Retailers A and E

Panel A: volume-weighted average price per kg for all sizes of Heinz ketchup sold by Retailer A



Panel B: volume-weighted average price per kg for all sizes of Heinz ketchup sold by Retailer E

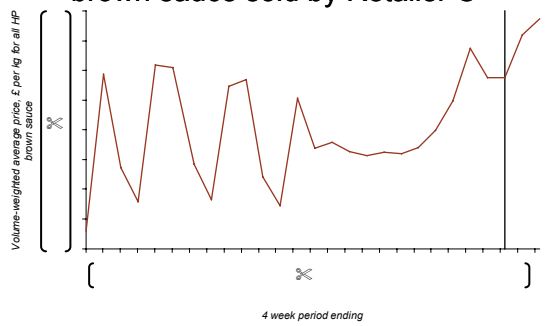


Source: Retailers A and E and CC calculations.

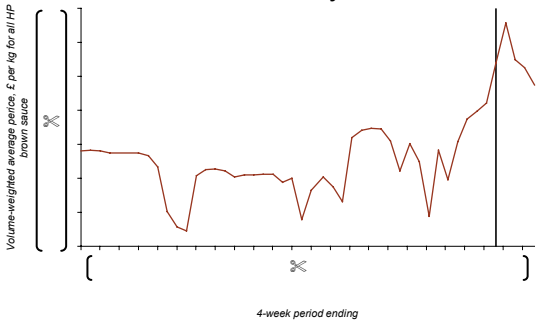
FIGURE 8

Pass-through of [✂] per cent increase in wholesale price of HP and Daddies brown sauce in July 2005 into average retail price charged by Retailers A and C

Panel A: volume-weighted average price per kg for all sizes of HP and Daddies brown sauce sold by Retailer C



Panel B: volume-weighted average price per kg for all sizes of HP and Daddies brown sauce sold by Retailer A

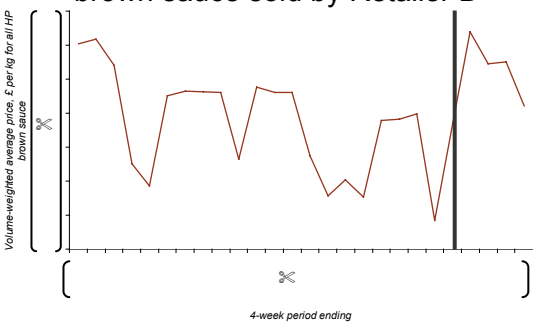


Source: Retailers A and C and CC calculations.

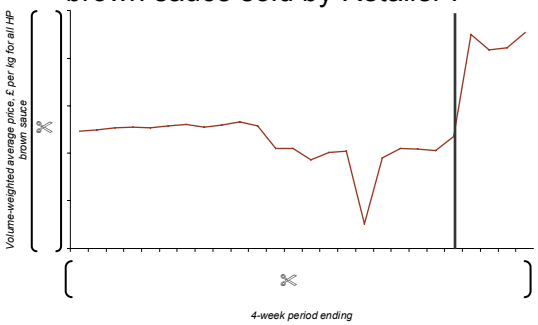
FIGURE 9

Pass-through of [✂] per cent increase in wholesale price of HP and Daddies brown sauce in August 2005 into average retail price charged by Retailers D and F

Panel A: volume-weighted average price per kg for all sizes of HP and Daddies brown sauce sold by Retailer D



Panel B: volume-weighted average price per kg for all sizes of HP and Daddies brown sauce sold by Retailer F



Source: Retailers D and F and CC calculations.

31. Secondly, the average revenue used by LECG may not have been a good measure of the aggregate price of sauce. The IRI data used by LECG was aggregated over both geographic localities and over sales channels (ie formats of grocery retail store such as convenience, mid-range and one-stop shop). If supermarkets charged different prices in different areas and/or in different formats of store, then aggregate price (as measured by average revenue) and aggregate output may not have corresponded to a point on the aggregate demand curve because aggregate price was a non-linear function of each supermarket's average revenue. The purpose of LECG's model essentially was to estimate the slope of the aggregate demand curves for ketchup, brown sauce etc. Therefore using average revenue data to estimate this slope—that may not have corresponded to a point on these aggregate demand curves—was a limitation.

32. Thirdly, the statistical model used by LECG (known as the nested logit) found large elasticities of substitution among larger segments by construction.[54] This meant that, because the ketchup and brown sauce segments had by far the largest volume shares in the IRI data used by LECG,[55] LECG's model estimated large elasticities of substitution to them from other sauce segments (eg barbecue) and small elasticities from them to other sauce segments. This was more likely to make LECG's SSNIP test conclude that ketchup and brown sauce were in separate markets, other things being equal, which is what it did.[56] LECG's model also restricted all cross-price elasticities to be positive[57] (ie all thick sauces were substitutes for each other to a greater or lesser extent), which ruled out any complementarities between them.

33. However, there was evidence that ketchup and barbecue sauce are complements.[58] Retailer A told us that it ran promotions of what it considered to be complementary products at the same time but did not promote what it considered to be competing products at the same time as this neutralized the impact of the promotion.

34. Examining the correlation of some major multiple grocery retailers' promotional activity on ketchup, barbecue sauce and brown sauce,[59] as given in the two parts of Table 1, suggested that barbecue sauce was up to twice as likely to have been jointly promoted with ketchup than ketchup and brown sauce were to have been jointly promoted with each other.[60] Of the 50 overlaps in retailers' promotional activity for ketchup, and brown and barbecue sauces:

- 22 involved only ketchup and barbecue sauce;
- two involved only brown sauce and barbecue sauce;
- 11 involved all three sauces (however, the promotion on brown sauce for four of these was a joint promotion with a spicy sauce[61]); and
- 15 involved only ketchup and brown sauce (the promotion on brown sauce for one of which was a joint promotion with a spicy sauce), which was the base degree of overlap.[62]

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[54]This is because LECG's estimated elasticities were functions of just two parameters (which they called α and σ) and the market share of the nest.

[55]68 per cent and 20 per cent respectively, the next closest being barbecue with 4 per cent.

[56]To take a concrete example, the volume shares of ketchup, brown sauce and barbecue sauce were approximately 70 per cent, 20 per cent and 5 per cent. LECG's model therefore restricted any switching away from barbecue sauce in response to a price increase to be 3.5 times greater to ketchup than to brown sauce (as 70/20 = 3.5). The practical implication of this assumption (known as the Independence of Irrelevant Alternatives) is that sauces were not allowed to be 'closer' or 'further' substitutes than their market shares dictated.

[57]Because LECG's estimate of α was negative and of σ was positive; when applied to their cross-price elasticity formulas in equations (2) and (3) of their paper this guaranteed positive cross-price elasticities (given positive market shares).

[58]For example, in May 2003 Heinz promoted a twin-pack of 450g barbecue sauce and 460g ketchup, which would be a strange bundling decision if they competed with each other.

[59]Based on IRI classifications for thick sauces.

[60]For clarity, Table 1 summarizes promotions by month, so some promotions bleed into other months by a few days or even a week or so. However, each monthly promotional overlap in Table 1 represents a true overlap for the sub-monthly periods (eg daily, weekly, bi-weekly) in the underlying data, so the table does not suggest spurious overlaps through aggregation. Not every retailer provided data for the same period. Grey cells therefore indicate that no data was available, not that there were no promotions.

[61]So one might think the possibly complementary barbecue sauce and ketchup were being promoted together, and the possibly complementary brown and spicy sauces were being promoted together.

[62]So barbecue sauce was promoted with ketchup 33 times out of 50 (22 times solely with ketchup, 11 times with both ketchup and brown sauce), whereas ketchup was promoted only with brown sauce 15 times. Hence, barbecue is between 22/15 = 1.5 times and 33/15 = 2.2 times more likely to be promoted with ketchup than ketchup is to be promoted with brown sauce.

35. Given barbecue sauce appeared to be complementary to ketchup, LECG's assumption appeared unsupported by other evidence. However, we noted that any complementarity between barbecue sauce and ketchup or brown sauce would not have overturned LECG's main result that ketchup and brown sauce were in separate markets.

TABLE 1 **Timing of major retailers' promotions on branded ketchup, branded barbecue sauce and branded brown sauce, [✂]***

	Retailer C			*Retailer A*			*Retailer D*		
Promotion period	*Ketchup*	*Barbecue*	*Brown*	*Ketchup*	*Barbecue*	*Brown*	*Ketchup*	*Barbecue*	*Brown*
✂	Extra free	Multi-buy		Price offer	Price offer	Extra free‡	Price offer	Multi-buy	
	Multi-buy	Multi-buy		Multi-buy	Multi-buy		Price offer	Price offer	
		Price offer		Multi-buy		Multi-buy§	Multi-buy	BOGOF	Price offer
	Extra free		Price offer	Multi-buy	Multi-buy		Price offer	Price offer†	
	Extra free			Extra free		Price offer	Extra free		Price offer
	Multi-buy		Multi-buy#	Extra free		Price offer	Extra free		Price offer
	Extra free			Multi-buy		Multi-buy	Price offer		
		Multi-buy†		Multi-buy	Multi-buy		Multi-buy	Price offer†	
	Extra free			Multi-buy			Multi-buy	Price offer†	
	Multi-buy			Extra free		Extra free	Price offer	Price offer†	Price offer
					Multi-buy†		Price offer		
					Multi-buy†, price offer		Extra free	Price offer†	
							Price offer		
							BOGOF		
							Extra free		
							Extra free		
							Multi-buy, extra free	Price offer†	
								Price offer	
								Price offer	Multi-buy
							Multi-buy		

	Retailer F			Retailer B		
Promotion period	*Ketchup*	*Barbecue*	*Brown*	*Ketchup*	*Barbecue*	*Brown*
				Price offer		
				Price offer, multi-buy¶	Multi-buy¶	
				Price offer, extra free		
				Extra free		Multi-buy
	Price offer	Price offer		Multi-buy	Price offer	Multi-buy
	Twin pack			Multi-buy	Multi-buy	Price offer
	Extra free	Price offer		Extra free	Multi-buy¶	
	Price offer	Price offer†			Price offer, multi-buy¶	
			Price offer	Multi-buy	Price offer	Multi-buy
	Price offer		Price offer	Extra free, multi-buy		Price offer
	Price offer, extra free			Price offer		
				Extra free		
				Multi-buy		Multi-buy
	Price offer			Price offer, multi-buy		
	Price offer, extra free			Multi-buy, extra free		Price offer
	Price offer			Multi-buy		
	Price offer	Price offer†		Multi-buy		
✂				Multi-buy, extra free	Price offer, multi-buy	
	Price offer	Price offer†		Price offer, extra free	Price offer	
	Extra free	Price offer†		Multi-buy	Multi-buy	Multi-buy
		Price offer†		Extra free		
				Multi-buy		
	Extra free		Price offer	Price offer		Multi-buy
				Extra free		
				Multi-buy		Multi-buy
			Price offer	Price offer		
	Price offer					Price offer
	Price offer			Multi-buy		
	Price offer, extra free	Price offer		Extra free	Multi-buy	
			Extra free	Extra free, multi-buy		Multi-buy
	Other	Price offer†	Extra free	Multi-buy	Multi-buy	
				Price offer	Multi-buy, price offer	Price offer
	Price offer			Extra free, price offer	Price offer	Multi-buy
				Extra free		Multi-buy
	Price offer			Extra free		

Source: Retailers' responses to CC customer questionnaire.

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*'Extra free' refers to some percentage of extra sauce free for the price of the original, smaller bottle; 'Multi-buy' refers to (eg) 'buy 2 save £1' or '2 for £2'.
†Spicy barbecue sauce and barbecue sauce.
‡Chilli sauce and brown sauce.
§Ketchup and brown promotions do not overlap within month.
¶Ketchup and barbecue sauce.
#Spicy barbecue sauce and brown sauce.

3. Price-based evidence for tinned baked beans and tinned pasta meals

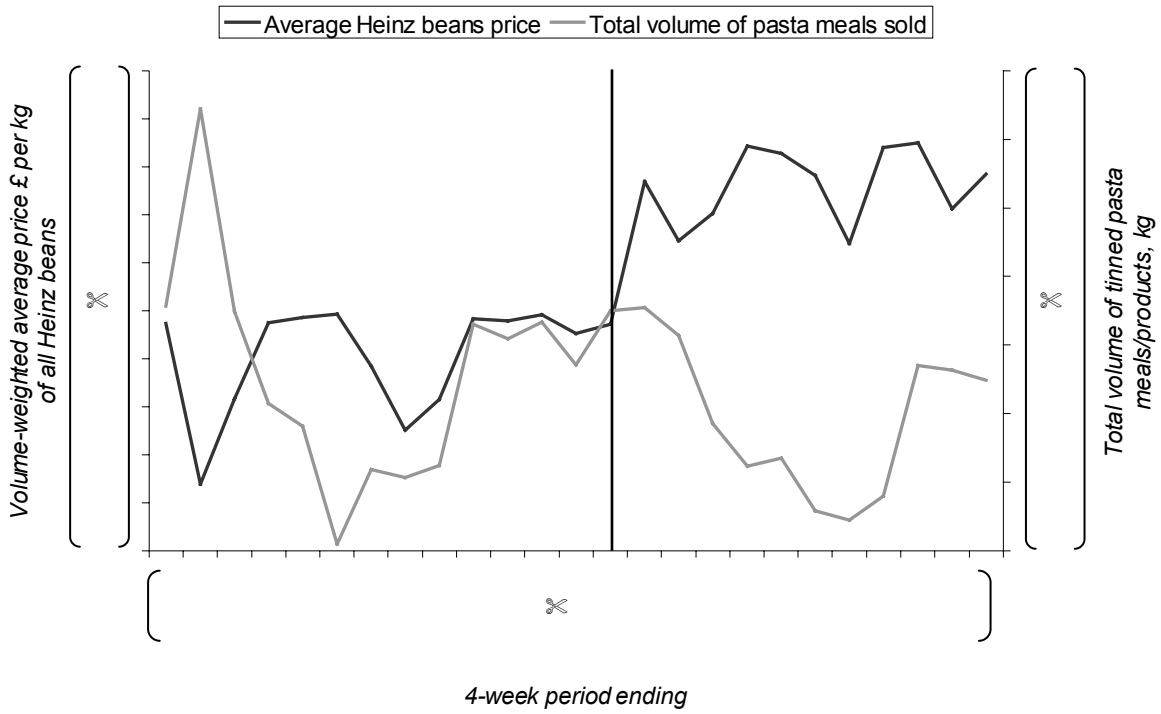
36. Heinz submitted there were two input-price increases to the wholesale prices of tinned baked beans and tinned pasta meals that could have shifted the relative price of one to the other, which we could have used for the purposes of market definition. Only one of these was unique (to beans, not pasta meals).[63] An increase in August 2003 was justified by Heinz on the basis of increased prices of steel (tin plate) and tomato paste, both of which were common to tinned baked beans and tinned pasta meals.[64] An increase in January 2005, however, was attributed by Heinz to a 40 per cent increase in spot-market navy-bean prices in Autumn 2004, which are not an ingredient in tinned pasta meals and following which Heinz increased its wholesale tinned baked-bean prices by [✂] per cent.[65]

37. Only Retailer E submitted sales data (volume and value) for all tinned baked beans and tinned pasta meals (branded and own label). Its average price per kg for Heinz tinned baked beans is given in Figure 10, which clearly shows the pass-through of the increase in navy-bean costs into the retail price in January 2005 (marked with a vertical line).[66] Were tinned baked beans and tinned pasta meals in the same market, one might expect to see that the volume sold of the latter increased in response to this adverse movement in the relative price of the former whereas the opposite is apparent from Figure 10.[67] In fact, taken literally, the apparent negative correlation of tinned baked bean prices and tinned pasta meal volumes suggested the two goods were complementary.[68]

[63]Hence, this worsening of the relative price of tinned baked beans may be informative about whether tinned pasta meal prices constrained tinned baked bean prices but not vice versa.
[64]Tomato paste is common to ketchup as well, as Heinz's ketchup wholesale price increase in August 2003 suggested. Tomato paste also is common to brown sauce but retailers' questionnaire responses suggested HP did not increase wholesale brown sauce prices in August 2003.
[65]Confirmed by retailers' questionnaire responses, although Retailer D submitted the increase was [✂] per cent, and Retailer B [✂] per cent.
[66]Retailer E's volume-weighted average price of all Heinz baked beans increased by [✂] per cent. The two sharp dips in February and August 2004 in the price of tinned baked beans coincided with promotions.
[67]Retailer E's branded tinned pasta meal average prices did not increase at this time, meaning the relative price of tinned baked beans to tinned pasta meals increased by [✂] per cent.
[68]The correlation between the two series in Figure 10 is –0.4.

FIGURE 10

Volume-weighted average price per kg of Heinz tinned baked beans and total volume of tinned pasta meals sold at Retailer E, [✂]



Source: Retailer E and CC calculations.

38. We also noted that there were few instances (24 out of 66) in the promotional data supplied to us by Heinz and the major retailers where Heinz tinned baked beans were promoted without Heinz tinned pasta meals also being on promotion for some or all of the time.[69]

4. Characteristics and intended uses of ketchup and brown sauce

39. Our Guidelines indicate that information on product characteristics such as physical properties and intended use can be helpful in the analysis of demand-side substitution.[70] For example, the EC's Unilever/Bestfoods decision appealed to the characteristics and intended uses of sauces to segment the market into ketchup and a wider product category comprising all other cold sauces (brown sauce did not feature in Unilever/Bestfoods).[71]

40. Heinz submitted that ketchup and brown sauce were different markets because:

- their consumer profiles were different, with ketchup use skewed towards children ([✂] per cent of users) and adults under 35 ([✂] per cent of users), while brown sauce use was skewed towards those over 45 ([✂] per cent of users), especially men ([✂] per cent of users);

[69]One major retailer (which we refer to as Retailer G) submitted that it treated the products as 'every day low price' and did not promote them.
[70]See *Merger References: Competition Commission Guidelines*, CC2, June 2003, paragraph 2.16.
[71]See www.europa.eu.int/comm/competition/mergers/cases/decisions/m1990_en.pdf, paragraphs 13, 22, 26 and 27.

- they were consumed largely at different times of the day and on some different host foods;

- [✂] per cent of consumers surveyed in the 2005 annual TNS Family Food Panel (FFP) survey[72] used one or the other, not both, as an accompaniment across all host foods (examining the TNS FFP results individually for different host foods—ie eggs, bacon, baked beans, sausages, chips, fish and chicken—the proportion of consumers that used one or the other sauce, but not both, was between [✂] per cent); and

- ketchup and brown sauce looked and tasted entirely different.

41. Retailer D submitted customer demographic data presented to it by a supplier in April 2005 that confirmed some of these points,[73] as did Retailer A's analysis of its sales data.[74]

42. We noted that Heinz submitted a report by Research International—a 2005/06 brand and advertising tracking study—that mentioned brown sauce as a competitor to Heinz ketchup. However, we considered this mainly as a consumer-awareness benchmarking exercise that was not informative about market definition in the sense of our Guidelines.[75]

[72]A two-week food diary of meals consumed at home using sauces for the 52 weeks ending May 2005.
[73]'Tomato Ketchup has a younger profile whilst brown sauce is generally preferred by the older consumer.'
[74]'[Y]oung families purchase [✂] per cent more tomato ketchup than the average across all customers, whereas older adults purchase [✂] per cent less than the average. In contrast, older adults purchase [✂] per cent more brown sauce than the average for all customer groups.'
[75]We noted that the Research International brand and advertising tracking study did not benchmark Heinz ketchup against Daddies ketchup.

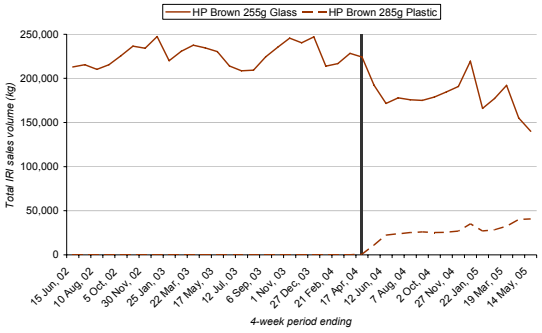
Analysis of AC Nielsen's research for HP on the replacement of the 255g glass bottle of brown sauce with the 285g plastic bottle

1. Figure 11 shows that the conclusions of AC Nielsen's research for HP on the replacement of the 255g glass bottle of brown sauce with the 285g plastic bottle (the timing of which is indicated by the vertical lines) are supported by the aggregate IRI sales data, ie that the loss of 255g glass sales of HP brown sauce (solid brown line) went to the new 285g plastic bottle (dashed brown line), see Panel A, and to Heinz's 570g top-down bottle of ketchup (whose peak in sales after the replacement, shown by the solid red line, is correlated in Panel B with the fall in the sales of HP's 255g glass bottle of brown sauce). However, as explained in paragraph 11, this is not evidence of switching given the sales growth being enjoyed by the 570g top-down bottle of Heinz ketchup at that time.

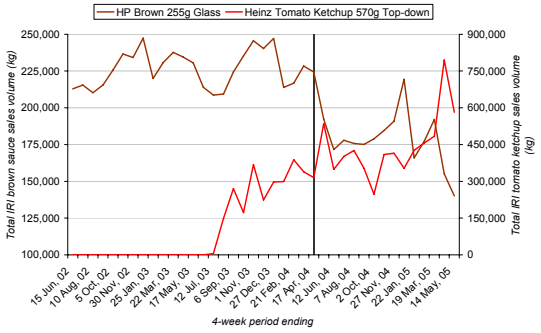
FIGURE 11

Aggregate sales volume of HP 255g brown sauce glass bottle, HP 285g brown sauce plastic bottle and Heinz 570g top-down ketchup bottle from IRI data, June 2002–May 2005

Panel A: Introduction of 285g plastic bottle of HP brown sauce



Panel B: Sales of 570g top-down bottle of Heinz ketchup



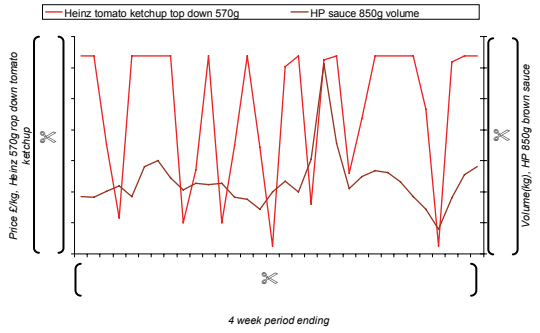
Source: IRI data from Heinz and CC calculations.

Effect of major retailers' promotions of Heinz ketchup on sales of HP brown sauce

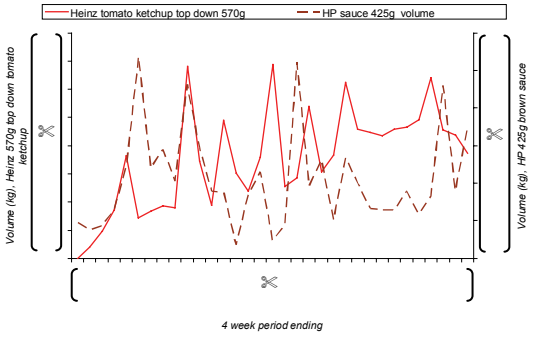
FIGURE 12

Effect of Retailer E's promotion of Heinz 570g top-down ketchup on sales of HP brown sauce,* [✂]

Panel A: Heinz 570g top-down price and HP 850g volume



Panel B: Heinz 570g top-down and HP 425g volumes



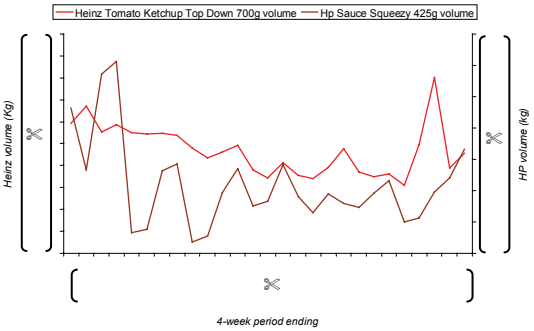
Source: Retailer E and CC calculations.
*Retailer E did not sell the 198g bottle of Daddies brown sauce.

FIGURE 13

Effect of Retailer C's promotion of Heinz 700g top-down ketchup* on sales of HP brown sauce,† [✂]

Panel A: Heinz 570g top-down and HP 850g volumes

P Panel B: Heinz 700g top-down and HP 425g volumes



Source: Retailer C and CC calculations
*Retailer C promoted the 700g top-down bottle of Heinz ketchup more heavily then the 570g
†Retailer C did not sell the 198g bottle of Daddies brown sauce.