Title: Restricting volume promotions for high fat, sugar, and salt (HFSS) products **IA No:** 9560 **RPC Reference No:** RPC-DHSC-4333(3) **Lead department or agency:** Department of Health and Social Care (DHSC) **Other departments or agencies:** N/A	Impact Assessment (IA) **Date:** 11/11/2020 **Stage:** Final **Source of intervention:** Domestic **Type of measure:** Secondary legislation **Contact for enquiries:** Childhood.Obesity@dhsc.gov.uk

Summary: Intervention and Options

RPC Opinion: Fit for purpose

Cost of Preferred (or more likely) Option (in 2019 prices)			
Total Net Present Social Value	**Business Net Present Value**	**Net cost to business per year**	**Business Impact Target Status**
£2,916m	-£148m	£53.5m	Qualifying provision

What is the problem under consideration? Why is government intervention necessary?

Regular overconsumption of food and drink high in fat, sugar and salt (HFSS) is one of the key factors leading to weight gain and, over time, obesity. Obesity is a major cause of ill health in England, increasing the risk of heart disease, stroke, type II diabetes and some cancers, imposing a substantial burden and negative externality on the NHS and the wider economy in the long run. Price promotions, especially volume offers, are a significant driver of the excess purchasing of HFSS food and drink, which in turn increases consumption of these products; increasing the likelihood of being obese or overweight. Previous voluntary commitments to restrict promotions of HFSS food and drink have been very limited and unsuccessful. Therefore, legislative intervention is necessary to ensure that retailers do not encourage excess purchasing and over consumption of HFSS products.

What are the policy objectives and the intended effects?

The policy is intended to reduce excess purchases and therefore consumption of HFSS products which is likely to contribute to children's excess weight gain over time, while minimising the distortionary effect on products that do not contribute to childhood obesity. By increasing the opportunities for retailers to provide healthier options on promotion, further improvements in diets may be experienced.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

All options cover the area of England only.

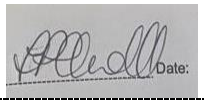
Option 0: Do nothing
Option 1: End all volume offers for HFSS products included in a narrow list of Discretionary Food and Drink product categories in the retail sector excluding small and micro businesses
Option 2: End all volume offers for HFSS products which contribute significant sugar and calories to children's' diets and are of most concern for childhood obesity, in the retail sector excluding small and micro businesses
Option 3: End all volume offers for HFSS products which contribute significant sugar and calories to children's' diets and are of most concern for childhood obesity, in the retail sector excluding micro businesses only.
Option 4: End all volume offers for HFSS products included in original list of categories consulted on in all retailers who sell food and drink in the retail sector excluding small and micro businesses.

Option 2 is the preferred option because it strikes the best balance between delivering the aims of the policy and significant health benefits while considering proportionality and feasibility of implementation. The product categories in scope are significant contributors to children's sugar and calorie intakes, are often heavily promoted and therefore they are the products of most concern for childhood obesity.

Will the policy be reviewed? It will be reviewed. **If applicable, set review date:** Before 2023

Does implementation go beyond minimum EU requirements?		N/A		
Is this measure likely to impact on international trade and investment?		No		
Are any of these organisations in scope?	**Micro** No	**Small** No	**Medium** Yes	**Large** Yes
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)		**Traded:** N/A	**Non-traded:** N/A	

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible Minister:  Date: 15/07/21

Summary: Analysis & Evidence

Policy Option 0

Description: Do nothing option

FULL ECONOMIC ASSESSMENT

Price Base Year 2019	PV Base Year 2020	Time Period Years 25	Net Benefit (Present Value (PV)) (£m)		
			Low:	**High:**	**Best Estimate:**

COSTS (£m)	**Total Transition** (Constant Price)	Years	**Average Annual** (excl. Transition) (Constant Price)	**Total Cost** (Present Value)
Low	Optional		Optional	**Optional**
High	Optional		Optional	**Optional**
Best Estimate				

Description and scale of key monetised costs by 'main affected groups'

No costs have been monetised under this option. Businesses who currently continue to voluntarily remove volume offers of certain HFSS products, and those currently offering volume promotions would be expected to continue doing so.

Other key non-monetised costs by 'main affected groups'

No non-monetised costs have been outlined under this option.

BENEFITS (£m)	**Total Transition** (Constant Price)	Years	**Average Annual** (excl. Transition) (Constant Price)	**Total Benefit** (Present Value)
Low	Optional		Optional	**Optional**
High	Optional		Optional	**Optional**
Best Estimate				

Description and scale of key monetised benefits by 'main affected groups'

No benefits have been monetised under this option.

Other key non-monetised benefits by 'main affected groups'

No non-monetised benefits have been outlined under this option. The benefits as a result of other policies announced from the 'Childhood obesity: A plan for action' or any other possible future actions by government have not been monetised and considered in this option due to the considerable number of uncertainties. The impact SDIL has had on products in scope of this policy has been considered in the counterfactual but has not been factored into the calculations. This is due to the impact to benefits being less than 1% and to streamline calculations, this has not been factored in.

Key assumptions/sensitivities/risks **Discount rate (%)**

There are a number of implicit assumptions about the counterfactual that are key to the calculations for other options relative to this: (1) industry's use of volume promotions would stay roughly constant without this policy, (2) the effectiveness of volume promotions on HFSS products would stay roughly constant without this policy, (3) the discounted costs of treating obesity-related conditions, and the impact on QALYs, is roughly constant over the 25-years projected in this analysis.

BUSINESS ASSESSMENT (Option 0)

Direct impact on business (Equivalent Annual) £m:			**Score for Business Impact Target (qualifying provisions only) £m:**
Costs:	**Benefits:**	**Net:**	

Summary: Analysis & Evidence

Policy Option 1

Description: End all volume offers for HFSS products included in a narrow list of Discretionary Food and Drink product categories in the retail sector excluding small and micro businesses

FULL ECONOMIC ASSESSMENT

Price Base Year 2019	PV Base Year 2020	Time Period Years 25	Net Benefit (Present Value (PV)) (£m)		
			Low: Optional	**High:** Optional	**Best Estimate:** 2,488

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low				
High				
Best Estimate	4.6		4.8	**126**

Description and scale of key monetised costs by 'main affected groups'

The expected transition costs to retailers include familiarisation costs (£0.2m), product assessment costs (£1m), knowledge sharing costs (£1.5m) and IT system costs (£2m). Over the 25-year appraisal period, retailers will also have ongoing product assessment costs, for new and modified products, which is estimated to be £6.3m. Retailers' lost profits are expected to be around £17.1m per year (direct cost), after considering temporary price cuts replacing volume promotions and further sales offsetting (indirect benefit), retailers' lost profit is expected to be around £2.6m per year (direct cost plus indirect benefit). Manufacturers' lost profits are expected to be around £3m per year (direct cost plus indirect benefit). The enforcement cost to Government is expected to be £106k in the first year with an on-going cost of £67k per year.

Other key non-monetised costs by 'main affected groups'

A reduction in sales, and hence profits, for the suppliers of ingredients to the food and drink manufacturers of HFSS products has not been monetised due to it being a second order effect and therefore not in scope of the IA. If businesses, choose to reformulate their products, there may be additional indirect costs associated with this – although we expect businesses to do this only if it increases their profits.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low				
High				
Best Estimate				**2,614**

Description and scale of key monetised benefits by 'main affected groups'

Expected direct benefits are the health benefits that would accrue because of lower calorie consumption amongst overweight and obese people – equivalent to £2,038m over the 25-year assessment period. Social care benefits would amount to £181m, NHS cost savings of £154m and reduced premature mortality would be expected to deliver an additional £241m of economic output.

Other key non-monetised benefits by 'main affected groups'

Consumers may experience an increase in consumer surplus as they no longer have to make extra purchases and are still able to profit from price cuts. This is an indirect benefit as consumers should be spending less on HFSS products. There would also be an indirect non-monetised health benefits if manufacturers reformulate their HFSS products as a result of the policy.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5/1.5%

Key assumptions in the analysis are: (1) Retailers switch to using price cuts to promote HFSS products such that the average price of HFSS products previously sold on volume promotion will remain the same but sales are reduced, (2) Consumers will adopt compensatory behaviour meaning 40% of calories removed through this policy will be replaced by calories from other products (3) Costs to industry are based on limited data on profit margins due to the commercial sensitivity of this information. (4) A discount rate of 1.5% is applied on health impacts and 3.5% on all other monetised impacts.

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target (qualifying provisions only) £m:
Costs: 44.4	**Benefits:** NA	**Net: -44.4**	

Summary: Analysis & Evidence

Policy Option 2

Description: End all volume offers for HFSS products which contribute significant sugar and calories to children's' diets and are of most concern for childhood obesity, in the retail sector excluding small and micro businesses

FULL ECONOMIC ASSESSMENT

Price Base Year 2019	PV Base Year 220	Time Period Years 25	Net Benefit (Present Value (PV)) (£m)		
			Low: 50	**High: 8,579**	**Best Estimate: 2,916**

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	2.1		+2.1	**50**
High	21		12.6	**336**
Best Estimate	4.6		5.8	**149**

Description and scale of key monetised costs by 'main affected groups'

The expected transition costs to retailers include familiarisation costs (£0.2m), product assessment costs (£1m), knowledge sharing costs (£1.5m) and IT system costs (£2m). Over the 25-year appraisal period, retailers will also have ongoing product assessment costs, for new and modified products, which is estimated to be £6.3m over 25 years. Retailers' lost profits are expected to be around £20.6m per year (direct cost), after considering temporary price cuts replacing volume promotions and further sales offsetting (indirect benefit), retailers' lost profit is expected to be around £3.1m per year (direct cost-plus indirect benefit). Manufacturers' lost profits are expected to be around £4.1m per year (direct cost plus indirect benefit). The enforcement cost to Government is expected to be £106k in the first year with an on-going cost of £67k per year.

Other key non-monetised costs by 'main affected groups'

A reduction in sales, and hence profits, for the suppliers of ingredients to the food and drink manufacturers of HFSS products has not been monetised due to it being a second order affect and therefore not in scope of the IA. If businesses choose to reformulate their products, there may be additional indirect costs associated with this – although we expect businesses to do this only if it increases their profits.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low				**0**
High				**8,915**
Best Estimate				**3,065**

Description and scale of key monetised benefits by 'main affected groups'

Expected direct benefits are the health benefits that would accrue because of lower calorie consumption amongst overweight and obese people – equivalent to £2,390m over the 25-year assessment period. Social care benefits would amount to £212m, NHS cost savings of £180m and reduced premature mortality would be expected to deliver an additional £283m of economic output.

Other key non-monetised benefits by 'main affected groups'

Consumers may experience an increase in consumer surplus as they no longer have to make extra purchases and are still able to profit from price cuts. This is an indirect benefit as consumers should be spending less on HFSS products. There would also be an indirect non-monetised health benefits if manufacturers reformulate their HFSS products as a result of the policy.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5/1.5%

Key assumptions in the analysis are: (1) Retailers switch to using price cuts to promote HFSS products such that the average price of HFSS products previously sold on volume promotion will remain the same but sales are reduced, (2) Consumers will adopt compensatory behaviour meaning 40% of calories removed through this policy will be replaced by calories from other products (3) Costs to industry are based on limited data on profit margins due to the commercial sensitivity of this information. A discount rate of 1.5% is applied on health impacts and 3.5% on all other monetised impacts.

BUSINESS ASSESSMENT (Option 2)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target (qualifying provisions only) £m:
Costs: 53.5	**Benefits:** NA	**Net: -53.5**	

Summary: Analysis & Evidence

Policy Option 3

Description: End all volume offers for HFSS products which contribute significant sugar and calories to children's' diets and are of most concern for childhood obesity, in the retail sector excluding micro businesses only.

FULL ECONOMIC ASSESSMENT

Price Base Year 2019	PV Base Year 2020	Time Period Years 25	Net Benefit (Present Value (PV)) (£m)		
			Low: Optional	**High:** Optional	**Best Estimate:** 2,881

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low				
High				
Best Estimate	31.2		9.8	**277**

Description and scale of key monetised costs by 'main affected groups'

The expected transition costs to retailers include familiarisation costs (£1.7m), product assessment costs (£19m), knowledge sharing costs (£2.9m) and IT system costs (£7.7m). Over the 25-year appraisal period, retailers will also have ongoing product assessment costs, for new and modified products, which is estimated to be £102m over 25 years. Retailers' lost profits are expected to be around £21.2m per year (direct cost), after considering temporary price cuts replacing volume promotions and further sales offsetting (indirect benefit), retailers' lost profit is expected to be around £3.2m per year (direct cost-plus indirect benefit). Manufacturers' lost profits are expected to be around £4.2m per year (direct cost plus indirect benefit). The enforcement cost to Government is expected to be £163k in the first year with an on-going cost of £124k per year.

Other key non-monetised costs by 'main affected groups'

A reduction in sales, and hence profits, for the suppliers of ingredients to the food and drink manufacturers of HFSS products has not been monetised due to it being a second order affect and therefore not in scope of the IA. This policy could impact the profitability of small businesses to the point of destabilising them due to the disproportional burden on smaller businesses who may find it difficult to implement the policy. If businesses, choose to reformulate their products, there may be additional indirect costs associated with this – although we expect businesses to do this only if it increases their profits.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low				
High				
Best Estimate				**3,158**

Description and scale of key monetised benefits by 'main affected groups'

Expected direct benefits are the health benefits that would accrue because of lower calorie consumption amongst overweight and obese people – equivalent to £2,462 m over the 25-year assessment period. Social care benefits would amount to £219m, NHS cost savings of £186m and reduced premature mortality would be expected to deliver an additional £291m of economic output.

Other key non-monetised benefits by 'main affected groups'

Consumers may experience an increase in consumer surplus as they no longer have to make extra purchases and are still able to profit from price cuts. This is an indirect benefit as consumers should be spending less on HFSS products. There would also be an indirect non-monetised health benefits if manufacturers reformulate their HFSS products as a result of the policy.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5/1.5%

Key assumptions in the analysis are: (1) Retailers switch to using price cuts to promote HFSS products such that the average price of HFSS products previously sold on volume promotion will remain the same but sales are reduced, (2) Consumers will adopt compensatory behaviour meaning 40% of calories removed through this policy will be replaced by calories from other products (3) Costs to industry are based on limited data on profit margins due to the commercial sensitivity of this information. A discount rate of 1.5% is applied on health impacts and 3.5% on all other monetised impacts.

BUSINESS ASSESSMENT (Option 3)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target (qualifying provisions only) £m:
62.2	**Benefits:** NA	**Net: -62.2**	

Summary: Analysis & Evidence

Policy Option 4

Description: End all volume offers for HFSS products included in original list of categories consulted on in all retailers who sell food and drink in the retail sector excluding small and micro businesses.

FULL ECONOMIC ASSESSMENT

Price Base Year 2019	PV Base Year 2020	Time Period Years 25	Net Benefit (Present Value (PV)) (£m)		
			Low: Optional	**High:** Optional	**Best Estimate:** 3,364

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low				
High				
Best Estimate	4.6		6.4	**165**

Description and scale of key monetised costs by 'main affected groups'

The expected transition costs to retailers include familiarisation costs (£0.2m), product assessment costs (£1m), knowledge sharing costs (£1.5m) and IT system costs (£2m). Over the 25-year appraisal period, retailers will also have ongoing product assessment costs, for new and modified products, which is estimated to be £6.3m over 25 years. Retailers' lost profits are expected to be around £23m per year (direct cost), after considering temporary price cuts replacing volume promotions and further sales offsetting (indirect benefit), retailers' lost profit is expected to be around £3.5m per year (direct cost-plus indirect benefit). Manufacturers' lost profits are expected to be around £4.6m per year (direct cost plus indirect benefit). The enforcement cost to Government is expected to be £106k in the first year with an on-going cost of £67k per year.

Other key non-monetised costs by 'main affected groups'

A reduction in sales, and hence profits, for the suppliers of ingredients to the food and drink manufacturers of HFSS products has not been monetised due to it being a second order affect and therefore not in scope of the IA. If businesses, choose to reformulate their products, there may be additional indirect costs associated with this – although we expect businesses to do this only if it increases their profits.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low				
High				
Best Estimate				**3,529**

Description and scale of key monetised benefits by 'main affected groups'

Expected direct benefits are the health benefits that would accrue because of lower calorie consumption amongst overweight and obese people – equivalent to £2,752m over the 25-year assessment period. Social care benefits would amount to £244m, NHS cost savings of £208m and reduced premature mortality would be expected to deliver an additional £325m of economic output.

Other key non-monetised benefits by 'main affected groups'

Consumers may experience an increase in consumer surplus as they no longer have to make extra purchases and are still able to profit from price cuts. This is an indirect benefit as consumers should be spending less on HFSS products. There would also be an indirect non-monetised health benefits if manufacturers reformulate their HFSS products as a result of the policy.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5/1.5%

Key assumptions in the analysis are: (1) Retailers switch to using price cuts to promote HFSS products such that the average price of HFSS products previously sold on volume promotion will remain the same but sales are reduced, (2) Consumers will adopt compensatory behaviour meaning 40% of calories removed through this policy will be replaced by calories from other products (3) Costs to industry are based on limited data on profit margins due to the commercial sensitivity of this information. A discount rate of 1.5% is applied on health impacts and 3.5% on all other monetised impacts.

BUSINESS ASSESSMENT (Option 4)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target (qualifying provisions only) £m:
Costs:59.8	**Benefits:** NA	**Net: -59.8**	

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Executive summary

Problem and justification for action

1. Childhood obesity is one of the biggest health problems this country faces[1]. Around a fifth of children in England are overweight or obese by the time they start primary school aged 4-5, and this rises to one third by the time they leave aged 10-11[2].

2. Childhood obesity increases the risk of obesity in adulthood. Data shows an obese child is five times more likely to be an obese adult[3]. Obesity is a major determinant of ill health[4], increasing the risk of heart disease, stroke, type 2 diabetes and some cancers. This imposes a substantial burden on the NHS, with overweight and obesity costing the health service in England an estimated £5.1bn in 2014/15[5]. Some estimates place this cost higher. Obesity causes further costs to society through premature mortality, increased sickness absence and additional benefit payments.

3. Obesity is caused by regularly consuming more calories than is expended. There is a consensus that excess calorie intake is the largest factor contributing to weight gain and obesity[6].

4. Price promotions, particularly volume promotions, have been found to drive excess consumption of HFSS goods. Price promotions (volume and temporary price cuts) in the UK are the highest in Europe, accounting for around 34% of take-home food and drink expenditure[7]. Furthermore, higher sugar food and drink items are more likely to be promoted and are more deeply promoted[8] than lower sugar items. Government intervention is necessary to ensure businesses promote healthier environments and establish shopping environments that do not encourage excess purchasing and consumption of food and drink high in fat, sugar, salt and calories.

Policy objective

5. The restriction of volume promotions on HFSS food and drinks is intended to:

    - Reduce overconsumption of HFSS products likely to lead to excess calorie intake and, over time, weight gain, while minimising the impact on food purchases that do not contribute to childhood obesity;

    - Shift the balance of promotions towards healthier options and maximise the availability of healthier products that are offered on promotion, to make it easier for parents to make healthier choices when shopping for their families;

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[1] Time to Solve Childhood obesity: An Independent Report from the Chief Medical Officer, Professor Dame Sally Davies, 2019. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/837907/cmo-special-report-childhood-obesity-october-2019.pdf (last accessed 05/03/2020)

[2] NHS Digital (2019) National Child Measurement Programme- England, 2018/19: Tables

[3] Simmonds M, Llewellyn A, Owen CG, Woolacott N. Predicting adult obesity from childhood obesity: a systematic review and meta-analysis. Obes Rev. 2016;17(2):95–107

[4] Guh et al. (2009) The incidence of co-morbidities related to obesity and overweight: A systematic review and meta-analysis, BMC Public Health

[5] Estimates for UK in 2014/15 are based on: Scarborough, P. (2011) The economic burden of ill health due to diet, physical inactivity, smoking, alcohol and obesity in the UK: an update to 2006–07 NHS costs. Journal of Public Health. May 2011, 1-9. Uplifted to take into account inflation. No adjustment has been made for slight changes in overweight and obesity rates over this period. We assume England costs account for around 85% of UK costs.

[6] Time to Solve Childhood obesity: An Independent Report from the Chief Medical Officer, Professor Dame Sally Davies, 2019. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/837907/cmo-special-report-childhood-obesity-october-2019.pdf (last accessed 05/03/2020)

[7] An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, a research project for Public Health England conducted by Kantar Worldpanel UK, 2020. Availble here: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action
It is an update of Sugar Reduction: The evidence for action - Annexe 4: An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, Public Health England, 2015.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470175/Annexe_4._Analysis_of_price_promotions.pdf (last accessed 05/03/2020).

[8] An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, a research project for Public Health England conducted by Kantar Worldpanel UK, 2020. Availble here: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action
It is an update of Sugar Reduction: The evidence for action - Annexe 4: An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, Public Health England, 2015.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470175/Annexe_4._Analysis_of_price_promotions.pdf (last accessed 05/03/2020)

- Assist the wider childhood obesity strategy to reduce circumstances currently contributing to the obesogenic environment;
- Create a level playing field in which stores that make voluntary progress are no longer penalised.

6. The policy has been updated following the consultation, see summary of consultation responses below for further detail.

Policy options

7. This IA includes modelling of a range of options. The options analysed in the IA are:

- **Option 0:** Do nothing
- **Option 1:** End all volume offers for HFSS products included in a narrow list of Discretionary Food and Drink product categories in the retail sector excluding small and micro businesses
- **Option 2:** End all volume offers for HFSS products which contribute significant sugar and calories to children's' diets and are of most concern for childhood obesity, in the retail sector excluding small and micro businesses
- **Option 3:** End all volume offers for HFSS products which contribute significant sugar and calories to children's' diets and are of most concern for childhood obesity, in the retail sector excluding micro businesses only.
- **Option 4:** End all volume offers for HFSS products included in original list of categories consulted on in all retailers who sell food and drink in the retail sector excluding small and micro businesses.

8. Option 4, which was presented as the Government's preferred proposal in the consultation[9], has the highest NPV due to the wide scope of products included in the restrictions. However, following consultation feedback from industry, further engagement with businesses and additional analysis and modelling by DHSC, it became clear that this option would likely result in disproportionate burden for businesses and present significant implementation challenges.

9. Therefore, Government decided that Option 2 is the preferred option because it strikes the best balance between delivering a robust policy that will deliver significant health benefits while considering proportionality and feasibility of implementation. The product categories in scope are significant contributors to children's sugar and calorie intakes and are often heavily promoted.

Costs and benefits of options

10. The benefits from restricting the promotion of HFSS products are expected to be a reduction in purchasing of excess HFSS products. Excess consumptions of HFSS products leads to excess calorie consumption and weight gain over time. In the long-term this will help lower obesity prevalence and obesity related morbidity and mortality, compared to a counter-factual of no restrictions.

11. The main categories of costs are familiarisation, transition and on-going costs associated with checking products and lost profits to industry due to reduced sales of HFSS products.

Preferred Option

12. Option 2 is the preferred option. In Option 2, Government restricts all volume offers for HFSS products which contribute significant sugar and calories to children's' diets and are heavily promoted. This option exempts small and micro businesses in England, apart from those stores that are part of a symbol group. This option ensures the policy is as targeted as possible to minimise the costs to business and the distortionary impact of regulation on the market while still having a significant impact on health at a population level.

13. This IA assumes the volume promotions restrictions will come into force alongside the location restrictions. Both sets of restrictions will apply to the same products. This means businesses subject to both restrictions will only need to assess a product once to establish if it is subject to both restrictions. This is therefore a shared cost across both policies. There are some additional businesses that are in scope of this policy but not of the locations promotion restrictions. Therefore, for ease, this IA captures the double counting and therefore treats such costs conservatively. This IA

[9] Option 4 was presented as the preferred option in the pre-consultation IA. It excluded micro businesses and included the OOH sector.

will include the costs to the additional businesses that are in scope of the restrictions to volume promotions, but not in scope of the location restriction IAs.

14. For Option 2, over 25 years, expected costs to retailers include total transition costs of £5m and lost profit of approximately £59m. Over this period, manufacturers of HFSS products would also experience total lost profits of around £100m. The enforcement costs will be borne by the Department of Health and Social Care. The on-going cost to the department of enforcing these regulations is estimated to be around £1.2m across 25 years. The on-going cost to retailers of product assessment is estimated to be £6.3m across 25 years.

15. The expected health benefits for Option 2 are estimated to be around £2,390m over the 25-year appraisal period. Reduced morbidity would also result in NHS and social care cost savings. Social care savings would amount to £212m, NHS cost savings of £180m and reduced premature mortality would be expected to deliver an additional £283m economic output through additional labour force participation. The benefits will be experienced by all age groups as the food and drink targeted is consumed across age groups. Although a significant amount of the costs from obesity accrue in later life, the rising incidence in paediatric cases of type 2 diabetes[10] and liver disease[11] in the UK shows the burden of obesity is increasingly being felt in younger generations. Therefore, today's children will benefit their lifetime health from the policy being implemented from their childhood.

16. The total benefits will be around £3,065m, giving a total net present value of £2,916m.

NPV Summary

17. The table below outlines the expected impacts of the different policy options over the 25-year assessment period. Option 0 represents the do-nothing option against which the other options are compared. As such, the costs and benefits of this option are 0.

Table 1: Summary of the central estimates for the policy options (£m)

Option	Total cost	Total benefit	NPV
0	0	0	0
1	126	2,614	2,488
2	**149**	**3,065**	**2,916**
3	277	3,158	2,881
4	165	3,529	3,364

Critical Value analysis

18. It is possible that wider factors, such as changes to consumer behaviour, could offset some of the expected benefits of this policy. To assess the impact of this compensation, we consider the degree of offsetting required to result in a neutral NPV. Any offset would depend on additional consumption, and thus further profits to industry. Therefore, most of the costs and benefits of the policy tend to vary together. Considering this suggests that 95% of the benefits of the policy would need to be offset for the policy not to be considered socially beneficial based on Option 2.

Problem under consideration

19. England has some of the highest rates of childhood obesity in Western Europe and a significant inequalities gap. Nearly a quarter of children in England are obese or overweight by the time they start primary school aged five, and this rises to one third by the time they leave aged 11[12].

[10] Continuing rise of Type 2 diabetes incidence in children and young people in the UK, T. P. Candler, O. Mahmoud, R. M. Lynn, A. A. Majbar, T. G. Barrett and J. P. H. Shield, 2018.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5969249/pdf/DME-35-737.pdf

[11] Pediatric non-alcoholic fatty liver disease, Haley Bush, Pegah Golabi and Zobair M. Younossi, 2017.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5483623/pdf/children-04-00048.pdf

[12] NHS Digital. (2019) National Child Measurement Programme 2018/2019

20. Children living in the most deprived areas are twice as likely to be obese and four times as likely to be severely obese than children in the least deprived areas[13]. Obesity has a significant impact on children's health and wellbeing and increases the risk of obesity and related diseases in adulthood.

21. In England, 28% of adults are obese and 63% are either overweight or obese. Amongst children aged 2-15, the equivalent figures are 15% and 28% respectively[14]. Obesity is a major determinant of ill health in the UK and a leading cause of serious diseases such as type 2 diabetes, heart disease and some cancers. Being overweight is the biggest single preventable cause of cancer after smoking and causes 13 types of cancer [15]. It is estimated 40,000 deaths per year in England are attributable to being overweight or obese (over 10% of all deaths). An estimated 70,000 premature deaths could be avoided each year if diets matched nutritional guidelines[16].

22. This is causing a huge strain on the NHS and economy more broadly. In 2014, there were 16 million sickness days attributed to obesity[17]. Obesity costs the NHS £5.1bn a year and wider societal costs are estimated at between £27-47bn[18].

23. The COVID-19 pandemic has further highlighted the impact that obesity can have on people's health. Evidence suggests people living with obesity who contract COVID-19 are more likely to be admitted to hospital and have an increased risk of dying from COVID-19 compared to those with a healthy weight. Tackling obesity is therefore an immediate priority to support individuals and the NHS.[19]

24. Obesity causes further costs to society and government through premature mortality, increased sickness absence and additional benefit payments.

25. Without action, the burdens of obesity and its related conditions are expected to grow substantially over time. Projections suggest that the proportion of the UK adult population who are obese will increase significantly over the coming decades[20] [21].

26. Childhood obesity is a complex problem with many drivers, including food production, societal influences, food consumption, individual psychology and biology, individual activity and environment[22]. Therefore, the government is committed to pursuing a wide set of actions across the system to reduce obesity. Despite the complexity of its drivers, at its root obesity is caused by consistently consuming more calories than we use to maintain our bodies and through activity over a long amount of time. It is estimated that on average, compared with those of healthy body weights, overweight and obese children consume between 140 and 500 excess calories per day for boys and between 160 and 290 for girls, depending on their age[23].

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[13] NHS Digital. (2019) National Child Measurement Programme 2018/2019

[14] Health Survey for England 2018, NHS Digital

[15] Secretan, B. L. et al. Special Report Body Fatness and Cancer — Viewpoint of the IARC Working Group. (2016). Available at: https://www.nejm.org/doi/10.1056/NEJMsr1606602?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%3dwww.ncbi.nlm.nih.gov

[16] Mortality attributable to excess adiposity in England and Wales in 2003 and 2015: explorations with a spreadsheet implementation of the Comparative Risk Assessment methodology, Christopher Kelly, Nora Pashayan, Sreetharan Munisamy and John W Powles, Population Health Metrics, 2009, 7:11

[17] Making the case for tackling obesity - why invest?, Public Health England,2014. https://khub.net/documents/31798783/32184747/Making+the+case+for+tackling+obesity+-+why+invest+-+supporting+references.pdf/091f75ad-91fd-4275-aa37-e17b31984b67 (last accessed on 05/03/2020

[18] Estimates for UK in 2014/15 are based on: Scarborough, P. (2011) The economic burden of ill health due to diet, physical inactivity, smoking, alcohol and obesity in the UK: an update to 2006–07 NHS costs. Journal of Public Health. May 2011, 1-9. Uplifted to take into account inflation. No adjustment has been made for slight changes in overweight and obesity rates over this period. We assume England costs account for around 85% of UK costs.

[19] Docherty, A.B., Harrison, E.M., Green, C.A., Hardwick, H.E., Pius, R., Norman, L., Holden, K.A., Read, J.M., Dondelinger, F., Carson, G. and Merson, L., (2020). Features of 16,749 hospitalised UK patients with COVID-19 using the ISARIC WHO Clinical Characterisation Protocol. medRxiv

[20] Tackling Obesities: Future Choices – Project report, Government Office for Science, 2007. https://www.gov.uk/government/publications/reducing-obesity-future-choices (last accessed 05/03/2020)

[21] Pineda E, Sanchez-Romero LM, Brown M, Jaccard A, Jewell J, Galea G, Webber L, Breda J. Forecasting Future Trends in Obesity across Europe: The Value of Improving Surveillance. Obesity facts. 2018;11(5):360-71.

[22] Tackling Obesities: Future Choices – Project report, Government Office for Science, 2007. https://www.gov.uk/government/publications/reducing-obesity-future-choices (last accessed 05/03/2020)

[23] Calorie reduction: the scope and ambition for action, Public Health England, 2018. https://www.gov.uk/government/publications/calorie-reduction-the-scope-and-ambition-for-action (last accessed 05/03/2020)

27. Price promotions are effective at influencing food purchases and can lead to up to 20% more purchases that people would not otherwise make[24]. Given that price promotions are widely used in the retail sector to promote HFSS products, they can lead to over purchasing and overconsumption of HFSS products. Over time, this consistent overconsumption of highly calorific products can lead to weight gain and obesity. Taking action to help reduce this excess calorie consumption will decrease obesity prevalence and obesity related ill health.

Types of price promotions

28. Price promotions fall into two main categories[25] volume offers and reference pricing, both of which are outlined below.

29. Generally speaking, volume offers include:

- Multi-buy offers - where the discount is obtained by purchasing more than one unit, such as in buy-one-get-one-free and 3 for 2 offers.
- Combination offers - where a discount is given when individuals purchase a specified combination of products, as is the case in meal deals for example.
- Linked offers - where the consumer is offered a free or discounted product when they purchase another product, such as a half price drink when they buy a sandwich.
- Extra for the same price - when the consumer is given more for the same price, such as 50% extra free.

30. The second category of price promotions is reference pricing, i.e. pricing that demonstrates good value by referring to another price, typically of higher value. This category includes:

- Was/now prices - which compare an advertised price to a price the retailer has previously charged,
- After promotion or introductory prices - which compare the current price to a price that the retailer intends to charge in the future,
- Recommended retail prices (RRP) - which compare the advertised price to one recommended by the manufacturer or supplier and,
- External reference prices - which compare an advertised price to a price charged by another retailer for the same product.

31. For the purposes of this IA, we use price promotions to cover all types of promotional offers on food and drink, temporary price reductions (price cuts) to describe all promotions falling under the reference pricing category above and volume promotions to describe all volume offers. The policy only targets 'multi-buy offers' and 'extra for the same price'.

Rationale for intervention

32. On average, diets in the UK are not in line with the recommended guidelines and contain too much sugar, saturated fat and salt and not enough fibre and fruit and vegetables.[26] Overweight or obese children consume between 146 and 505 kcals more than they need per day for boys and between 157 and 291 kcals per day for girls.[27] Regular overconsumption is one of the key factors contributing to weight gain and, over time, obesity. Although some HFSS products will be purchased as part of a balanced diet and may not contribute to excess consumption and obesity, they nevertheless represent

[24] An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, a research project for Public Health England conducted by Kantar Worldpanel UK, 2020. Availble here: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action
It is an update of Sugar Reduction: The evidence for action - Annexe 4: An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, Public Health England, 2015.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470175/Annexe_4._Analysis_of_price_promotions.pdf (last accessed 05/03/2020)

[25] Guidance for Traders on Pricing Practices, Chartered Trading Standards Institute, 2016.
https://www.businesscompanion.info/sites/default/files/Guidance-for-Traders-on-Pricing-Practices-Apr-2018.pdf (Accessed 22/10/2018)

[26] Sugar reduction: The evidence for action, Public Health England, 2015.https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/470179/Sugar_reduction_The_evidence_for_action.pdf (Accessed 05/03/2020) .

[27] Calorie reduction: The scope and ambition for action, Public Health England, 2018. https://www.gov.uk/government/publications/calorie-reduction-the-scope-and-ambition-for-action (last accessed 05/03/2020)

the most focused group of products to reduce excess calorie consumption, as they are widely available and are often over consumed[28].

33. Individuals face only some of the costs associated with ill health as universal healthcare ensures the financial costs are borne by the taxpayer. Consequently, the health costs associated with overconsumption of HFSS products are passed on to society and are not just experienced by the individual. In economic terms, this is referred to as a negative externality.

34. An individual is likely to make decisions based only on the costs they face. When a negative externality is present, the market fails to operate efficiently because the social costs are greater than the personal costs and therefore not considered in an individual's decision making at the margin.

35. This negative externality gives a rationale for intervention, but it is not immediately clear what form this intervention should take.

36. Many different cues can affect food and drink purchases. Furthermore, if individuals fail to consider the outcomes of their actions, they may make decisions that result in weight gain and ill health. There is evidence to suggest that not only may this be the case for some people[29], but that many people's attitudes when considering the future are irrational[30]. While it is not clear how a policy could easily correct for this, there are certain behavioural factors that are open to intervention.

37. Price promotions on HFSS products can lead to excess consumption of goods which are associated with a greater propensity to create impulse purchases[31] and act as a significant contributor to weight gain[32].

38. It is clear from academic evidence that marketing and promotions in stores are extensive, deep and effective at influencing preferences and purchases[33]. Price promotions are a significant feature of food purchasing and are employed to encourage shoppers to make certain buying choices. Fundamentally, these promotions result in additional sales relative to undiscounted prices. The main reason for this is a combination of the temporary nature of these promotions and the reduction in prices they create. This in itself is no reason to intervene in the market and merely represents markets reacting as expected. It is how these promotions impact on food consumption decisions, which results in poor health outcomes.

39. Although price promotions appear to be mechanisms to help consumers save money, data shows that they increase consumer spending by encouraging people to buy more than they intended to buy in the first place. Price promotions appeal to people from all demographic groups and increase the amount of food and drink people buy by around 20%[34]. Figure 4 also shows that volume promotions (multibuys), captured under expansion and extra trips, cause a greater sales uplift compared to other types of price promotions, such as simple price reductions, regardless of the discount offered.

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[28] Hawkes, Corinna. "Sales Promotions and Food Consumption." *Nutrition Reviews* 67.6 (2009): 333-42. Web.

[29] Komlos et al. (2004) Obesity and the rate of time preference: is there a connection? Journal of biosocial science, Mar;36(2):209-19

[30] Thaler RH, Sunstein CR (2003) Libertarian paternalism. The American Economic Review, May 1;93(2):175-9.

[31] Muruganantham G, Bhakat RS. (2013) A review of impulse buying behavior. International Journal of Marketing Studies, 2013 Apr 22;5(3):149.

[32] Mendoza JA, Drewnowski A, Christakis DA. (2007) Dietary energy density is associated with obesity and the metabolic syndrome in US adults. Diabetes care. 2007 Apr 1;30(4):974-9.

[33] Sugar Reduction: The evidence for action, Public Health England, 2015. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470179/Sugar_reduction_The_evidence_for_action.pdf (last accessed 05/03/2020)

[34] An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, a research project for Public Health England conducted by Kantar Worldpanel UK, 2020. Availble here: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action

It is an update of Sugar Reduction: The evidence for action - Annexe 4: An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, Public Health England, 2015. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470175/Annexe_4._Analysis_of_price_promotions.pdf (last accessed 05/03/2020)

40. It is clear from academic evidence that marketing and promotions influence food preferences and purchases in stores[35]. Price promotions employed to encourage shoppers to make certain buying choices. Fundamentally, these multibuy promotions result in £75 additional spending per year for an average household[36]. This, in turn, is offset by £61 of non-incremental purchasing, therefore the total impact of multibuy promotions is an overall additional expenditure of £14. The excess consumption of these products catalyses the increasing likelihood of obesity related diseases later in life.

41. While people may purchase promoted items on the assumption that the additional quantity bought will be offset by reduced purchases later (having long-term cost savings), this does not consider the subconscious decision to consume more when more is available. This can lead to increases in consumption frequency and the quantity eaten which could lead to excess calorie consumption[37]. Moreover, when comparing homes with and without large stockpiles, consumption over the first week following the purchase is found to be substantially greater in homes with large stockpiles. When the relative difference in the quantity available within homes has fallen, this difference in consumption between homes disappears[38],[39]. This increased consumption is thought to occur due to the increased visibility of stockpiled foods, not least because they are often stored in visible locations within the home.

42. Price promotions on HFSS products can lead to excess consumption of goods which are associated with a greater propensity to create impulse purchases[40] and act as a significant contributor to weight gain[41].

43. In addition, free refills of sugar-sweetened beverages (SSBs) can also encourage excess consumption. Free refills are based in the out of home (OOH) environment in which an individual would immediately consume the extra portion/s. Consumption of SSBs has been positively correlated with increased obesity, chronic diseases and greater risk of dental issues[42]. The calorie intake from SSBs contain little nutritional value, with high levels of free sugars[43], and tend to not satisfy hunger in comparison to solid food[44]. Resultingly, total consumption of SSBs may increase while consumption of foods with more nutritional calories to decrease, causing weight gain and increased obesity over time[45]. WHO recommends that a daily free sugar target should be 5% of total energy intake. Currently, PHE reveals that SSBs are accounting for 29% of total free sugar consumption for teenagers 11-18 years and 16% for those aged between 4-10 years[46].

44. Acting to reduce the promotion of HFSS food and drinks in retailers has previously been recommended by Public Health England as a way of reducing excessive sugar consumption. In

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[35] Sugar Reduction: The evidence for action, Public Health England, 2015. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470179/Sugar_reduction_The_evidence_for_action.pdf (last accessed 05/03/2020)

[36] Hill, R. et al. Kantar. An analysis of the role of price promotionson the household purchases of food and drinks high in sugar.2019.

[37] Chandon P, Wansink B. (2002) When are stockpiled products consumed faster? A convenience-salience framework of post-purchase consumption incidence and quantity. J. Mark. Res. 39:321–35

[38] Ibid.

[39] Girju, Marina and Ratchford, Mark, The Influences of Portion Size, Context and Package Characteristics on Snack Food Consumption: Evidence from a U.S. Rolling Cross-Sectional Survey (April 19, 2016). Available at SSRN: https://ssrn.com/abstract=2664375 or http://dx.doi.org/10.2139/ssrn.2664375 (Last accessed 05/03/2020)

[40] Muruganantham G, Bhakat RS. (2013) A review of impulse buying behavior. International Journal of Marketing Studies, 2013 Apr 22;5(3):149.

[41] Mendoza JA, Drewnowski A, Christakis DA. (2007) Dietary energy density is associated with obesity and the metabolic syndrome in US adults. Diabetes care. 2007 Apr 1;30(4):974-9.

[42] Carbohydrates and Health, Scientific Advisory Committee on Nutrition (SACN), 2015. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/445503/SACN_Carbohydrates_and_Health.pdf (last accessed 15/06/2020)

[43] Free sugars include monosaccharides and disaccharides added to foods and beverages by the manufacturer, cook or consumer, and sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates

[44] Guideline: Sugar intake for adults and children, World Health Organisation, 2015. https://apps.who.int/iris/bitstream/handle/10665/149782/9789241549028_eng.pdf;jsessionid=6698D92F7C9A601EFD7B35FA684958C3?sequence=1 (last accessed on 05/03/2020)

[45] Guideline: Sugar intake for adults and children, World Health Organisation, 2015. https://apps.who.int/iris/bitstream/handle/10665/149782/9789241549028_eng.pdf;jsessionid=6698D92F7C9A601EFD7B35FA684958C3?sequence=1 (last accessed on 05/03/2020)

[46] Why 5%?, Public Health England, 2015. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/769482/Why_5__-_The_Science_Behind_SACN.pdf (last accessed 05/03/2020)

2015, Public Health England conducted a review of the evidence to establish the most effective levers to reduce sugar intake across the population. As part of this review, researchers specifically investigated the impact that marketing and promotions can have on purchasing decisions and, therefore, consumption. Overall, Public Health England's research recommended that reducing and rebalancing promotions towards healthier products would improve the balance of people's diets.

45. We recognise there have been voluntary programmes by some retailers to reduce the use of price promotions, particularly multi-buy promotions, to promote unhealthy products. However, these voluntary commitments to restrict promotions of HFSS food and drink have been limited to individual retailers and were not implemented consistently across all stores.

46. This shows that the current market conditions have failed to eliminate the negative externalities of overconsumption of HFSS products due to price promotions and previous voluntary actions have not been that successful in eradicating the problem either. Therefore, the existence of this market failure provides a rationale for government intervention.

Impact on children

47. This policy benefits all age groups and the food and drink categories outlined in Option 2 focus on foods that significantly contribute to children's sugar and calorie intakes and are often heavily promoted. Obesity in childhood directly affects physical and mental health and is associated with an increased risk of obesity in adulthood[47] when the majority of costs of obesity occur. Although food habits are not perfectly stable over the life course, there is considerable scope for influencing lifetime habits by intervening in children[48]. Adjusting the consumption patterns of children therefore offers substantial benefits in the long term.
48. In most cases, children are unable to choose what they eat as their parents decide on their behalf. Multiple influences and factors play into the decisions that parents make about the food and drinks that they buy for their families and will vary between each individual. However, when a volume promotion is available it encourages purchasing of extra portions of food and drink. It is reasonable to assume that many parents, as for other groups of consumers, lack an understanding of the long-term health impact of the excess purchases.
49. Children are uniquely vulnerable to the techniques used by marketers to promote sales[49], a fact that marketers have responded to in the past by significantly increasing advertising budgets for products aimed at children[50]. These effects can be transmitted into the purchasing behaviours of parents through 'pester power'[51].
50. Academic studies provide evidence that food promotion does encourage children to pester their parents to purchases specific foods, particularly HFSS products[52]. A study into Australian parents' experiences of food marketing directed towards children, for example, found that most of the items requested by children were HFSS products and 70% of parents purchased at least one food item requested during the shopping trip[53]. Furthermore, parents may not fully realise the extent to which their purchases are driven by prompts from children, with an observational study finding that children trigger twice as many purchases as parents realised[54].

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[47] Singh AS, Mulder C, Twisk JW, Van Mechelen W, Chinapaw MJ. (2008) Tracking of childhood overweight into adulthood: a systematic review of the literature. Obesity reviews. 2008 Sep 1;9(5):474-88.

[48] Hursti UK. Factors influencing children's food choice. Annals of medicine. 1999 Jan 1;31(sup1):26-32.

[49] Carter OB, Patterson LJ, Donovan RJ, Ewing MT, Roberts CM. (2011) Children's understanding of the selling versus persuasive intent of junk food advertising: Implications for regulation. Social Science & Medicine. 2011 Mar 31;72(6):962-8.

[50] Linn S, Novosat CL. (2008) Calories for sale: food marketing to children in the twenty-first century. The ANNALS of the American Academy of Political and Social Science. 2008 Jan;615(1):133-55.

[51] Marshall D, O'Donohoe S, Kline S. (2007) Families, food, and pester power: beyond the blame game? Journal of Consumer Behaviour. 2007 Jul 1;6(4):164-81.

[52] McDermott L, O'Sullivan T, Stead M, Hastings G. (2006) International food advertising, pester power and its effects. International Journal of Advertising. 2006 Jan 1;25(4):513-39.

[53] Campbell S, James EL, Stacey FG, Bowman J, Chapman K, Kelly B. (2012) A mixed-method examination of food marketing directed towards children in Australian supermarkets. Health promotion international. 2012 Nov 15;29(2):267-77.

[54] Ebster C, Wagner U, Neumueller D. (2009) Children's influences on in-store purchases. Journal of Retailing and Consumer Services. 2009 Mar 31;16(2):145-54.

Policy context and options

Policy context

Obesity and the retail sector

51. The proposal to restrict promotions of HFSS products by price and location in the retail sector and free-refills of sugary drinks in the out of home sector is part of a wider set of policies included in the Government's Childhood Obesity: a plan for action – Chapter 2[55], published in June 2018. The plan sets out the Government's national ambition to halve childhood obesity by 2030 and significantly reduce the gap in obesity prevalence between children from the most and least deprived areas[56]. The proposals outlined in Chapter 2 include consulting on ending the sales of energy drinks to children, consulting on introducing a 9pm watershed on tv and similar protections online, encouraging further action in local areas, mandating consistent calorie labelling in takeaways, restaurants and cafés and further restrictions on HFSS advertising. The proposed policies will help parents make the best decisions for their families by changing the food environment, so that healthier choices become the easiest choices.

52. In the budget 2016 the Government announced the introduction of a new levy on soft drinks that contain added sugar to help tackle childhood obesity, the Soft Drinks Industry Levy (SDIL). In August 2016, the Government launched the first part of its plan for action to tackle obesity in childhood[57]. This comprehensive plan aims to help children and families make healthier choices and be more active[58]. Key measures in the plan included a sugar reduction programme, and a commitment to helping children enjoy an hour of physical activity every day. Chapter 2 builds on the first chapter of the plan, both to cement the action already taken, and to take action in other areas.

53. The SDIL, was designed to incentivise businesses to reformulate sugary drinks. It is a charge on drinks with a total sugar content of 5 grams or more per 100 millilitres, with a higher charge for drinks that contain 8 grams or more sugar per 100 millilitres. The levy came into force in April 2018 and has been hugely successful. The latest data published in September 2019 shows that the average sugar content of drinks subject to the soft drinks industry levy decreased by 28.8% between 2015 and 2018[59]. The report also showed an increase in sales of drinks subject to the levy of 10.2% (due to increased sales of lower sugar drinks), but a reduction in the total sugar content in the drinks sold of 21.6%. Analysis by socio-economic group shows that the total sugar purchased per household from drinks subject to SDIL has decreased in all socio-economic groups by between 9% - 29%.

54. As part of the wider reformulation programme in March 2018 Public Health England announced an extensive calorie reduction programme[60]. This programme aims to remove excess calories from the food that children eat most, helping to make the healthy choice the easy choice for consumers. The calorie reduction programme challenges the food industry to achieve a 20% reduction in calories by 2024 in product categories that contribute significantly to children's calorie intakes and where there is scope for substantial reformulation and/or portion size reduction. This requires work to be undertaken by retailers and manufacturers, restaurants, pubs, cafes, takeaway and delivery services and others in the eating out-of-home sector.

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[55] Childhood obesity: a plan for action, chapter 2, Department for Health and Social Care, 2018. https://www.gov.uk/government/publications/childhood-obesity-a-plan-for-action-chapter-2 (last accessed 05/03/2020)

[56] Childhood obesity: a plan for action, chapter 2, Department for Health and Social Care, 2018. https://www.gov.uk/government/publications/childhood-obesity-a-plan-for-action-chapter-2 (last accessed 05/03/2020)

[57] Childhood obesity: a plan for action, Department for Health and Social Care, 2016. : www.gov.uk/government/uploads/system/uploads/attachment_data/file/546588/Childhood_obesity_2016__2__acc.pdf (last accessed 05/03/2020)

[58] Ibid.

[59] Sugar reduction: progress between 2015 and 2018, Public Health England, 2019. https://www.gov.uk/government/publications/sugar-reduction-progress-between-2015-and-2018 (last accessed 05/03/2020)

[60] Calorie reduction: the scope and ambition for action (2018) https://www.gov.uk/government/publications/calorie-reduction-the-scope-and-ambition-for-action (last accessed 13/03/2020)

55. In June 2019 Government published Chapter 3 of the Childhood Obesity Plan in the Prevention Green Paper including; consulting on improving the marketing and labelling of infant foods, a reduction and reformulation programme aimed at commercial infant feeding foods, consulting on building on the success of front of pack nutrition labelling and further action to support individuals to achieve and maintain a healthier weight.

56. A range of policies are being proposed in the childhood obesity plan because the "causes of obesity are embedded in an extremely complex biological system, set within an equally complex societal framework"[61] to which there is no single, simple solution. The size of the problem has led to its normalisation and the inability of many people to judge their own weight accurately[62]. Furthermore, evidence suggests that 50% of parents underestimate their overweight/obese child's weight[63].

57. Although people have difficulty identifying obesity as an issue at a personal level, the public recognises the problem at a national level. Obesity is reported as the second biggest health problem facing people today, with 35% of people identifying it as an issue – only 1% less than cancer. Additionally, 19% of people now report diabetes as a major issue – up from just 10% in 2010[64].

58. There has been significant engagement with industry to encourage businesses to promote healthier eating and support their customers to make healthier choices. For example, as part of the Public Health Responsibility Deal (RD), a partnership between Government and industry, the food industry was challenged to take voluntary action on food promotions, including the placement of confectionery at checkouts and increasing the promotion of healthier foods. Some approaches included:

    - Retailers removing sweets from their checkouts (Lidl, Aldi, Tesco)
    - Retailers taking voluntarily action on discounting and price promotions. For example, Sainsbury's moved away from multi-buy offers in 2016.

59. However, these voluntary commitments to restrict promotions of HFSS food and drink have been limited to individual retailers and were not implemented consistently across all stores and different stores have used different definitions of HFSS. The evaluation of the RD clearly showed the programme failed to encourage concerted action from businesses to establish healthier shopping environments and therefore did not have the anticipated impact on helping people make healthier choices[65]. The RD was shown to be unsuccessful in encouraging retailers to reach a common agreement on promotion restrictions and feedback from industry stakeholders, including retail trade bodies, was clear that competition law inhibits businesses from openly discussing or agreeing a common promotional strategy voluntarily; in order to achieve consistent and concerted action on promotions, legislation is required.

60. Furthermore, a level playing field is required to ensure forward thinking businesses are not penalised for taking action, and this is not possible with a voluntary approach. This experience has shown that these initiatives require comprehensive participation, and some are too commercially sensitive or complex for voluntary initiatives to be effective.

61. Figure 1[66] below shows the extent and depth of UK price promotions (both volume promotions and temporary price cuts) over time. Levels of price promotions on take home food and drink have declined since 2015. In 2015, the annual percentage of products sold on promotion was 40%. This figure is now 33%. The decline has largely been driven by shoppers' move to discounters, with other retailers also adopting more Every Day Low Price Strategies. As the discounters tend not to promote extensively,

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[61] Tackling Obesities: Future Choices – Project report, Government Office for Science, 2007. https://www.gov.uk/government/publications/reducing-obesity-future-choices (last accessed 08/09/2018)

[62] Johnson et al. (2014) Do weight perceptions among obese adults in Great Britain match clinical definitions? Analysis of cross-sectional surveys from 2007 and 2012, BMJ Open

[63] Lundahl et al. (2014) Parental underestimates of child weight: a meta-analysis. Pediatrics 014;133:e689–703.

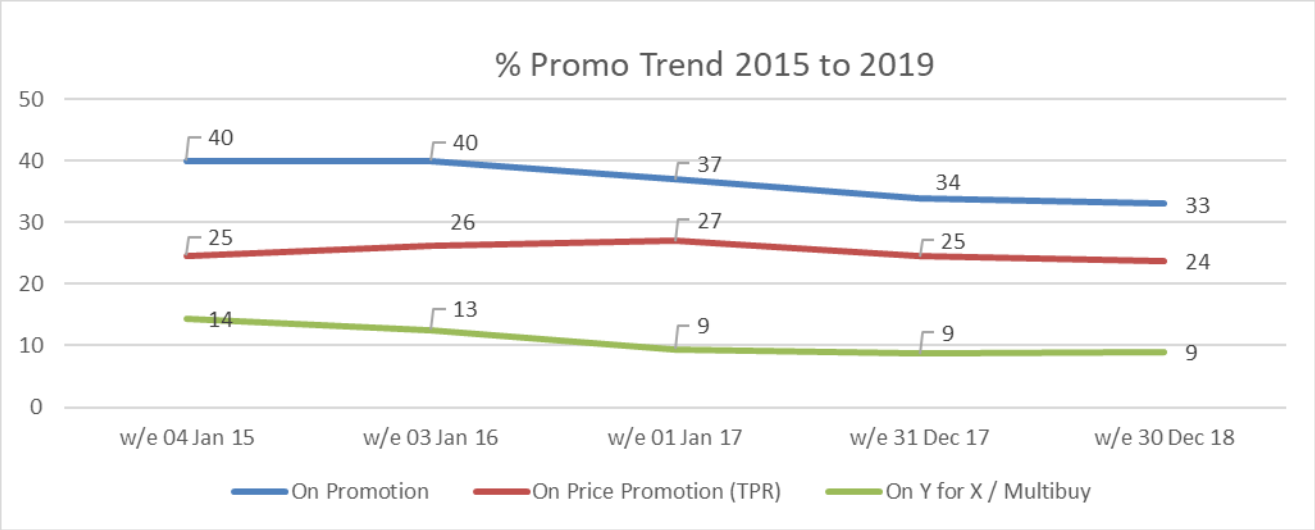
[64] Public Perceptions of the NHS and Social Care - Winter 2014: Ipsos MORI report for the Department of Health, 2015. https://www.gov.uk/government/publications/public-perceptions-of-the-nhs-and-social-care-winter-2014 (last accessed 05/03/2020)

[65] Knai C. et al, Has a public–private partnership resulted in action on healthier diets in England? An analysis of the Public Health Responsibility Deal food pledges, July 2015. Available at: https://www.sciencedirect.com/science/article/pii/S0306919215000391

[66] An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, a research project for Public Health England conducted by Kantar Worldpanel UK, 2020. Availble here: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action
It is an update of Sugar Reduction: The evidence for action - Annexe 4: An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, Public Health England, 2015.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470175/Annexe_4._Analysis_of_price_promotions.pdf (last accessed 05/03/2020)

the move to discounters means the average amount sold on promotion has gone down. Though the discounters consistently offer low price items, these are not technically promotions and therefore do not appear in the 'promoted items' calculation. Though the percentage sold on deal has decreased in the UK, it is still significantly higher than other major economies where comparable data is available. Promotional levels for groceries in countries such as Germany, France and Spain are in the order of 20% of shopper expenditure. Czechia and Italy are the markets which have similar levels of promotion to the UK.

Figure 1: Promotional breadth and depth over time (take home food and drink)



62. These findings are supported by a report from Food Standards Scotland[67], which reported in 2016 that purchase on promotion had recently decreased from 39% of calories to 36%. Furthermore, their results also suggested that up to 74% of confectionery was being purchased on promotion in 2016.

International comparisons

63. At least 11 countries[68], including Ireland, Norway, Portugal and Sweden in Europe, have introduced restrictions on advertising HFSS foods to children on television or online. Incentives such as free toys that could attract children are also prohibited in Chile and Taiwan.

64. Whilst several countries have introduced controls over marketing of HFSS food to children, we are not aware of any countries restricting the promotion of HFSS food in stores or online by location or volume price. However, Berkeley City Council[69] in the USA has recently approved a law that will restrict the availability of foods high in calories, salt and sugar at checkouts in favour of healthier options from March 2021. This will apply to all grocery stores above 2500 sq. ft.

65. A recent randomised controlled trial[70] in Australia found that restricting the promotion of high sugar products in favour of healthier options in a real-world store setting led to significant reductions in sales of high sugar products with no adverse impact on retailer profit.

[67] Foods and drinks purchased into the home in Scotland using data from Kantar Worldpanel, Food Standards Scotland, 2016. https://www.foodstandards.gov.scot/publications-and-research/publications/monitoring-retail-purchase-and-price-promotions-in-scotland-2010-2016 (last accessed 05/03/2020)

[68] World Cancer Research Fund International, *Nourishing and Moving policy datatbases*. Available here: https://policydatabase.wcrf.org/level_one?page=nourishing-level-one#step2=3#step3=328 (Accessed 14/10/2020)

[69] Berkeley City Council (2020) *Healthy Checkout Ordinance*

[70] Brimblecombe J, McMahon E, Ferguson M, De Silva K, Peeters A, Miles E, Wycherley T, Minaker L, Greenacre L, Gunther A, Chappell E, Chatfield MD, Mah CL. *Effect of restricted retail merchandising of discretionary food and beverages on population diet: a pragmatic randomised controlled trial*. Lancet Planet Health. 2020 Oct;4(10):e463-e473. doi: 10.1016/S2542-5196(20)30202-3. PMID: 33038320. Available at: https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(20)30202-3/fulltext?utm_campaign=trials20&utm_content=141864365&utm_medium=social&utm_source=twitter&hss_channel=tw-27013292#articleInformation (accessed: 14/10/2020)

Summary of consultation responses

66. The consultation asked for views on what size of businesses should be in scope of the regulation. Whilst many highlighted the need for an even playing field, those representing smaller businesses said that the policy could disproportionately impact small businesses. Stakeholders explained that, compared to large businesses, the policy could be more burdensome for small businesses to:

    - familiarise themselves with the new regulation;
    - assess which products are in scope of the restrictions; and
    - implement the policy.

67. In addition, it was highlighted that it may limit the ability of small retailers to compete with larger retailers. Small businesses are less likely to be able to respond to the restrictions by adopting alternative pricing or promotional strategies, such as temporary price promotions. This is because smaller businesses are unlikely to have the same purchasing power as larger businesses.

68. Following this consultation feedback, we recognise that the small businesses might find the requirement more challenging and burdensome. As a result, Government decided to exempt small businesses from the restrictions unless they are part of a symbol group.

69. Following further engagement with stakeholders, symbol groups have been identified as businesses who provide a support function to stores, often on promotions and what products to stock, similar to supermarkets. For example, we expect the assessment of which products are in scope of the restrictions to be carried out by the symbol business' HQ, meaning the product assessment cost would not fall on the individual store. Hence, the stores that are part of a symbol group would not find it as burdensome to familiarise themselves with the regulation, assess the products in scope and implement the policy, compared to small/micro businesses not part of a symbol group.

70. The consultation also asked for views on whether the Government's proposal should apply to online retailers that also sell food and drink. 50% of respondents agreed that the restrictions should also apply to online shopping, to reflect the increasing trend of people shopping online and to ensure a level playing field with retailers that only operate online. On this basis Government decided that the price restrictions will also apply to online shopping to promote a level playing field with retailers that mainly or only operate online. We will explore with industry what support is needed in the accompanying guidance.

71. It should be noted that the Government will consult on how to enforce this policy in due course. This consultation will be another opportunity for stakeholders to provide evidence on how the enforcement of the policy may differ for businesses part of a symbol group.

72. The consultation asked for views on whether price promotions in the out of home sector, for example '3 courses for £X', 'kids eat free', and meal deals should be in scope of the restrictions. Overall, 56% of respondents said no and 21% said yes. 45% of respondents said that meal deals (for example sandwich, snack and drink) should be in scope of the restrictions and 38% said they should not be in scope.

73. In line with the initial proposal, Government decided that promotions in the out of home sector (except free-refills of sugary drinks) and meal deals will not be in scope of the restrictions. Offers in the out of home sector are generally targeted to multiple individuals eating out together as a group and it is not the aim of this policy to make it more expensive for families eating out as a treat. In addition, there are practical problems with calculating the NPM on unpackaged foods due to the complexity of doing so without the back-of-pack nutritional information that is mandatory for pre-packaged food. Meal deal offers, though usually on pre-packaged goods, are generally targeted as lunch options for adults to consume on the go that day rather than being stockpiled at home; and they aim to reduce the cost of a single meal. Therefore, it was decided that both types of price promotion will not be in scope of the restrictions.

74. Consultation responses were largely supportive of the proposal to include free refills of soft drinks in the restrictions due to the well-known link between sugary soft drinks and negative health outcomes. Children consume up to three times more sugar than the daily recommended level [71] and there is

[71] National Diet and Nutrition Survey (NDNS), Public Health England and Food Standards Agency, 2018.

strong evidence showing that this overconsumption contributes to weight gain and, over time, obesity. In addition, we know that eating outside the home contributes around a quarter of adults daily calories[72], therefore it can play a significant role in excess calorie intake. Therefore, Government decided that the price promotion restrictions will also apply to free refills of SSBs (that are in scope of the SDIL) in the out-of-home sector and that free refills will be available only for low/no sugar soft drinks.

Policy Options

Option 0: Do nothing

75. This is the do-nothing scenario against which all other options are compared. This assumes no changes in age-specific rates of overweight and obesity but does assume that the average BMI of cohorts of individuals increases over time as the cohorts age. This increase in average BMI has been based on current trends[73]. Under the do-nothing scenario, a limited number of supermarkets would continue to voluntarily limit the promotion of certain HFSS products, and those not currently restricting promotions would be expected to continue doing so.
76. Other policies already in place like the voluntary sugar reduction programme and the SDIL will continue to incentivise businesses to reformulate their products to reduce sugar intake.
77. Due to the considerable number of uncertainties which would need to be considered, the do-nothing scenario in this Impact Assessment does not attempt to quantify the future impact of the policies already announced or any other possible future actions by government. Furthermore, the interactions of implementing multiple policies at once are also not assessed under our estimates. The potential interactions are examined further in the 'Interaction of policy effects' section.

Option 1: End all volume offers for HFSS products included in a narrow list of Discretionary Food and Drink product categories in the retail sector excluding small and micro businesses.

78. Under Option 1, retailers would be prevented from using volume offers to promote HFSS food and drink products which are in a narrow list of Discretionary categories. These categories are defined as products that are not essential to the diet and do not provide useful nutrients. The full list of food and drinks included in this option are disclosed in Annex D.
79. HFSS products within the above categories in scope would be defined using the 2004/5 Nutrient Profiling Model (NPM), which differentiates foods based on their nutritional composition (see Annex B – HFSS Definition for more details). To assist retailers the Department of Health and Social Care would provide guidance and a methodology to help identify which products can or cannot be part of a volume promotion. We received some concerns about the NPM update but would reiterate that the Department intends to utilise the 2004/5 version and would have to consult further on any changes to this.
80. 'Non-pre-packaged products' would be excluded from the policy. The regulation excludes these items since it may be impractical for businesses to assess the NPM score of these products when nutritional information is not available on pack. This is because businesses are not currently required to provide nutritional information for certain products which are sold loose[74].
81. A ban on volume offers would not affect businesses ability to use temporary price reductions to promote HFSS products. This recognises that volume offers are most closely linked to the excess purchase of HFSS products compared to temporary price reductions.

https://www.gov.uk/government/statistics/ndns-results-from-years-7-and-8-combined (last accessed 05/03/2020)

[72] Calorie reduction: the scope and ambition for action, Public Health England, 2018. https://www.gov.uk/government/publications/calorie-reduction-the-scope-and-ambition-for-action (last accessed 05/03/2020)

[73] Ara R, Blake L, Gray L, Hernández M, Crowther M, Dunkley A, Warren F, Jackson R, Rees A, Stevenson M, Abrams K. (2012) What is the clinical effectiveness and cost-effectiveness of using drugs in treating obese patients in primary care? A systematic review. Health technology assessment (Winchester, England). 2012;16(5):iii.

[74] Food labelling: loose foods, Department for Environment, Food & Rural Affairs and Food Standards Agency, 2017., https://www.gov.uk/guidance/food-labelling-loose-foods (last accessed 05/03/2020)

82. Micro and small businesses[75] are excluded from the restrictions, under options 1, 2, and 4 unless they are part of a symbol group. The symbol group itself is seen as a large business who have small and micro independent and multiple retailers trading under the symbol group who provide support to the retailers. Stakeholder engagement highlighted that support could include having central standards and a shared marketing proposition, but independent and multiple retailers operating under a symbol group can still make their own buying and operational decisions. According to the Association of Convenience Stores (ACS), there are around 15,000 stores in the UK that are part of symbol groups and make up 38% of total sales in the convenience sector.

83. Civil society organisations such as voluntary bodies or charities are excluded from the restrictions.

84. Under Option 1, the restrictions will also apply to free refills of SSBs (that are in scope of the SDIL) in the out-of-home sector.

Option 2: End all volume offers for HFSS products which contribute significant sugar and calories to children's' diets and are of most concern for childhood obesity, in the retail sector small and micro businesses.

85. The same exclusions discussed above for Option 1 would also apply to Option 2. As with Option 1, temporary price reductions for these products would continue to be permitted.

86. Under Option 2, retailers would be prevented from using volume offers to promote HFSS products which contribute the most sugar and calories to children's diets and are of most concern for childhood obesity. A list of the product categories included in this option can be found in Annex D.

87. Including these products means the regulations are targeting the products that contribute the most sugar and calories to children's diets, while also reducing costs to business, and therefore represents a balanced and proportionate approach.

88. Also, as with Option 1, the restrictions will also apply to free refills of SSBs (that are in scope of the SDIL) in the out-of-home sector.

Option 3: End all volume offers for HFSS products which contribute significant sugar and calories to children's' diets and are of most concern for childhood obesity, in the retail sector excluding micro businesses only.

89. Under Option 3, retailers would be prevented from using volume offers on the same list of products as outlined in Option 2, however it would only exclude micro businesses from this regulation in addition to the other exclusions discussed in Option 1.

90. As with Option 1 and 2, temporary price reductions for these products would continue to be permitted and the restrictions will also apply to free refills of SSBs (that are in scope of the SDIL) in the out-of-home sector.

Option 4: End all volume offers for HFSS products included in original list of categories consulted on in all retailers who sell food and drink in the retail sector excluding small and micro businesses.

91. The same exclusions discussed above for Option 1 and 2 would also apply to Option 4.

92. Under Option 4, retailers would be prevented from using volume offers for any HFSS products included in original list of categories consulted on in all retailers who sell food and drink in the retail sector excluding small and micro businesses.

93. As with Option 1, 2, and 3 temporary price reductions for these products would continue to be permitted and the restrictions will also apply to free refills of SSBs (that are in scope of the SDIL) in the out-of-home sector.

[75] Micro businesses as those with 10 or less full time equivalent employees and small businesses are those with 11-49 full time equivalent employees

Details of Alternative Options Considered

94. In addition to the policy options above, several other options have been considered but were not deemed sufficient to achieve the policy objectives..

95. Alternative options include education and awareness initiatives such as doing more to educate children through the curriculum and raising awareness among the public through a public health campaign.

96. The curriculum gives teachers the scope to do this, not least through the science programmes of study and Personal, Social, Health and Economic education (PSHE). Guidance published by the Department for Education makes it clear that through PSHE pupils should learn what constitutes a healthy diet as well as the characteristics of a poor diet and the risks associated with unhealthy eating. It is for teachers to decide how to approach education on these matters and what examples to use.

97. The Government encourages everyone to have a healthy balanced diet, in line with the national food model the Eatwell Guide which depicts a diet that is based on fruit, vegetables and higher fibre starchy carbohydrates. It shows the proportions of the different types of foods and drinks for a healthy, balanced diet.

98. The Government supports behaviour change through its social marketing campaigns including: Change4Life and OneYou, the reduction and reformulation programme and providing advice to the consumer through NHS choices to promote making the healthier choice, the easiest choice.

99. Through the Change4Life campaign, Public Health England (PHE) provides practical advice to families and children to help them make healthier choices.

100. Education and awareness initiatives already exist, but there is still concern about excess calorie and sugar consumption and obesity prevalence has not declined. Therefore, whilst these form a complementary part of the strategy, alone, we believe these would have limited efficacy in achieving the policy aim of reducing childhood obesity.

101. Consideration was also given to a voluntary approach to limiting promotions of HFSS foods, which was unsuccessful when attempted under the Responsibility Deal (see paragraph 57 for details), therefore this option was not considered appropriate as explained in the table below. No viable alternative options to deliver this policy were provided in response to the consultation.

102. Prior to consultation we also considered a number of alternatives that could be used to define what products were in scope, including the option to use the front of pack nutrition labelling scheme. Again this approach was not considered appropriate as it was designed as a voluntary scheme and it does not consider the overall nutritional content of the product in the same way as the nutrient profiling model.

Table 2: Alternative policy options considered

Option	Consideration
Educating children through the curriculum on healthy eating	• There is already scope in the curriculum to do this but is has limited impact if used in isolation.
Public health campaigns	• These already exist but are not considered sufficiently effective to reduce the prevalence of obesity in children.
Using the front of pack nutrition labelling scheme to define HFSS food and drink – only allowing promotions of products	• The front of pack scheme was designed and intended to be a voluntary scheme. Using this model to define HFSS products for the purposes of this policy would mean using a voluntary scheme as mandatory and part of a legislative approach.

that have a combination of green and amber ratings	• The front of pack scheme rates products based on levels of specific nutrients rather than giving an overall score. As a result, it does not consider the overall nutritional content of products in the same way as the Nutrient Profile Model (NPM). Therefore, it would not give products a representative and appropriate scoring for the purposes of this policy. • The Government will be consulting on the UK's front of pack labelling scheme in 2020.
A voluntary ban on promotions of HFSS food and drink	• Voluntary action on restricting price promotions of HFSS products was not achieved through the voluntary Public Health Responsibility Deal. • A voluntary approach would not promote a level playing field among retailers or between the retail and out of home sectors and may penalise forward thinking businesses who may want to take action in this space.
Restricting temporary price reductions in addition to volume based (multibuy) promotions	• Temporary price reductions do not require consumers to purchase more than they may need or more than they intended in the first place to take advantage of the discount being offered. As a result, these types of promotions do not incentivise over purchasing and overconsumption in the same way as volume-based promotions (such as multibuy offers). • It is not the intention of this policy to increase the cost of households shopping baskets. Restricting temporary price reductions may lead to increases in the price of food and drink, which would likely have a larger impact on households from lower socio-economic backgrounds who tend to spend a greater proportion of their incomes on food.

Rationale for Preferred Option

103. Following careful analysis of the consultation feedback, Option 2 is the preferred option because it strikes the best balance between delivering a robust policy, that will deliver significant health benefits while considering proportionality and feasibility of implementation.

104. Consultation feedback suggested that small businesses would find removing volume offers a more challenging requirement to implement. By requiring medium and large businesses, whom hold 94% of the market turnover[76], to end volume offers it avoids the risk of disproportionately burdening those who might find the new requirement more challenging, while delivering significant health benefits. It also greatly reduces the costs to businesses.

105. Symbol stores are included in scope. Whilst the ACS categorise them as small and micro businesses, symbol stores represent 15 businesses, and 13,433 stores, and make up 38% of total sales in the convenience sector. Stakeholder responses indicated that, in terms of promotions, extra support from a 'head office' is often provided and we have therefore categorised them as large stores in our analysis.

[76] Department for Business, Energy and Industrial Strategy (2018) Business population estimates https://www.gov.uk/government/statistics/business-population-estimates-2018 (Accessed 13/03/20)

106. Academics have found that children have greater influence over purchases on products such as cereal[77] [78]and snacks[79], therefore the extended list of food items may be better at influencing the HFSS intake of a child. Option 4, which was presented as the Government's preferred proposal in the consultation, has the highest NPV due to the wide scope of products included in the restrictions. However, following consultation feedback from industry, further engagement with businesses and additional analysis and modelling by DHSC, it became clear that this option, along with Option 3 would likely result in disproportionate burden for businesses.

107. As outlined in Table 1: Summary of the central estimates for the policy options (£m), this policy does not have the highest NPV compared to options 3 and 4, however it is easier to implement, monitor and enforce whilst capturing product categories that are the biggest contributors to children's sugar and calorie intakes and are often heavily promoted in retailers. Therefore, Option 2 is better targeted compared to Option 1, 3 and 4 whilst considering the implementation and enforcement elements of the policy to ensure a balanced and proportionate approach.

Interactions with location promotion restrictions

108. There is a well-recognised relationship between the use of volume promotions and placement of goods in prominent locations around stores.

109. A number of businesses and products will be subject to both the restrictions on volume and location promotions. However, the scale of the potential overlap between polices is unclear. The individual impacts of restricting these activities could therefore differ from the combined impact of implementing both. It is not clear if each policy would reinforce the effectiveness of the other to have a magnifying effect, or if their individual effectiveness would be diminished by pursuing both policies, and no evidence was found, or provided through the consultation or further stakeholder engagement, either way. The evidence used to determine the level of volume promotions on HFSS products doesn't distinguish whether any of the volume promotions were in areas in scope of the location restriction, and this distinction is not available in the Kantar data.

110. The analysis for the individual policies is presented in separate IAs given the uncertainty around the scale of the overlap between the two and that individually they are tackling different problems. We therefore have assumed that the calculation of the costs and benefits of the policies are independent and can simply be added. There is one exception to this in the calculations: the costs of assessing products to identify if they are in scope. Many businesses captured under this policy are also in scope of the location restrictions, therefore this IA captures, the cost of assessing products for all the businesses in scope of this IA only. All businesses and stores subject to the location restrictions are also in scope of this policy in addition to stores that are over 2,000 sq. ft and specialised stores. The double counting has therefore been adjusted in this IA as there are more businesses and stores in scope under this policy compared to the location restrictions.

111. In terms of benefits we have not been able to make any adjustments to consider the change on consumers calorie intake if a product is promoted on volume promotions under this policy and is on a location promotion. We did not have any further evidence on where volume promotions occur in a store and did not receive any evidence through the consultation or further stakeholder engagement, due to the commercial sensitive nature of this information. Without this information it has not been possible to understand what proportion of volume promotions are sold in the key locations in scope of the location restrictions. There currently is no database available that captures what products are bought on volume promotions and where in a store these products are picked up. This is an area we are trying to look into as part of the Post Implementation Review, with the use of innovative primary research.

[77] Aitkin CK. 1978. Observation of parent-child inter-action in supermarket decision-making.Journalof Marketing42(4): 41–45.in Marshall D, O'Donohoe S, Kline S. (2007) Families, food, and pester power: beyond the blame game? Journal of Consumer Behaviour. 2007 Jul 1;6(4):164-81.

[78] Mehorta and Jurges. 1997. In Marshall D, O'Donohoe S, Kline S. (2007) Families, food, and pester power: beyond the blame game? Journal of Consumer Behaviour. 2007 Jul 1;6(4):164-81.

[79] Bordy et all. 1981; Hall et al. 1995. In Marshall D, O'Donohoe S, Kline S. (2007) Families, food, and pester power: beyond the blame game? Journal of Consumer Behaviour. 2007 Jul 1;6(4):164-81.

Impact of promotions on sales and profits

Impact of price cuts and multi-buy promotions on sales

112. Public Health England commissioned Kantar Worldpanel to investigate the role that price promotions play in stimulating changes in purchasing levels, specifically for foods and drink containing high levels of sugar[80]. This study examined Kantar Worldpanel's representative sample of 30,000 British households over 2 years up to the 30th December 2018.

113. It should be noted that only price promotions occurring in the 'Big Four' supermarkets – Tesco, Asda, Sainsbury and Morrison's were included in this analysis. As a result, this assessment refers only to a subset of the overall retail market. Together, these four supermarkets comprise approximately 68% of the grocery market[81].

114. The Kantar Worldpanel data splits price promotions into temporary price reductions (TPR), multi-buy and extra free. Regarding the types of promotions discussed earlier, multi-buy in the Kantar Worldpanel data covers multi-buys, combination offers and linked offers, which are all forms of volume offers. Temporary price restrictions cover was/now prices and after promotion or introductory price offers. Extra free is a promotion that occurs when an enlarged pack size is created by the manufacturer, and where the label states that a proportion of the product is free. These promotions are far less common and account for less than 1% of total grocery spend and is therefore not separated out into individual promotional mechanisms.

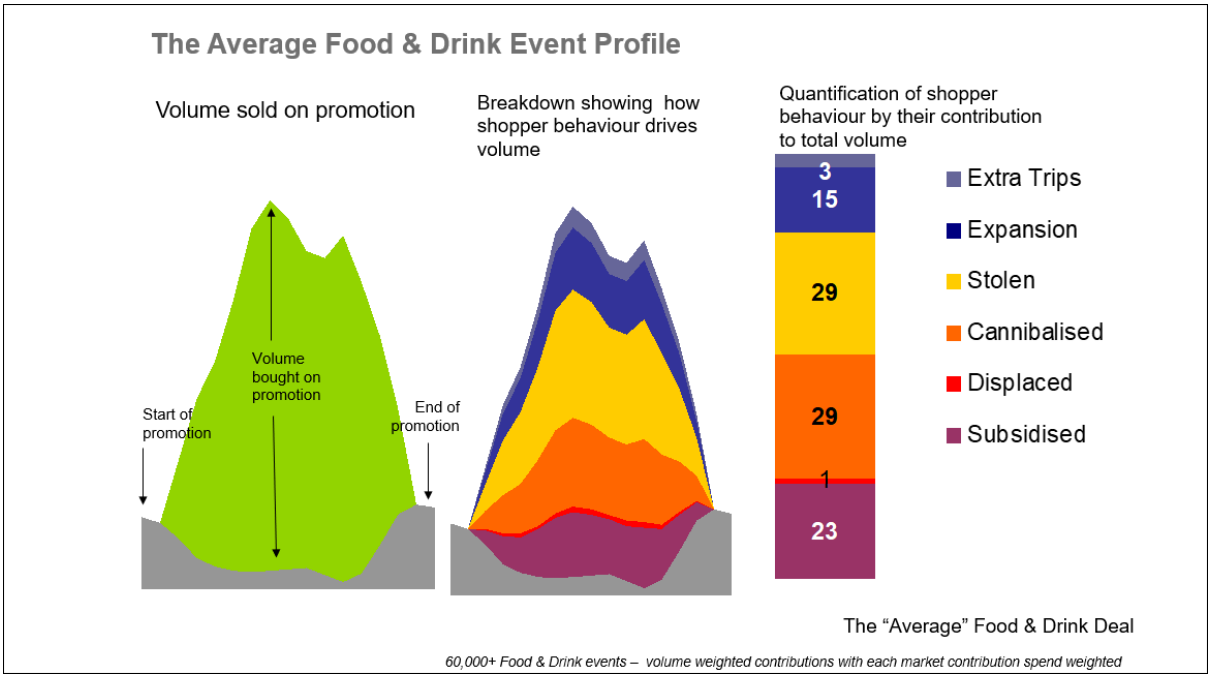
115. Analysis from the Kantar Worldpanel data suggests that the impact of price promotions is inherently short term. Promotions generate short term uplifts in sales by encouraging promotionally motivated shoppers to participate. In effect, promotions are a means of buying market share amongst promotionally sensitive shoppers. These effects are always short term, in the sense that the sales uplift falls away as soon as the promotion ends, leaving a brand selling at the same levels seen prior to the promotion. In the Fast-Moving Consumer Good (FMCG) marketing environment this fact is not always well understood and there are plenty of myths about the desired role of promotions in convincing shoppers to switch brands permanently after a discounted trial. Numerous promotional studies undertaken by Kantar Worldpanel in a wide range of categories have provided no reliable evidence to support this view.

116. As it does not appear that price promotions have any long-term effects on price, it is important to assess the impact that promotions have on short terms sales uplifts. Figure 2 below displays the estimated breakdown in uplifted sales volumes during a price promotion, as estimated by Kantar Worldpanel.

[80] An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, a research project for Public Health England conducted by Kantar Worldpanel UK, 2020. Availble here: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action
It is an update of Sugar Reduction: The evidence for action - Annexe 4: An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, Public Health England, 2015.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470175/Annexe_4._Analysis_of_price_promotions.pdf (last accessed 05/03/2020)

[81] Grocery Market Share, Kantar Worldpanel, 2019.
https://www.kantarworldpanel.com/en/grocery-market-share/great-britain (last accessed 05/03/2020)

Figure 2 The volume decomposition of deals[82]



117. The constituent classifications are defined as:

- *Subsidised* – represents the volume of the promoted product that shoppers would have been expected to buy at the time of the promotion, in the same store, irrespective of whether there was a promotion or not.
- *Displaced* - is the volume of the product that would have been purchased in subsequent weeks in the same store. These purchases have been brought forward.
- *Cannibalised* - is the volume that would have come from sister products within the promoting manufacturers' portfolio e.g. swapping between flavours within the same brand.
- *Stolen* – represents the volume that is taken from competitor products e.g. Pepsi stealing sales from Coca Cola.
- *Expansion* - represents growth from faster than expected return times to the category after a shopper participates in a promotion. This expansion effect is caused by shoppers purchasing above average quantities of the category that is then not fully offset by delayed repurchase.
- *Extra Trips* - are unexpected purchases that appear to have been motivated by the promotion.

118. The resulting volume breakdown shows that most of the volume under the sales spike is a result of shoppers shifting purchasing from competing products whether owned by the promoting manufacturer or otherwise. This data shows that 58%[83] of the volume bought on promotion is accounted for by product switching, with a further 24% either being subsidised or brought forward consumption. The remaining 18% of sales volume represent the net growth in sales from volume that would not have been purchased if not for the promotion.

119. It is important to consider that this data is unable to directly establish if this incremental volume is being consumed but in the case of food and drink, we assume that a significant proportion of this will be. Increased amounts of product kept in stock in the home and higher food wastage (especially on short shelf life items) are also further explanations to consider.

120. While this clearly displays uplifted sales within product categories, it is possible that consumers respond by reducing consumption of goods from other categories. To examine this, Kantar assessed

[82] An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, a research project for Public Health England conducted by Kantar Worldpanel UK, 2020. Availble here: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action
It is an update of Sugar Reduction: The evidence for action - Annexe 4: An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, Public Health England, 2015.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470175/Annexe_4._Analysis_of_price_promotions.pdf (last accessed 05/03/2020)

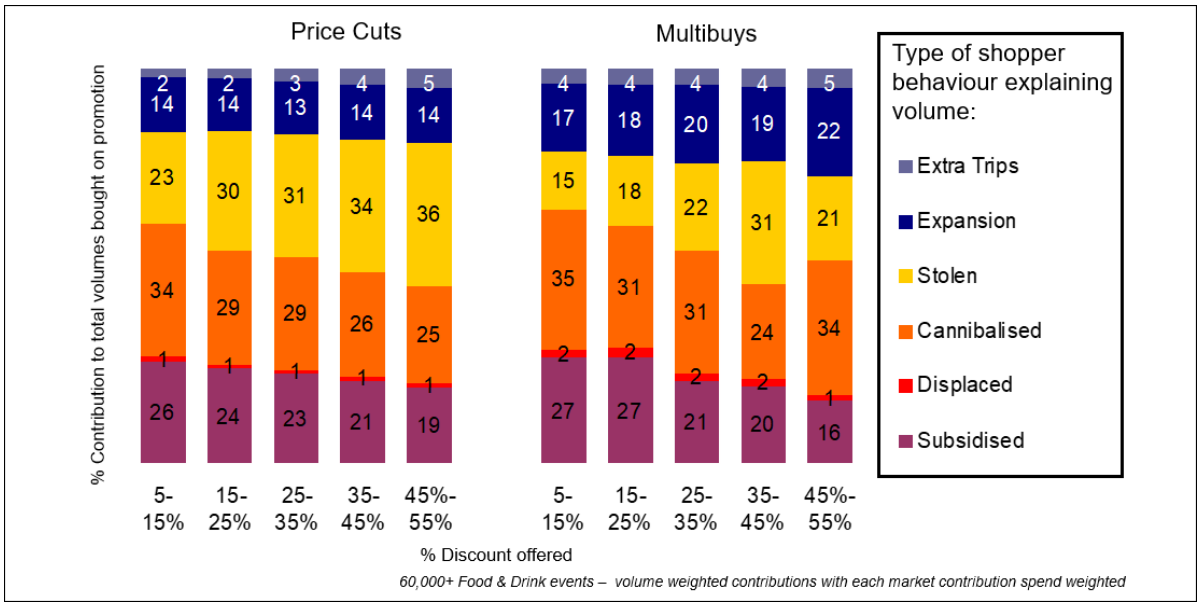
[83] Adding Canabilsed and stolen classifications.

the correlation between sales volumes of competing and complementary product categories. Overall, positive correlations were found between different categories of high sugar products, for example chocolate confectionary and sugar confectionary. In contrast, negative correlations were more often found between 'unhealthier' products such as chocolate and those with healthier characteristics such as fruit and salad.

121. Based on this analysis, it appears unlikely that, for products with high sugar content, the uplift in sales generated by price promotions would be offset by a reduction in sales of other products with high sugar content.

122. Figure 3 displays the estimated breakdown in uplifted sales volume during price cuts and multi-buys, split by the size of discount offered.

Figure 3 Promotional volume percentage decomposition by type of price promotion and size of discount[84]



123. The data indicates that for both types of promotion, as the size of the discount increases, so does the proportion of sales that are extra trips or expansion (i.e. additional sales to the product category). Furthermore, multi-buys result in a greater proportion of additional sales than temporary price cuts. This is expected, as consumers are required to purchase additional quantities of the product to benefit from the discount.

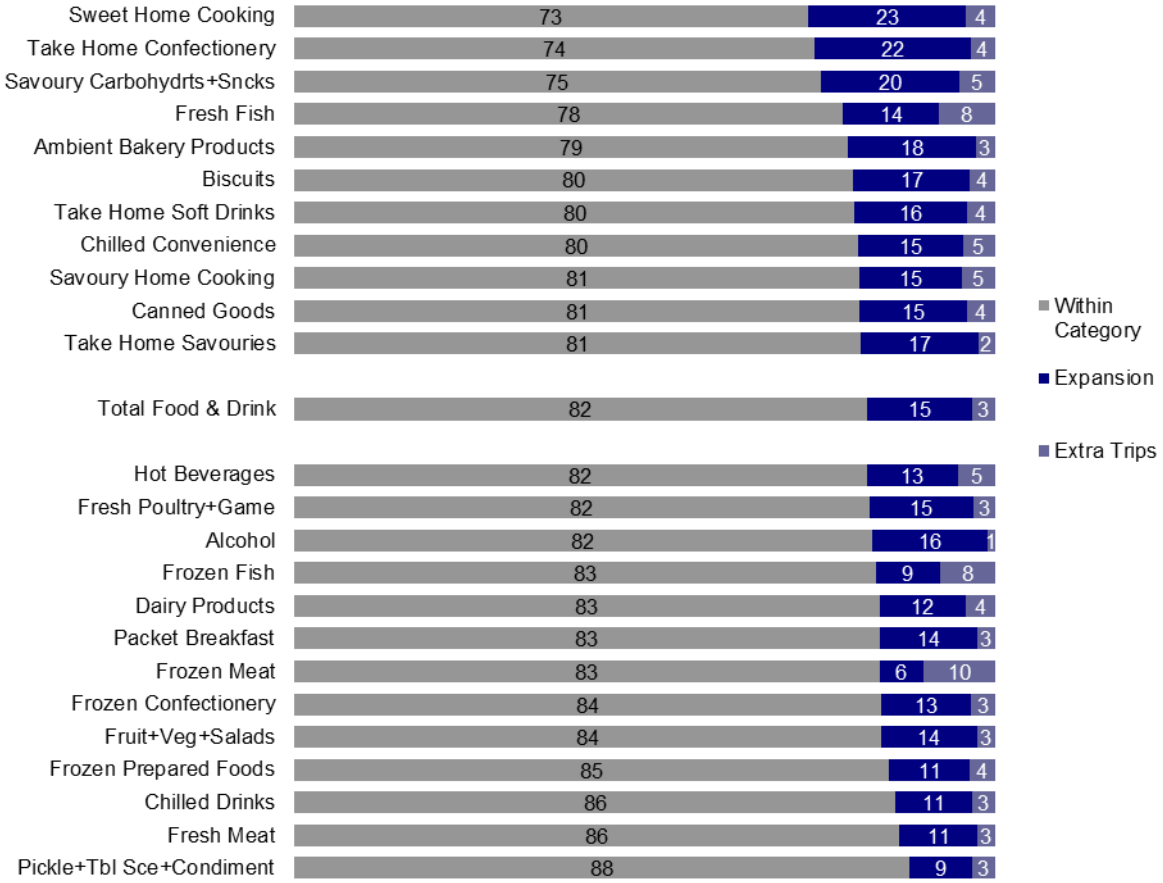
124. Figure 4 shows how incremental volumes amongst higher sugar categories tend to be proportionally greater where products are more discretionary or more treat and special occasion oriented. Notable categories are confectionery, soft drinks and bakery. This is supported by evidence from Scotland, which found that "discretionary, less healthy food and drink categories are more frequently purchased on promotion compared to the staple, healthier categories"[85].

125. Such categories tend to have run promotions that have been more incremental as drivers of extra volume and overall more impulsive and discretionary categories appear to hold more potential for shoppers to increase typical take home volumes and use up this volume faster.

[84] An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, a research project for Public Health England conducted by Kantar Worldpanel UK, 2020. Availble here: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action
It is an update of Sugar Reduction: The evidence for action - Annexe 4: An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, Public Health England, 2015.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470175/Annexe_4._Analysis_of_price_promotions.pdf (last accessed 05/03/2020)

[85] Foods and drinks purchased into the home in Scotland using data from Kantar Worldpanel, Food Standards Scotland, 2016.
http://www.foodstandards.gov.scot/downloads/Food_and_Drinks_Purchased_into_The_Home_in_Scotland_report.pdf (last accessed 05/03/2020)

Figure 4 Category incremental proportions for promotions on higher sugar categories[86]



Impact of promotions on manufacturer and retailer profits

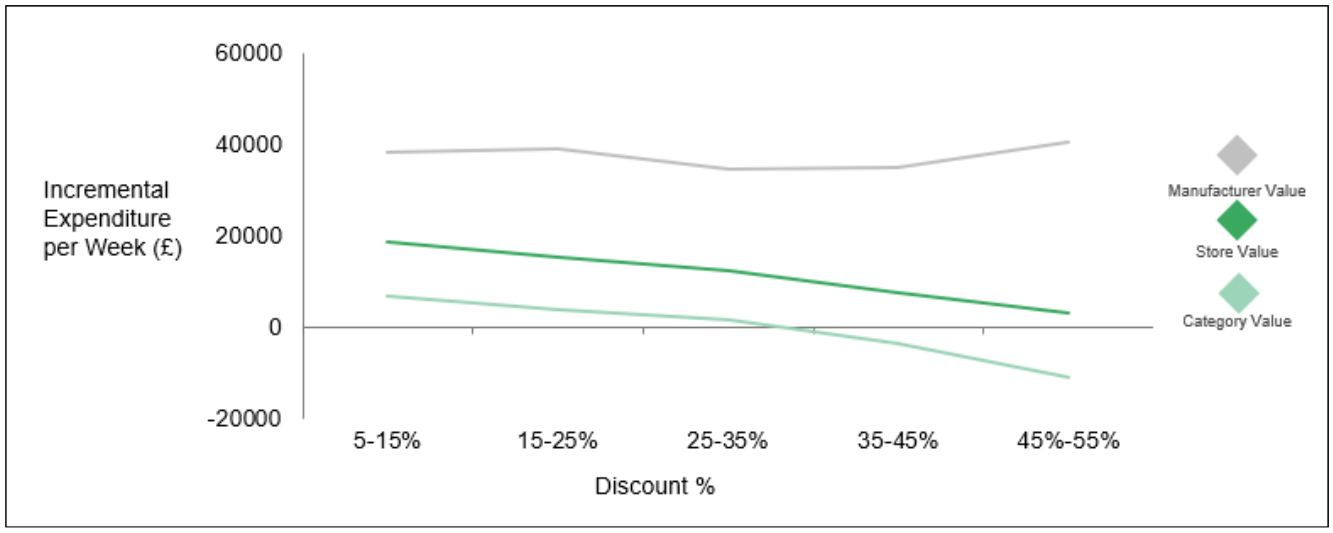
126. Individual promotions deliver clear increases in product sales for manufacturers and retailers. However, promotions for a specific brand do not occur in isolation – they form part of a product category in which other brands can be expected to discount in a similar fashion.

127. We have engaged extensively with businesses and trade bodies in the retail and manufacturing sectors to better understand the relationship between manufacturers and retailers with regard to promotional strategies. Although businesses have generally been reluctant to share detailed information about how promotional strategies are determined and how the relationship between manufacturers and retailers works, it was commonly acknowledged by businesses that promotions are agreed between the manufacturer and the retailer through negotiation. The details of a promotional strategy are dependent on many factors such as the type of product, seasonality, estimated sales, and they are often decided months in advance and agreed in contracts between the manufacturer and retailer.

128. Kantar assessed the impact of how differing levels of discount affect manufacturer, store and category revenue. These results are summarised in Figure 5 below.

[86] An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, a research project for Public Health England conducted by Kantar Worldpanel UK, 2020. Availble here: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action
It is an update of Sugar Reduction: The evidence for action - Annexe 4: An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, Public Health England, 2015.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470175/Annexe_4._Analysis_of_price_promotions.pdf (last accessed 05/03/2020)

Figure 5 Average impacts on shopper expenditure by discount[87]



129. Regardless of the level of discount offered, manufacturers and stores typically see increased revenue from implementing a discount. However, once discounts reach above 45%, the expenditure return from promotions for the product category decreases. Kantar estimate that this occurs for approximately 4 out of every 10 promotions.

130. With 4 out of 10 promotions reducing category expenditure (but greatly increasing the quantity sold), there are clear pressures on retailer and manufacturer profit margins because of promotions. Losses on individual promotions might be accepted as part of wider pricing decisions and strategy. The idea of 'Loss leaders' is a well-known pricing strategy used to draw customers into stores and stimulate other sales on more profitable items. Promotions may also be necessary to ensure brand prominence within stores, with the existence of competitor promotions encouraging subsequent promotions.

131. However, if we look at it from a broader category perspective (encompassing all retailers and manufacturers operating in that food or drink market), the benefit that any one manufacturer enjoys by stealing from competitor brands is unlikely to hold much benefit. Movements from one brand to another (i.e. from full priced to discounted alternatives) will tend to generate reductions in total category expenditure unless these gains are offset by increased volume sales.

132. For retailers, the competition between different manufacturers within product categories is less important, as stores stocking a range of brands will generate profit from sales across all products. They do however benefit from some transferred spending from their retail competitors. Most shoppers now shop in a range of different stores, so being tempted to spend on a promotion tends to prevent a degree of purchasing in competitor outlets. Promotions do not often cause a loss in sales value for manufacturers, but in a quarter of cases the promotion causes a loss for the retailer[88].

[87] An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, a research project for Public Health England conducted by Kantar Worldpanel UK, 2020. Availble here: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action
It is an update of Sugar Reduction: The evidence for action - Annexe 4: An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, Public Health England, 2015.

[88] An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, a research project for Public Health England conducted by Kantar Worldpanel UK, 2020. Availble here: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action
It is an update of Sugar Reduction: The evidence for action - Annexe 4: An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, Public Health England, 2015.https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470175/Annexe_4._Analysis_of_price_promotions.pdf (last accessed 05/03/2020)

Current composition of the market

Market share and sales

133. The 'big four' retailers Tesco, Asda, Sainsbury's and Morrison's account for the majority of GB grocery sales, capturing 68% of the market in the 12 weeks ending 01/12/19. Retailers outside of the top 9 identified by Kantar, account for less than 5% of the market. These market shares include the sales of some non-food and drink items such as health and beauty products. However, we expect these to be a reasonable reflection of shares within the food only market. In 2014, the GB food retail market was worth an estimated £88.5bn[89]. This includes products bought both in store and online, however a breakdown is not available in the data.

Table 3: GB Grocery Market Shares, 12 weeks ending 01/12/19[90]

Tesco	27.3%
Sainsbury's	15.7%
Asda	14.6%
Morrison's	10.1%
Aldi	8.0%
The Co-Operative	6.3%
Waitrose	4.8%
Lidl	6.1%
Iceland	2.2%
Symbols & Independent	1.7%
Ocado	1.4%
Other Outlets	1.7%

134. Much of grocery retail spend occurs within supermarkets and hypermarkets. IGD data for 2019 shows that 'Hypermarkets & superstores' accounted for 54.9% of all grocery sales[91]. Convenience stores account for 21.4% of grocery sales. Again, this definition of grocery captures non-food items. We also assume that these figures represent the online grocery retail market as well as physical stores. This results in a total 2019 UK market size of £193.6bn, compared to Kantar's food-specific GB estimate of £88.5bn. This IGD dataset captures non-food items, therefore Kantar data is used to estimate the value of the food and drink market.

Table 4: UK Grocery sales, 2019[92]

Store Type	2019 sales, £bn	%
Hypermarkets	16.3	8%
Supermarkets	90.0	47%
Convenience stores	41.4	21%
Discounters	24.5	13%
Online	11.6	6%
Other retailers	9.8	5%
Total	**193.6**	**100%**

135. Restricting the placement of food and drink items within stores is expected to have particular relevance to the food to go market. Driven by changing lifestyles the food to go sector is an

[89] 2014 Kantar Worldpanel Purchasing Data

[90] Grocery Market Share, Kantar Worldpanel, 2019. https://www.kantarworldpanel.com/en/grocery-market-share/great-britain (last accessed 05/03/2020)

[91] UK food sales to grow by £24bn by 2024, IGD, 2019. https://www.igd.com/about-us/media/press-releases/press-release/t/uk-food-sales-to-grow-by-24bn-by-2024/i/21868 (last accessed 05/03/2020)

[92] Ibid.

increasingly important part of the retail market, with many people having their lunch and snacking on the go. This sector is forecast to grow strongly over the coming years and can be split into the following two broad categories that are in scope of these restrictions:

- Convenience, forecourt & other retailers
- Supermarkets & hypermarkets

136. The analysis uses the value of the GB food retail market from Kantar, of £88.5bn. This only considers food and drink that is taken home and therefore we have adjusted the value of the food retail market to take into account food and drink eaten on the go from IGD data[93], which shows that the value of the food-to-go market in convenience, forecourt & other retailers is £2.7bn and £1.3bn for supermarkets and hypermarkets.

Table 5 Value of the food retail market

	Kantar estimate of the value of take home food retail market (2014) [94]	Value of food-to-go market in convenience, forecourt & other retailers (2017)	Value of food-to-go market in supermarkets and hypermarkets (2017)	Total	Adjusted total at 2019 prices
Value of the market (bn)	£88.5	£2.7	£1.3	£92.5	£100.5

137. The value of the retail market is based on data with different base years, therefore it has been inflated to 2019 prices using the GDP deflator[95] of 2%, which is in accordance with the standard practice outlined in the HMT Green Book.

138. There are no forecasts relating to the growth in the HFSS market, however, we do expect there to be changes in the size of the market over the 25-year appraisal period. As such, we have looked at the growth of the take home market from Kantar. Following discussions with Kantar, their data over the last 5 years on the volume of take home food and drink purchases indicated a yearly increase by around 1% each year, driven by population increase. It has not been possible to identify another appropriate growth rate, and therefore we have assumed that the market (outlined in Table 5) will grow by 1% each year over the 25-year appraisal period. It is possible that other factors could influence the size of the market in the future, however, this cannot be captured in the analysis due to the high level of uncertainty.

Impact of the COVID-19 pandemic

139. The COVID-19 pandemic has affected the market share of retailers, where consumers shop, the frequency and what they have been buying. This has has a impact on other buisnesses part of the supply chain including manufactures, wholesales and ingredient suppliers.

140. Figure 6[96] below shows the change in growth of grocery sales in the beginning of the pandemic and highlights the increase in sales from convenience stores and online grocery platforms and a decrease in sales from the high street, by around 17.9%.

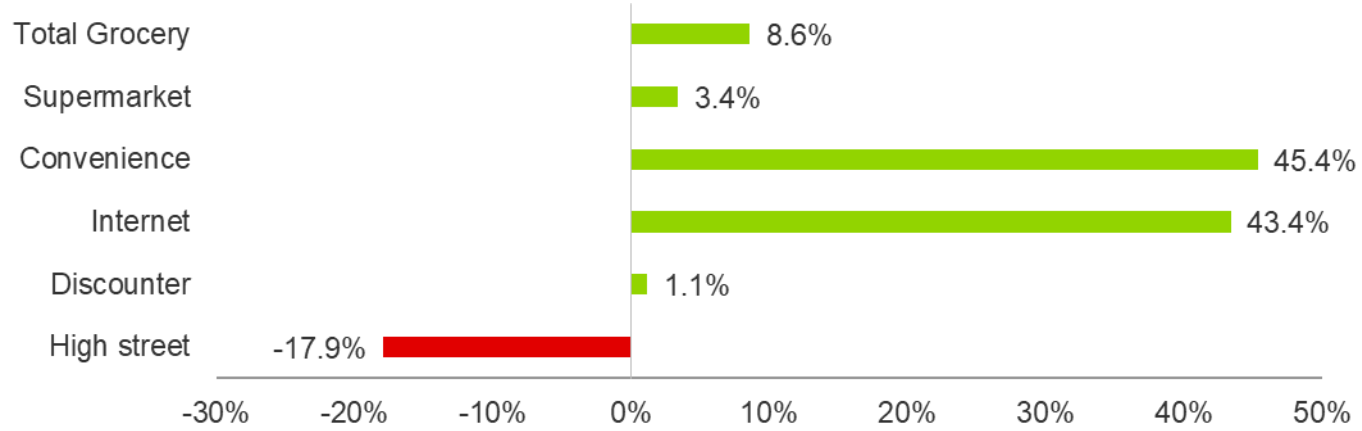
[93] https://www.igd.com/about-us/media/press-releases/press-release/t/food-to-go-on-the-move-to-235bn-by-2022-igd-forecasts/i/17287

[94] Kantar data includes both products bought in store and online, but the data does not provide the breakdown.

[95] https://www.gov.uk/government/publications/tag-data-book

[96] Kantar, FMCG Panel, 4 weeks to 19th April 2020

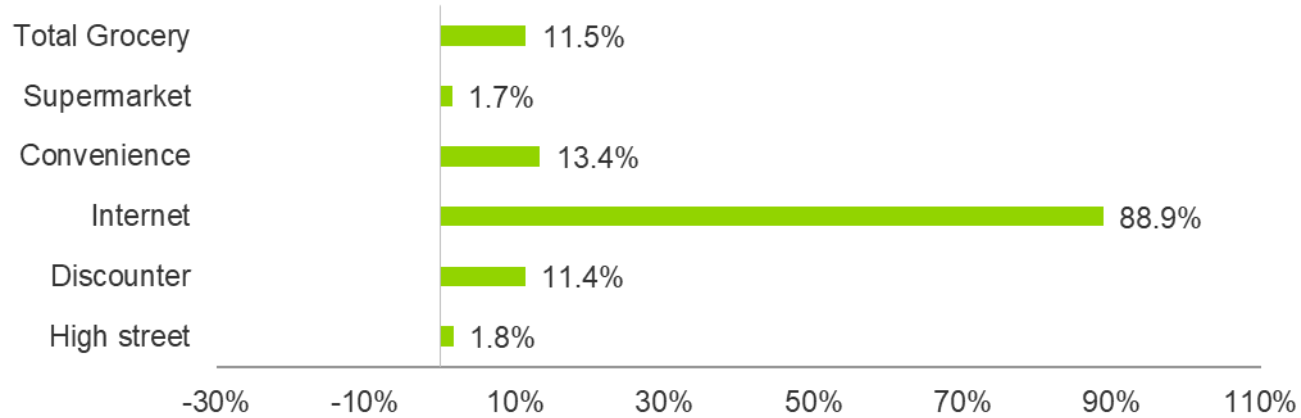
Figure 6 Total percentage change in grocery sales and by type of store in April 2020



141. The latest grocery market share figures from Kantar show take-home grocery sales rose by 10.8% during the 12 weeks to 6 September 2020[97]. Although this is the sector's fifth consecutive period of double-digit growth, sales had slowed down in August.

142. Figure 7[98] shows more recent data on the change in growth in grocery sales, showing a contious increase in sales from convenience stores and online grocery platforms, and a increase in sales from the high street of 1.8%.

Figure 7 Total percentage change in grocery sales and by type of store in August 2020



143. Evidence from Kantar shows that online grocery sales have rose during the pandemic. Retailers have seen a cumulative increase in online orders of £3.2 billion since lockdown began with the highest growth reported in June at 91.6%, however since then it has been falling[99].

144. Evidence from Kantar[100] also highlights that the frequency of purchases has declined, with consumers making bigger shopping trips across all retailers in the beginning of the pandemic. Although this pattern has not changed significantly online, there has been a rise in the frequency of online grocery purchases.

145. Since lockdown there has also been a decrease in the use of promotions by stores. As retailers had seen a significant rise in demand for products, many retailers imposed limits on the number of products that could be purchased in order to prevent panic buying and hoarding, and due to capacity and workload issues which resulted in a fall in volume sales from promotions. Analysis by Institute for

[97] Kantar FMCG
[98] Kantar, FMCG Panel, 4 weeks to 9th August 2020
[99] Kantar FMCG
[100] Kantar FMCG

Fiscal Studies[101] shows that month-to-month inflation for groceries in the first month of lockdown was 2.4%, and half of this increase in prices was due to a decrease in the use of promotions (both volume promotions and price reduction promotions).

146. The data used in the analysis below is prior to the pandemic. Whilst evidence does suggest changes in consumers shopping behaviour and the use of promotions, it is not clear whether these trends will continue or whether it is for a limited time. We currently do not have recent data to update the analysis in the IA and we do not think it is reasonable to draw any long term inferences from consumer habits during COVID-19.

Turnover of the market

147. The proportion of turnover that is in scope of this regulation has been calculated using business population estimates by Standard Industrial Classification (SIC) codes. The retail market consists of seven SIC codes, we have assumed the following contain businesses in scope of our policy: 47.1 (Retail sale in non-specialised stores), 47.2 (Retail sale of food, beverages and tobacco in specialised stores),47.3 (Retail sale of automotive fuel in specialised stores), 47.6 (Retail sale of cultural and recreation goods in specialised stores) and 47.7 (Retail sale of other goods in specialised stores)..

148. However, within the three digit SIC codes 47.6 and 47.7, only a certain number of stores would be in scope and because we cannot get more granular data on turnover, we have decided to only include 47.1, 47.2 and 47.3 in our turnover analysis. Therefore, figures in our analysis that incorporate turnover will be an underestimate as we are unable to capture turnover for the 9,078 non-food businesses from SIC codes 47.6 and 47.7.

149. Table 6 outlines the proportion of turnover in scope of the regulation by the size of businesses. Under options 1, 2 and 4, it is estimated that 93.92% of the markets turnover is in scope of the restrictions, and 96.7% under option 3.

150. These figures have been adjusted to consider Symbol groups (further information in paragraph 105). Our initial assessment considered symbol retailers as small and micro businesses. ACS consider symbol stores and businesses to be small and micro as the affiliated stores to a symbol are largely considered as independent businesses. However, further information received through the consultation showed that when implementing a promotion, symbols largely operate like a large business as they are often given additional support from the parent company. Because of this, symbol groups will now be in scope of our policy and will be categorised under large businesses. Therefore, in the table below, symbol groups have been considered as large businesses. Granular information on what type of business is included under each SIC code is not available.

Table 6: Proportion of turnover in scope of the regulation

Type of businesses in scope by size	Proportion of market turnover in scope of the restrictions
Option 1	93.92%
Option 2	93.92%
Option 3	96.70%
Option 4	93.92%

Number of businesses

151. To estimate the number of businesses in England these stores belong to we use the Inter Departmental Business Register (IDBR) data which outlines the number of businesses in the sector. SIC codes 47.1 (retail sale in non-specialised stores), 47.2 (Retail sale of food, beverages and tobacco

[101] O'Connell, M and Jaravel, X (2020) *Grocery prices rose by 2.4% in a month at the beginning of lockdown, fuelled by a fall in promotions*. Institute of Fiscal Studies. Available at: https://www.ifs.org.uk/publications/14881 (accessed 14/10/2020)

in specialised stores),47.3 (retail sale of automotive fuel in specialised stores), 47.62 (Retail sale of newspapers and stationery in specialised stores), 47.71 (Retail sale of clothing in specialised stores), 47.73 (Dispensing chemist in specialised stores) and 47.75 (Retail sale of cosmetic and toilet articles in specialised stores) were used to calculate the number of businesses.

152. Adjustments were made to the number of small and micro businesses, to include symbol stores. To estimate how many of these symbol businesses exist to reflect to promotional support they likely receive, we used data from ACS which showed that around 60% of convenience stores were captured as micro symbol businesses and 40% as small symbol businesses; equating to 15 symbol businesses in total. These businesses are now recategorized under large businesses.

153. The table below shows the market breakdown by both number of businesses and revenue. As later discussed, our policy can disproportionately burden micro and small businesses, which in terms of number of business makes up the majority (99%) of the market. However, looking at the market share by revenue micro and small businesses only make up approximately 6% of the market's revenue. These figures would mean that the majority of businesses are making a very small amount of money and hence will bear more of the policy cost, therefore it is more proportionate to implement in medium and large businesses with higher revenue and more resources available.

Table 7: Market breakdown

Size of business	Number of food retail businesses (excluding non-food retailers)	Number of food retail businesses (including non-food retailers)	% share of all food retail businesses	Market share (in terms of revenue)
Micro	42,961	50,776	88.9%	3%
Small	4714	5,807	10.16%	3%
Medium	300	413	0.72%	3%
Large	85	143	0.25%	91%

154. Medium businesses are in scope of the policy due to their high revenue earnings. The small number of medium businesses, compared to their 3% market turnover (equating to £6.9bn per annum), indicates that these businesses have the resources available to implement the policy. Also, medium businesses capture the majority of the larger specialised stores whom are experiencing relatively large turnover, hence medium businesses are in scope of our policy

155. Large businesses make up the majority of the revenue in the market (91%) and therefore should also have the resources to implement this policy.

156. Therefore, the approximate number of retail businesses that will be affected by this policy is 555, which comprises of medium and large businesses only (including symbol stores and businesses whose primary function is not to sell food).

Businesses with an online offering and online only retailers

157. To calculate the number of medium and large businesses with an online offering, we have assumed that 60% of these businesses would have an online offering. This assumption is based on stakeholder engagement and therefore is not a conclusive estimate representing the whole sector. Without any further evidence on whether this assumption is a fair assessment of the proportion of businesses with an online offering, this has been adjusted in the sensitivity analysis.

158. To calculate the number of small and micro businesses with an online offering, we have assumed that 17% of these businesses would have an online offering. This is based on data from ACS[1] which estimates that 17% of convenience stores provide a grocery home delivery service. This includes

[1] ACS (2020) *The Local shop report.* Available online: https://www.acs.org.uk/sites/default/files/acs_local_shop_report_2020.pdf (Accessed 08/10/2020)

both convenience retailers that use online delivery platforms and those that provide a home delivery service.

159. Data on the number of online only retailers is not available. Stakeholder engagement identified two large online only retailers. Without any further information, these two retailers have been captured in the analysis below, although we expect this to be an underestimate

Table 8 Retailers in England– number of online only businesses and those with an online offering

	Online only businesses	Businesses with an online offering
Micro	0	8,632
Small	0	987
Medium	0	248
Large	2	86
Total	2	9,952

Number of stores

160. An assessment of the size of the relevant market can be taken from IGD data on the UK grocery market. In 2017, IGD data identifies 84,521 stores involved in grocery retail in the UK[2]. Given that this gives the number of stores in the UK, this was adjusted to estimate the number of stores in England. Without further information available on the number of stores specifically in England, we have assumed the number of stores would scale with population size and have applied appropriate weighting. [3].The estimated distribution of stores by store type, for England, is displayed in Table 9. This does not include non-food stores.

Table 9: Estimated grocery retailers in England - number of stores by type[4] [5]

Convenience (includes forecourts and excluding symbols[6])	25,324
Convenience (symbols)	13,052
Discount	3,733
Hypermarkets/Supermarkets	5007
Online - Grocery Retail	N/A
Other retailers	24,100
Total	**71,216**

161. To calculate the number of stores in scope of the regulation we have split the sector by the type of stores. **Error! Reference source not found.**shows the grocery retail sector split by size; micro (0-9 employees), small (10-49 employees), medium (50-249 employees) and large (over 250 employees).

[2] IGD data (2017)

[3] Without further information available, we assumed the number of outlets would scale with population size,

[4] To estimate the number of grocery stores specifically in England the IGD data for the number of grocery stores in the UK was multiplied by England's share of the UK population (84.3%).

[5] Estimates of the population for the UK, England and Wales, Scotland and Northern Ireland, Office for National Statistics, 2019. https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland (last accessed 05/03/2020)

[6] Convenience stores within petrol stations.

Table 10 Grocery retailers in England - number of stores by size[7]

	Retail Market England															
	96,444															
	Convenience				Other retailers (food and beverage specialists)				Other (Supermarket, Hypermarket, Discount)				Other (non-food and beverage stores)			
	38,376				24,100				8,739				25,228			
	Micro	Small	Medium	Large	Micro	Small	Medium	Large	Micro	Small	Medium	Large	Micro	Small	Medium	Large
Number of stores	14,906	10,037	-	13,433	20,725	3,286	94	-	-	-	240	8,499	17,588	6,603	955	83
Proportion of stores	38.8%	26.2%	-	35.0%	86.0%	13.6%	0.4%	-	-	-	2.7%	97.3%	69.7%	26.2%	3.8%	0.3%

162. To estimate the proportion of 'convenience stores' in scope, we used the IGD data to estimate the number of stores under a symbol group to categorise them as large. IGD data concluded that 35% of convenience stores are symbols. Hence, these 13,433 symbol stores, whom were originally categorised as small and micro, are now defined as large under our analysis.

163. In addition, we used data from the ACS to estimate the number of stores that are considered small and micro (adjusting for stores that are part of a symbol group). From ACS data there were no medium stores in this sub sector of the market.

164. To estimate the proportion of 'other retailers (food and beverage specialists)' in scope, we used the IDBR which contains detailed information on the number of businesses and stores involved in consumer retail, to calculate the proportion of stores that were micro, small medium and large. The three digit SIC code 47.2 (Retail sale of food, beverages and tobacco in specialised stores) was used to calculate the percentage of stores by size and applied this to the number of 'other retailers (food and beverage specialists)' from the IGD data set.

165. We assume that supermarkets, hypermarkets and discount stores are part of medium or large businesses. For medium and large businesses, we assumed that businesses with more than 25 stores were large (corresponding to 10 employees per store). Below this cap we checked businesses on Companies House to determine size.

166. We identified SIC codes that are likely to make up the number of businesses in the 'Other (non-food and beverage stores)' category. We reviewed the full list of SIC codes, and excluded those who we considered very unlikely to be in scope of the policy. We used the IDBR four digit SIC codes 47.62 (Retail sale of newspapers and stationary in specialised stores), 47.71 (Retail sale of clothing in specialised stores), 47.73 (Dispensing chemist in specialised stores) and 47.75 (Retail sale of cosmetic and toilet articles in specialised stores) as the most likely non-food and beverage stores to sell HFSS pre-packaged products in their stores. However, we expect that not all stores captured under these SIC codes will sell pre-packaged HFSS products, and/or use volume promotions, given it is not their main business focus. There is no data source we are aware of that could provide an estimate of what proportion would be affected by this legislation. Therefore, in the absence of data, we have assumed 50% will sell some HFSS products and will need to be familiar with this legislation. This assumption is not evidence based, as data on how many non-food retailers sell HFSS products is not available and we did not receive any additional information through the consultation. It is logical to assume that it is not 0% or 100%, and without any further evidence 50% was chosen as a plausible midpoint.

Summary of the composition of the market

167. The table below summaries the main information in this section. These estimates are used the cost and benefit calculations in each option.

[7] IGD data adjusted for England

Table 11 Summary of the composition of the market

Size of business	Number of businesses (including non-food retailers)	Number of stores (including non-food and beverage stores)	Number of Symbol businesses	Number of Symbol stores	Number of businesses with an online offering and online only businesses	Market share (in terms of revenue)
Micro	50,776	53,219	N/A	N/A	8,632	3%
Small	5,807	19,926	N/A	N/A	987	3%
Medium	413	1,289	N/A	N/A	248	3%
Large	143	22,014	15	13,433	88	91%

168. We do not have an estimate on the number of manufactures who will be impacted by this policy. The IDBR data which outlines the number of businesses in the sector has estimates of the number of manufactures, however granular data of HFSS manufactures is not available. The approach to estimating the impact on manufacturers is outlined in the 'Loss in manufacturer profit' section.

Costs and benefits of options

169. In this section we focus on the cost and benefits of this regulation.

170. This IA assumes the volume promotions restrictions will come into force alongside the location restrictions. Both sets of restrictions will apply to the same products. This means businesses subject to both restrictions will only need to assess a product once to establish if it is subject to both restrictions. This is therefore a shared cost across both policies. For ease, the volume promotions restrictions IA captures, the cost of assessing products for all the businesses in scope of the IA. There are some additional businesses that are in scope of this policy but not in scope of the locations restrictions IA.

171. The table below outlines the costs and benefits captured in the analysis for each option.

Table 12: Costs and benefits of location restrictions

Monetised costs	Transition costs associated with businesses the familiarising themselves with the new regulations
	Transition costs associated with assessing if products are in scope of the regulation
	Transition costs associated with distributing familiarisation and product assessment information to stores
	Transition costs associated with online only businesses or businesses with an online offering distributing familiarisation information to IT professionals.
	Transition costs associated with making changes to websites to remove volume offers on HFSS products
	On-going cost associated with assessing new or reformulated products
	Loss in profit to retailers and manufacturers because of reduced sales of HFSS food and drinks
	Profit offset to retailers and manufacturers due to retailers switching to price cuts
	Profit offset to retailers and manufacturers due to consumers compensatory behaviour and businesses using alternative marketing techniques

	Profit offset to retailers and manufacturers from consumers purchasing non-HFSS products
Non-monetised costs	Reformulation cost to manufacturers
	Impact on retailer and manufacturer relationship
	The impact on wholesalers from reduction in sales of HFSS products
	The costs of restricting free refills
Monetised benefits	A reduction in excess purchases of HFSS products and therefore calorie overconsumption, with a consequent reduction in childhood obesity prevalence
	A reduction in obesity-related morbidity and mortality, resulting in NHS and social care savings, and an increase in economic output
	A potential increase in consumption of healthier items, contributing to further health benefits
Non-monetised benefits	Impact on consumers and consumer surplus
	Benefits to consumers as a result of reformulation
	Benefits to consumers as a result of restricting free refills
	Impact on productivity from preventing obesity related ill health
	Reinvested cost savings to the NHS

172. The net present value of the options is assessed over a 25-year appraisal period. We believe the default period of 10 years is inadequate in this case because it fails to capture the typically later life health conditions that this policy targets. Examples of obesity/ over-weight related conditions that increase with age are breast cancer, coronary heart disease, colorectal cancer, type 2 diabetes, liver disease and stroke[8]. Even a 25-year period does not allow sufficient time to capture the future impact on today's children's, which only really starts to impact later in life. However, the significant benefits that are seen within 25 years are the impact on today's adults, whom are at a high risk of obesity-related conditions in the future. A longer appraisal period would have allowed us to fully capture the lifetime benefits on today's children. However, long appraisal periods also introduce increased uncertainty as assumptions need to be made over longer timelines. Therefore, 25 years was considered an optimum appraisal period.

Option 0-Do nothing

173. Option 0 is the do-nothing scenario against which all other options are compared. As such, the costs and benefits are zero.

174. The implicit assumptions in the calculations is that the counterfactual assumes no growth in the food retail sector and no change to the types of products that would otherwise be promoted, purchased and consumed.

175. It is worth acknowledging that there are other actions being taken by Government and others to reduce childhood obesity, alongside this intended action. Further discussion of the interactions is provided in

[8] Reference: https://www.diabetes.org.uk/resources-s3/2017-11/diabetes-key-stats-guidelines-april2014.pdf (last accessed 31/01/19), https://www.diabetes.org.uk/resources-s3/2017-11/diabetes_in_the_uk_2010.pdf (last accessed 05/03/2020) https://diabetes-resources-production.s3-eu-west-1.amazonaws.com/diabetes-storage/migration/pdf/DiabetesUK_Facts_Stats_Oct16.pdf (last accessed 05/03/2020) https://www.bhf.org.uk/-/media/files/research/heart-statistics/bhf-cvd-statistics-compendium-2017.pdf?la=en (tables 2.8a and 2.8b; last accessed 05/03/2020), Breast cancer statistics, Cancer Research UK. https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/breast-cancer#heading-Zero (last accessed 05/03/2020), Bowel cancer incidence statistics, Cancer Research UK. https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/bowel-cancer/incidence#heading-One (last accessed 05/03/2020)

the ‘Interaction of policy effects’ section. No explicit quantitative adjustments have been made for these.

Option 1: End all volume offers for HFSS products included in a narrow list of Discretionary Food and Drink product Categories in the retail sector excluding small and micro businesses.

Costs to business

176. To avoid double-counting, the product assessment costs incurred in the location promotion restriction IA have been deducted from the product assessment costs in this IA, hence total transition costs and ongoing costs to businesses will be adjusted in this IA.

Transition costs

177. Transition costs are expected to fall within four categories:

- Familiarisation;
- Product assessment;
- Distributing information;
- Changes to websites

178. It is important to note that the transition costs estimated here are based on a number of assumptions covering the time it will take for businesses to familiarise themselves with the regulations and assess products. These costs are considered as direct cost and captured in the EANDCB.

Familiarisation

179. We assume that each business will have one manager who is responsible for understanding the regulations and making their stores aware of the changes, we assume this will take 10 hours. We have revised our assumption about the time taken for a manager to familiarise themselves with the regulation following consultation feedback. We have not assumed businesses with an online offering will take longer to familiarise themselves with these restrictions as the promotion will be the same whether it is in store or online.

180. The median hourly wage rate for a head office manager is £21.00[9]. This captures a large range of different level managers, as we cannot predict which member of staff a business would assign this role. This is uprated by 30% to £27.30 to account for non-wage labour costs such as national insurance and pensions[10]. This wage rate has been increased post consultation in response to stakeholder engagement. In practise, the wage rate will vary by business depending on the size and scale of the organisation. Sensitivity analysis using the maximum and minimum wage rate percentiles has been conducted to consider some of this uncertainty, the results of which are outlined below.

181. We estimate that there are around 557 businesses in England and therefore our central estimate using the median average wage indicates that familiarisation cost to business will be £0.2m.

Product Assessment

182. To comply with the regulations retail businesses will need to assess whether each of the products they stock is within the categories in scope of the restrictions and, if yes, they will need to assess whether it is considered HFSS by calculating its NPM score.

[9] Earnings and hours worked, occupation by four-digit SOC, Annual Survey of Hours and Earnings, Provisional 2019 (provisional) data, Office for National Statistics, 2019. (https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/occupation4digitsoc2010ashetable14) (last accessed 05/03/2020)

[10] This is in accordance with standard practice set out in The Green Book: appraisal and evaluation in central government https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent (last accessed 05/03/2020)

183. To assist retailers and minimise the burden of this assessment, DHSC will provide guidance to help businesses implement the restrictions.

184. We assume that the assessment of products will be done at a corporate level rather than store level, with chain retailers able to distribute centrally calculated lists. The time taken to assess products will depend greatly on the form and content of the information currently held by stores. If electronic information on the nutritional content of products is present, then simple rules could be applied to this data to generate a flag for HFSS products. Consultation responses highlighted that in many cases retailers may need to ask manufacturers to make this assessment or provide data for their products, given retailers do not have all the nutrient information needed to calculate the NPM score for branded products. Therefore, we have made a single estimate of the cost across manufacturers and retailers and not attempted to attribute it separately to the two business types.

185. We have assumed that it would take 30 minutes per product to assess and record the outcome. This assumption was not questioned during consultation and has been used to estimate the costs. We considered the possibility of this assessment requiring more time in the sensitivity analysis.

186. To assess whether a product is in scope of the regulation, an individual assessment is required. The cost will depend on the number of products stocked by each business. Evidence from the global Agricultural Information Network[11] shows that Tesco will stock 25,000 products that are food and beverages. Analysis from Kantar data[12] highlights that around 30% of these products fall into categories subject to this regulation, and therefore use this assumption to calculate from all food and drink products, what categories need to be assessed. It is possible that other products not in these broad categories contain products that would fail NPM, and therefore have varied this assumption in the sensitivity analysis. We assume Tesco would need to assess 7,500 products.

187. The report also highlights that a typical Asda supermarket carries about 35,000 product lines, 60 percent of which are food and beverage items, resulting in 21,000 food and drink products. It also states that Morrisons stocks about 24,000 products. Kantar's food specific GB estimate of total grocery sales is £88.5bn, but IGD estimated that total grocery sales including non-food items was around £193.6bn. This suggests that around half of UK grocery sales are for food and drink items. Multiplying 24,000 by 50% suggests that approximately 12,000 products, in a typical Morrisons store, are food and drink items. We take the midpoint of these to calculations and apply the 30% estimate from the Kantar data and calculate that all other supermarkets will stock 4,950 products. For stores that aren't supermarkets, we assume they will stock 1,000 products. This assumption was not questioned in the consultation. Applying the 30% assumption to those products, as not all food and drink products will need to be assessed, we assume that stores that are not supermarkets will need to assess 300 products.

188. The median wage of head office managers in 2019 was £21.00 per hour, giving an hourly cost to businesses of £27.30 once 30% on-costs are included.

189. We estimate the product assessment cost will be £4.1m for 387 businesses. As highlighted in paragraph 176, product assessment cost will also be incurred under the location promotion restrictions. To avoid double-counting, the revised product assessment cost is £1m.

190. We have not estimated a product assessment cost for businesses whose primary function is not to sell food (outlined in paragraph 151) as we believe they will have an extremely small number of products in scope of the restrictions and what is HFSS would be more apparent, therefore we expect the product assessment costs to be negligible.

Distributing information

191. We assume that in medium and large businesses promotions are decided centrally, instead of by individual stores. Therefore, we assume that one manager at the head office will take one hour to pass the familiarisation and product assessment information to the store manager. The average hourly wage rate for a manager or director in retail and wholesale (store manager) is £13.12.[13] This is uplifted by

[11] UK Supermarket Chain Profiles, USDA Foreign Agricultural Service, 2016. https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=UK%20Supermarket%20Chain%20Profiles%202016_London_United%20Kingdom_12-13-2016.pdf (last accessed 05/03/2020)

[12] Kantar panel data of 30,000 housholds

[13] Earnings and hours worked, occupation by four-digit SOC, Annual Survey of Hours and Earnings, Provisional 2019 (provisional) data, Office for National Statistics, 2019.

30% to £17.10[14]. We estimate that there are around 23,304 stores in England and 557 businesses. As a result, our central estimate of the cost of distributing information between the head office and individual stores, using the median average wage, is £0.4m.

192. Similarly, we also assume that for online only retailers and retailers with an online offering, there would be an additional cost of information at the head office level being passed to IT professional who would be responsible of making these changes to the websites. Taking the uplifted wage of the manager at head office (£27.30) and the uplifted wage of an IT professional (£29.10) [15], the cost of sharing this information would be £19k across 336 businesses.

193. We also assume that every store will also have 2 employees in addition to the store manager responsible for understanding the regulations. We assume the employees will be briefed by the store manager. We assume that, on average, this will take one hour of employee and manager time.

194. We assume the two additional employees are paid the equivalent of the median hourly wage for stock control clerks and assistants, £10.72[16], and uplifted by 30% to £13.94[17]. The central estimate for the "opportunity cost" of this additional time spent on briefing store staff is £1m.

195. Thus, the cost of distributing will be approximately £1.5m.

Changes to online offering

196. For online only businesses and those with an online offering, retailers will need to remove volume offers on HFSS items. Stakeholder engagement identified that it could take an IT professional 20-30 days to make these changes and implement them across their online system. We therefore have assumed that in the central scenario it would take 25 days (200 hours based on 8 hours working days) for an IT professional to make these changes at an uplifted wage of £29.10[18], giving a central estimate of £2m across 336 businesses. The time taken to make these changes may vary by businesses and therefore these assumptions have been adjusted in the sensitivity analysis.

197. Overall, the total transition cost to business in Option 1 would be approximately £4.6m.

On-going costs

198. The on-going costs are expected to fall under these three main categories:
- Product assessment cost
- Distributing information
- Loss in retailer profit
- Loss in manufacturer profit

199. These costs will occur throughout the 25-year appraisal period.

200. As explained in paragraph 176, the total on-going cost to business is adjusted to account for double-counting in product assessment costs between the Location Restrictions IA and this IA.

Product assessment cost

201. Consultation responses highlighted that there would be additional on-going cost to business as a result of this regulation. As new products come into the market or products are reformulated, to comply

(https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/occupation4digitsoc2010ashetable14) (last accessed 05/03/2020)

[14] This is in accordance with standard practice set out in The Green Book: appraisal and evaluation in central government https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent (last accessed 05/03/2020)

[15] Annual Survey of Hours and Earnings, Provisional 2019 (provisional) data (https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/occupation4digitsoc2010ashetable14)

[16] Earnings and hours worked, occupation by four-digit SOC, Annual Survey of Hours and Earnings, Provisional 2019 (provisional) data, Office for National Statistics, 2019. (https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/occupation4digitsoc2010ashetable14) (last accessed 05/03/2020)

[17] This is in accordance with standard practice set out in The Green Book: appraisal and evaluation in central government https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent (last accessed 05/03/2020)

[18] Annual Survey of Hours and Earnings, Provisional 2019 (provisional) data (https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/occupation4digitsoc2010ashetable14)

with the regulations, retailers will need to assess whether each of the products they stock is within the categories in scope of the restrictions and, if so, they will need to assess whether it is considered HFSS by calculating its NPM score.

202. Stakeholder engagement has highlighted that products have a general reformulation cycle, where reformulation occurs between every 6 months to 3 years. To capture the on-going product assessment cost, we have assumed is that products will be reformulated every 2 years and have varied the time estimates in the sensitivity analysis. In the central estimate we assume that product assessment costs occur every 2 years and will cost £21.5m in total over the 25-year appraisal period.

Distributing information

203. Further costs would then be incurred from sharing this information with individual stores. We assume it takes 1 hour of time for a Manager/Director (or equivalent) at the head office for each of the 387 businesses, to distribute the knowledge to store managers, at an uprated cost of £27.30. We also assume it then takes 1 hour for a store manager to receive this information, at £17.10 (including 30% uplift) per hour for each of the 22,266 stores in England. It would then take one hour for one store manager to pass on this information to two store employees, whom have an uplifted wage of £13.94. There would also be an additional cost from sharing the information with IT professionals. It is assumed that it takes 1 manager at the head office with an hourly wage of £27.30, 1 hour to pass the information to the IT professional with a wage of £29.10. There would also be an additional cost from sharing the information with IT professionals. It is assumed that it takes 1 manager at the head office with an hourly wage of £27.30, 1 hour to pass the information to the IT professional with a wage of £29.10.

204. Hence the distribution of this information would cost a further £2.1m.

205. Thus, the total ongoing cost is £23.6m. As this cost is also captured in the location promotions restrictions IA, to avoid double-counting we have deducted the equivalent costs occurred in the location restriction IA from the estimate in this IA. Therefore, the revised estimate is £6.3m. This is considered as a direct cost and therefore captured in the EANDCB.

Loss in retailer profit

206. Retailers are expected to plan promotions to maximise profits. Consequently, any restriction on their ability to do this is expected to reduce profits. The methodology used to calculate the impact on retailer profits is outlined in Figure 8 below.

207. In our analysis, the EANDCB only captures the impacts on businesses that are a direct result of the regulation. The lost profit retailers incur due to restrictions to volume promotions is a direct cost as the regulation directly affects retailers' ability to maximise profits. However, any loss in profits offset by retailers switching to price cuts is not a direct impact. This is because the regulation does not require retailers to switch to using price cuts instead of volume promotions, this would be a business decision to maximise profits.

208. The first stage of calculating the loss involves calculating the proportion of sales that are at risk due to these regulations. In other words, we need to estimate the proportion of sales that occur due to some form of volume promotion. This is the 'expansion' and 'extra trips' categories discussed in the 'Impact of price cuts and multi-buy promotions on sales' section above.

209. Removing the discount offered by volume promotions would increase the average price of goods and likely increase people's expenditure of food and drink. However, this would only be the case without price adjustments by firms. Due to the highly competitive nature of the sector, we would expect retailers to subsequently reduce prices using temporary price cuts. The competition for retailers has increased in recent years due to the increase in the number of discounters and manufacturers of branded products now having to compete with products by retailers, known as 'private label' products.

210. Retailers could use temporary price cuts to reduce prices below, above or the same as their previous average level. If the average price discount was larger than the average discount size per product when multi-buys are allowed, then average prices would decrease below the previous level. This would offset a proportion of the reduction in sales due to the removal of volume promotions.

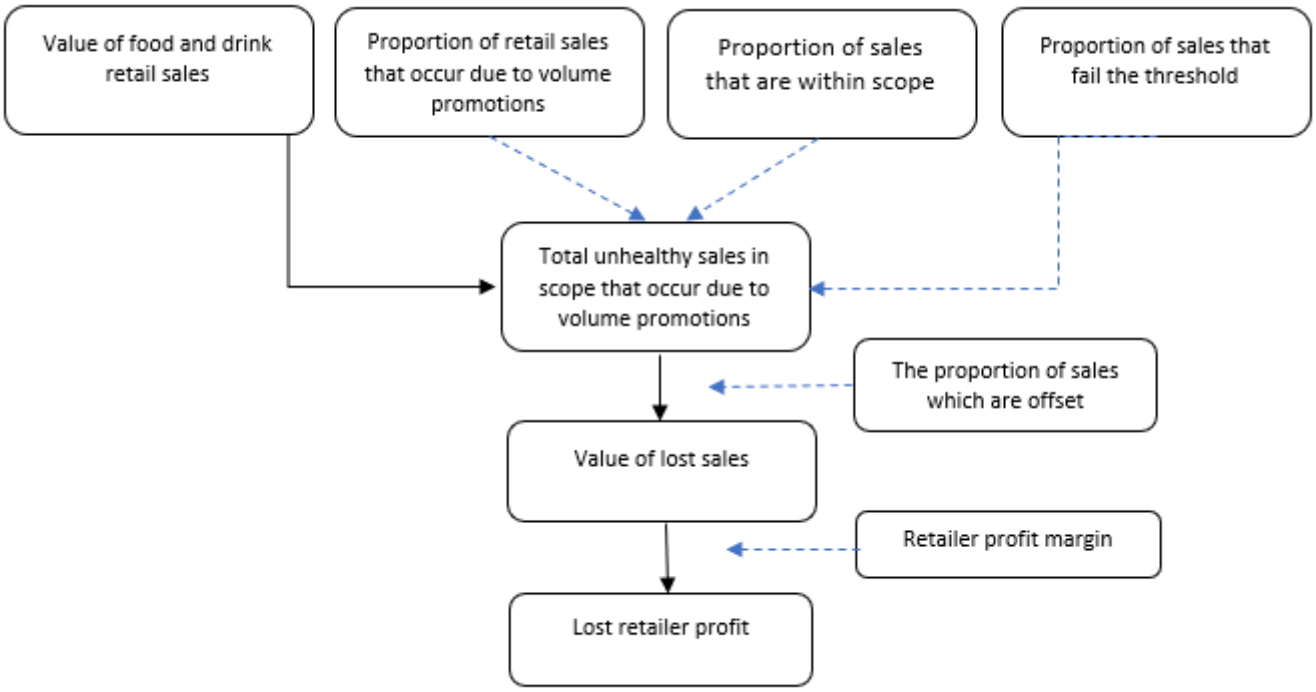
However, the regular use of temporary price cuts can devalue the brand image in the eyes of the consumer, having a negative impact on any brand equity they have built up through marketing. Thus, there is a limit as to how much retailers would be willing to use temporary price cuts in response to the restrictions on volume promotions.

211. Alternatively, if businesses use an average price discount smaller than the average discount size per product when multi-buys are allowed, then the average price per product would be higher than the previous level. Although this would reduce the negative impact on brand equity, the competition in the market means it is unlikely retailers could offer significantly lower discounts using temporary price cuts than they do currently using volume promotions.

212. Therefore, in the absence of evidence to suggest otherwise, we assume that retailers reduce average prices, using price cuts back to their pre-regulation level. This response would then increase demand and offset some of the drop in sales that were otherwise expected due to these restrictions. This would also reduce expected calorie savings compared to if average prices were to increase.

213. Once the expected value of lost sales has been estimated, we apply assumptions for retailer's margins to calculate the impact on their profits.

Figure 8 Estimating the reduction in retailer profits



Text-only description:
Step 1: To estimate the total sales of HFSS products that occur due to volume promotions, we use the value of food and drink retail sales, with the proportion of sales that occur due to volume promotions, proportion of sales in scope of the policy and the products that fail the NPM.
Step 2: To calculate the value of lost sales, we estimate that a proportion of the sales will be offset by retailers using alternative marketing strategies to promote products, like temporary price cuts and consumers compensating the loss calories.
Step 3: The retailer profit margin is applied to lost sales, to calculate the total lost profit to retailers.

Proportion of sales due to volume promotions

214. The Kantar Worldpanel analysis of the entire food and drink market suggests that food and drink goods sold on promotions account for approximately 33% of take-home expenditure for food and drink. Food and drink sold on promotion are being sold at an average discount of 30% (70% of their full price). These results are broadly consistent with those for promotions on high sugar products only, where 40% of expenditure was spent on promoted products, with an average discount of 32%.

As such, for HFSS products we consider the figures estimated for the entire market to be an appropriate estimate.

215. We disaggregate this spend using Kantar's breakdown of sales volume due to price discounts and multi-buy promotions in Figure 3, where the multi-buy breakdown is considered a reasonable representation of all volume-based promotions. Kantar provides data for the promotional column percentage decomposition by type of price promotion and size of discount. We take an average for each classification category in the 25-35% and 35-45% discount bands, grouping the 'extra trips' and 'expansion' categories together to estimate the total 'Additional' sales. The averages are displayed in Table 13.

Table 13: Promotional expenditure by source[19]

Type of purchase	Price cuts	Multi-buys
Additional[20]	17.0%	23.5%
Stolen	32.5%	26.5%
Cannibalised	27.5%	27.5%
Displaced	1.0%	2.0%
Subsidised	22.0%	20.5%

216. The Kantar Worldpanel analysis states that 24% of promotions offered in retail stores are price cuts/ temporary price reductions and 9% are multi-buy promotions. Dividing these figures by the 33% of take-home expenditure spent on promotions, we calculate that temporary price reductions account for 73% of price promotions, with various forms of multi-buy mechanisms accounting for the remaining 27%[21]. Multiplying the figures in Table 13 by these market share figures allows us to disaggregate all the expenditure of HFSS products into the undiscounted and discounted categories. The results of which are displayed in Table 14.

Table 14: Expenditure of HFSS products by source

Type of purchase		Percentage of expenditure		Totals[22]
		Price cuts	Multi-buy	
Discounted	Additional	4.1%	2.1%	6.2%
	Stolen	7.8%	2.4%	10.2%
	Cannibalised	6.6%	2.5%	9.1%
	Displaced	0.2%	0.2%	0.4%
	Subsidised	5.3%	1.8%	7.1%
Total Discounted Expenditure				33%
Total Non-Discounted Expenditure				67%

217. Table 14 shows that 2.1% (i.e. the percentage of additional purchases due to multi-buy promotions) of all expenditure on HFSS products currently occur because of volume promotions encouraging additional purchases. The implementation of this policy would prevent these additional purchases of HFSS products, resulting in a 2.1% reduction in expenditure on HFSS products.

[19] An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, a research project for Public Health England conducted by Kantar Worldpanel UK, 2020. Availble here: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action
It is an update of Sugar Reduction: The evidence for action - Annexe 4: An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, Public Health England, 2015.

[20] Additional sales are the extra trips and expansion categories outlined previously in the Impact of price promotions on sales section.

[21] An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, a research project for Public Health England conducted by Kantar Worldpanel UK, 2020. Availble here: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action
It is an update of Sugar Reduction: The evidence for action - Annexe 4: An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, Public Health England, 2015.

[22] Numbers may not sum to total due to rounding.

218. However, it is also necessary to consider the impact of removing the discount currently enjoyed by purchases that are being subsidised by promotions. From a pure expenditure point of view, this captures all sales that would have happened in the absence of the promotion, i.e. the 'displaced', 'subsidised', 'cannibalised' and 'stolen' sales in Table 14. Together these purchases make up around 6.9% of sales.

Retailer's price adjustment

219. Household expenditure on food and drink is divided by 33% discounted goods and 67% non-discounted goods. We can calculate that the current sales volume weighting of all discounted goods, before the policy, is 41.3% ((33%/70%)/ ((33%/70%)+67%))) and non-discounted goods is 58.7% (67% / ((33%/70%)+67%)). Taking both discounted and non-discounted goods together we calculate that, pre-policy, the average price of a product is 87.6% ((100%*58.7%) + (70%*41.3%)) of its full price.

220. Post policy implementation, due to the highly competitive nature of the retail sector, we expect businesses to implement a reduction in prices as they attempt to maximise profits subject to their new constraint. This is supported by a study evaluating the impact of banning volume promotions on alcohol in Scotland, which indicates that retailers responded to this ban using other forms of promotion, specifically price discounts[23][24]. It seems reasonable to assume that retailers will respond in a similar way to these restrictions.

221. Post policy implementation, with excess multi-buy promotions being substituted with temporary price cuts, we were then able to calculate the new average product price to be 90.74% through the sum of the average price of non-excess multibuys, undiscounted goods and price cuts. Therefore, the total change in average prices, generated by switching all multi-buys to price cuts, is 3.45% (1-(87.61% / 90.74%)).

222. As explained above, it seems reasonable to assume retailers would respond to volume promotion restrictions by using price discounts and reduce prices back to their previous average levels using price discounts.

223. To assess the possible impact of retailers adjusting their prices we consider the price elasticity of demand (PED) for products and how it may vary on whether price changes are due to volume promotions or price discounts. PED is a measure of how responsive the quantity demanded of a good or service is to a change in its price and is calculated by dividing the percentage change in the quantity demanded by the percentage change in its price.

224. To work out the price, when a product is on promotion, we first need to estimate the decrease in the average price because of this promotion type. As previously calculated in paragraph 219, 41.3% of products are being sold at an average discount of 30% and the remaining 58.7% being sold at full price, making the average price of products 87.61% of full price when volume promotions are allowed.

225. As stated above, to calculate the price elasticity of demand for volume promotions we also need to estimate the change in sales volumes because of this promotion type. To do this we use the expenditure share and average level of discount to estimate the volume of HFSS sales from discounted and undiscounted items. The results of this calculation are displayed in Table 15 below.

Table 15: Volume of HFSS products sold

Type of purchase		Percentage of expenditure		Percentage of volume sold		
		Price cuts	Multi-buy	Price cuts	Multi-buy	Total
Discounted	Additional	4.1%	2.1%	5.1%	2.6%	7.8%

[23]Robinson M, Geue C, Lewsey J, Mackay D, McCartney G, Curnock E, Beeston C. (2014) Evaluating the impact of the alcohol act on off-trade alcohol sales: a natural experiment in Scotland. Addiction. 2014 Dec 1;109(12):2035-43.

[24] Nakamura R, Suhrcke M, Pechey R, Morciano M, Roland M, Marteau TM. (2014) Impact on alcohol purchasing of a ban on multi-buy promotions: a quasi-experimental evaluation comparing Scotland with England and Wales. Addiction. 2014 Apr 1;109(4):558-67.

	Stolen	7.8%	2.4%	9.8%	3.0%	12.7%
	Cannibalised	6.6%	2.5%	8.3%	3.1%	11.4%
	Displaced	0.2%	0.2%	0.3%	0.2%	0.5%
	Subsidised	5.3%	1.8%	6.6%	2.3%	8.9%
Total Discounted Expenditure		33%		Total Discounted Volume		41.3%
Total Non-Discounted Expenditure		67%		Total Non-Discounted Volume		58.7%

226. Table 15 shows that volume promotions account for 8.6%[25] of the volume of HFSS items sold. Restricting the use of volume promotions would increase the average price of these subsidised sales to their undiscounted level. This suggests that removing volume promotions would result in products being sold at an average price of 90.74% of undiscounted levels (100%). The current average price, when volume promotions are allowed, is 87.61% of undiscounted prices. Therefore, as previously calculated in paragraph 221, volume promotions reduce average prices by around 3.45%.

227. Table 15 shows that 2.1% of additional expenditure is currently due to volume promotions. This expenditure accounts for 2.65% of the total volume of HFSS food and drinks sold, indicating that 97.35% (100%- 2.65%) of sales volumes would have taken place without volume promotions. Using this figure calculates the increase in quantity sold, due to volume promotions to be 2.72% (1/ (100%-2.65%)-1). This gives a volume promotion specific PED of around -0.79 (2.72% /3.45%)

228. Using the same process outlined in the table below, we estimate that on their own, temporary price cuts reduce average prices by around 9.16% and increases the volume of HFSS products sold by 5.4% (1/ (1-5.38%)-1). This gives a price discount specific PED of around -0.59 (5.38%/9.16%).

Table 16 Price elasticity of demand

	Current average price when volume promotions are allowed	Average price if volume promotion is removed	Reduction in total sales once excess sales from volume promotions have been removed	Increase in quantity sold due to volume promotions	Changes in average price	Price elasticity of demand
Volume promotion	87.61%	90.74%	2.65%	2.72%	-3.45%	-0.79
Price discount	87.61%	96.44%	5.11%	5.38%	-9.16%	-0.59

229. Using economic theory to compare the two elasticities, as the PED for volume promotions is nearer to 1, the quantity of HFSS products demanded is more sensitive to reductions in prices from volume promotions than temporary price cuts. This is to be expected given that volume promotions require an individual to purchase additional products to benefit from a lower average price, compared to price cuts where just one product can be purchased at a discount.

230. In the sensitivity analysis, we investigate a scenario in which businesses respond to the regulation by changing the general price level instead of switching their marketing strategy to temporary price cuts.

Impact on HFSS sales volume

[25] This is the sum of the Stolen, Cannibalised, Displaced and Subsidised categories (3%+3.1%+0.2%+2.3%=8.6%)

231. As explained above, to illustrate the potential impact of a restriction on volume promotions we assume that retailers would use non-volume price reductions to reduce the average price of all HFSS products in scope by 3.45%.

232. Removing the excess sales generated by volume promotions reduces the total sales volumes by 2.65%, indicating that 97.4% of sales volumes would have taken place without volume promotions. This would be a direct impact of the regulation. By removing volume promotions, there will be a decrease in sales of HFSS products by 2.72%, which is equivalent to 2.65% of the total volume sold before the restrictions were introduced. The reduction in total volume of HFSS products sold is calculated by multiplying the PED for multi-buy promotions (0.79) by the reduction in price of HFSS products in scope (3.1%). A reduction in sales of HFSS food and drink of 2.65% of the current volume, is equivalent to a reduction of 2.32% of current value, once price changes are considered.

233. However, assuming that retailers switch from volume promotions to price cuts, an indirect impact of the regulation there will be an increase in sales of HFSS products by 2.03% (0.59 x 3.45%), which is equivalent to 1.98% (2.65%/(2.72% x 2.03%) of the total volume sold before the restrictions were introduced. This is a net reduction in volume sold of 0.67% (2.65% - 1.98%). Then, taking into consideration the average price of a price promotions, 87.61% (calculated in paragraph 219) calculates the total net impact on sales value to be 0.59%. This is an overall net loss as it takes into consideration the direct impact of a fall in sales due to removal of volume promotions, but also the gain in sales due to the potential increase in temporary price cut promotions.

234. Department of Health and Social Care analysis of 2,500 food and drink products in Kantar Worldpanel data suggests that around 37.47% of GB food sales would be considered HFSS by the 2004/05 Nutrient Profile Model, and within Option 1 food/drink categories outlined in Annex D. The impact on sales and profit include both products bought in store and online, however a breakdown is not available in the data.

235. The product categories outlined in Annex D are not aligned to the categories included in the Kantar dataset. To address this, a degree of matching was conducted to translate the categories outlined in Annex D to the Kantar categories, using primary and sub categories in the Kantar dataset. Despite this alignment work, there may remain a small number of products within the Kantar categories that are not included in the product categories outlined in Annex D and vice versa, and therefore we have considered this in the sensitivity analysis.

236. The total value of the market equals £100.5bn in 2019 prices. This implies £37.66bn of total grocery sales is spent on products that fall under Option 1, given their predicted 37.47% market share. The proportion of sales by value under Option 1 which are from HFSS products (fail the NPM) is estimated at around 80%. Multiplying this by £37.66bn gives the total value of sales of HFSS products under Option 1 (£30.11bn). Using the proportion of turnover of businesses in scope from IDBR[26] (93.92%), the total value of sales under Option 1 (£30.11bn) and multiplying these by 0.59% (taken from paragraph 233 above) implies a total net reduction in sales of £166m per annum. This is a net reduction as it takes into account both the direct and indirect effect on sales.

Adjusting for consumer and retailer response

237. As highlighted earlier, it is possible, for example, that consumers might adjust their consumption behaviour in response to consuming fewer calories. This could include consumers shifting their purchases to other products within shops for consumption at home, increased consumption in the OOH environment (particularly through food on-the-go) or consumption of takeaways, either directly from OOH businesses or through takeaway delivery services.

238. The choice of which goods are purchased might be influenced by alternative marketing strategies from the same businesses who would otherwise lose out from the promotion restrictions. As explained above, we assume retailers will respond to restrictions to volume promotions for HFSS products by using temporary price cut promotions to offset a proportion of the loss in sales. The way products are marketed to us can be split into four elements often known as the 'four Ps': product; price; place; and promotion. This means that price cuts are only one of the possible ways retailers could respond to restrictions on volume promotions. In reality, retailers are likely to respond by using multiple marketing techniques to maximise profits following restrictions to volume promotions. For example, retailers could increase the use of volume promotions for products out of scope of the

[26] Business population estimates 2018, Department for Business, Energy and Industrial Strategy, 2018. https://www.gov.uk/government/statistics/business-population-estimates-2018 (last accessed 05/03/2020)

restrictions or use alternative in-store promotions, such as, increased shelf space, preferential aisle positioning, posters / banners and in-store samples.

239. We have assumed a further proportion of lost sales are offset by HFSS and non-HFSS products, specifically 40%.

240. We have considered this as an indirect impact on sales and profits as it would be a secondary reaction for consumers to compensate proportion of their calories and a business decision to use alternative marketing strategies. This will cause the total retailer reduction in sales to be £99.7m per annuum.

241. To calculate the EANDCB we only capture the direct cost to business. Therefore, using the proportion of turnover of businesses in scope from IDBR[27] (93.92%), the total value of sales HFSS under Option 1 (£30.11bn) and multiplying these by 2.32% (calculated in paragraph 232) implies a direct reduction in sales of £656m per annum.

242. This type of behaviour change is a significant source of uncertainty in our analysis and as such could have a significant impact on individual businesses' sales, and on the estimated total net present value.

243. The evidence on compensating behaviour in the literature is mixed. Several experiments investigating the impact of adjusting the energy density of specific meals have found no evidence of calorie compensation at subsequent meals or during the short time period covered by the study[28,29,30]. In contrast, other investigations have found that subjects completely compensated for a change in calorie intake.[31,32] Furthermore, two other studies have found imprecise levels of calorie compensation, with subjects adjusting their food intake to compensate for 40%[33] and 35%[34] of the calories removed from their diets.

244. The rate of compensation is also likely to depend on the foods that are removed from peoples' diets, with some evidence suggesting people are less likely to compensate for changes in calorie intake from beverages than solid food[35]. Furthermore, with many of these studies taking place in laboratory conditions or over relatively short periods of time, it is unclear how people might adjust their behaviour over time in real world conditions. Therefore, it is not obvious from the literature how consumers might adjust their behaviour in response to these regulations, if they do so at all.

245. Consultation responses from stakeholders argued that a 40% offset was an underestimation and that some evidence[113,36,37]has suggested that this figure could be closer to 100%, however, this does vary from person to person. It is also possible that level of compensation could vary depending on the purpose of a consumers shopping trip. The likeliness of consumers compensating for the loss calories would be dependent on whether they pick up non-HFSS items in these locations as part of an impulse purchase during a quick trip, or whether during a longer shop, consumers pick up other items throughout the store to replace the loss calories.

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[27] Business population estimates 2018, Department for Business, Energy and Industrial Strategy, 2018. https://www.gov.uk/government/statistics/business-population-estimates-2018 (last accessed 05/03/2020)

[28] Anton SD, Martin CK, Han H, Coulon S, Cefalu WT, Geiselman P, Williamson DA. (2010) Effects of stevia, aspartame, and sucrose on food intake, satiety, and postprandial glucose and insulin levels. Appetite. 2010 Aug 31;55(1):37-43.

[29] Rolls BJ, Roe LS, Meengs JS. (2006) Reductions in portion size and energy density of foods are additive and lead to sustained decreases in energy intake. The American journal of clinical nutrition. 2006 Jan 1;83(1):11-7.

[30] Kelly MT, Wallace JM, Robson PJ, Rennie KL, Welch RW, Hannon-Fletcher MP, Brennan S, Fletcher A, Livingstone MB. (2009) Increased portion size leads to a sustained increase in energy intake over 4 d in normal-weight and overweight men and women. British journal of nutrition. 2009 Feb;102(3):470-7.

[31] Foltin RW, Fischman MW, Emurian CS, Rachlinski JJ. (1988) Compensation for caloric dilution in humans given unrestricted access to food in a residential laboratory. Appetite. 1988 Feb 29;10(1):13-24.

[32] Foltin RW, Fischman MW, Moran TH, Rolls BJ, Kelly TH. (1990) Caloric compensation for lunches varying in fat and carbohydrate content by humans in a residential laboratory. The American journal of clinical nutrition. 1990 Dec 1;52(6):969-80.

[33] Porikos KP, Hesser MF, Van Itallie TB. (1982) Caloric regulation in normal-weight men maintained on a palatable diet of concentional foods. Physiology & behavior. 1982 Aug 31;29(2):293-300.

[34] Kendall A, Levitsky DA, Strupp BJ, Lissner L. (1991) Weight loss on a low-fat diet: consequence of the imprecision of the control of food intake in humans. The American journal of clinical nutrition. 1991 May 1;53(5):1124-9.

[35] Mourao DM, Bressan J, Campbell WW, Mattes RD. (2007) Effects of food form on appetite and energy intake in lean and obese young adults. International journal of obesity. 2007 Nov 1;31(11):1688-95.

[36]Werle. C. et al (2011). 'Just thinking about exercise makes me serve more food. Physical activity and calorie compensation'. Appetite 56(2).

[37] Mccrickerd, K., Salleh, N.B. & Forde, C.G. (2016). 'Removing energy from a beverage influences later food intake more than the same energy addition'. Appetite 105.

246. Due to the considerable amount of uncertainty surrounding the rate of off-set, we have applied a 40% compensation rate in the central scenario to our cost estimates, and have adjusted for different levels of compensation in the sensitivity analysis.

Impact on profits

247. To work out the impact of this reduction on profits, the profit margins must be applied. Grocery and food retailing is a low margin, high volume business, with increased competition over recent years meaning that profit margins for most grocery retailers are under pressure[38]. For the purposes of this analysis we could use retailers gross or net profit margins.

248. The gross profit margin is the difference between total revenue and the cost associated with selling products, such as the cost of purchasing the product from the supplier and transporting it to stores. As a result, using the gross margin would imply that these marginal costs associated with selling products decrease as revenue changes, but fixed costs remain constant.

249. In contrast, the net profit margin is the difference between total revenue and total operating costs. This measure of profit also considers fixed costs and using it would imply that both marginal and fixed costs can be adjusted as revenue changes.

250. Evidence suggests that food retailers net profit margins are around 2%[39]., with gross margins ranging from around 6% at Tesco and Sainsburys to around 4% at Morrisons[40]. With no evidence on the ability of retailers to adjust fixed costs and the different profit margins delivered by HFSS products and other goods, we present illustrative costs based on a 3% profit margin to capture the variation in profit margin between net and gross and that profit margins would vary by the type of products. Given its importance we vary this in the sensitivity analysis. The consultation did not provide any further evidence and given the data is commercially sensitive, we were not able to gather any further evidence through further stakeholder engagement.

251. Applying a 3% profit margin to the value of the reduction in sales of HFSS food and drinks implies total annual lost profits of around £2.6m, taking into account England's 86.7% share of the GB population. The direct loss of retailer profit because of the regulation is estimated at £17m per year.

252. This equates to a net loss in retailer profit of £49m over the 25-year appraisal period.

Summary

253. Table 17 below outlines the expected impact of the policy on retailer profits, with the calculations at each stage of the methodology split out.

Table 17: Option 1: Summary of the reduction in annual profits for retailers

Direct/indirect impact	Total grocery sales classified as HFSS in Option 1 and in businesses within scope of the regulations	Net reduction in the value of HFSS products	Reduction in retail sales of HFSS products	Reduction in retail sales of HFSS products, with compensation	Reduced retailer profit
Direct	£30.1bn	2.32%	£656m	NA	£17m
Direct and indirect	£30.1bn	0.59%	£166m	£99.7m	£2.6m

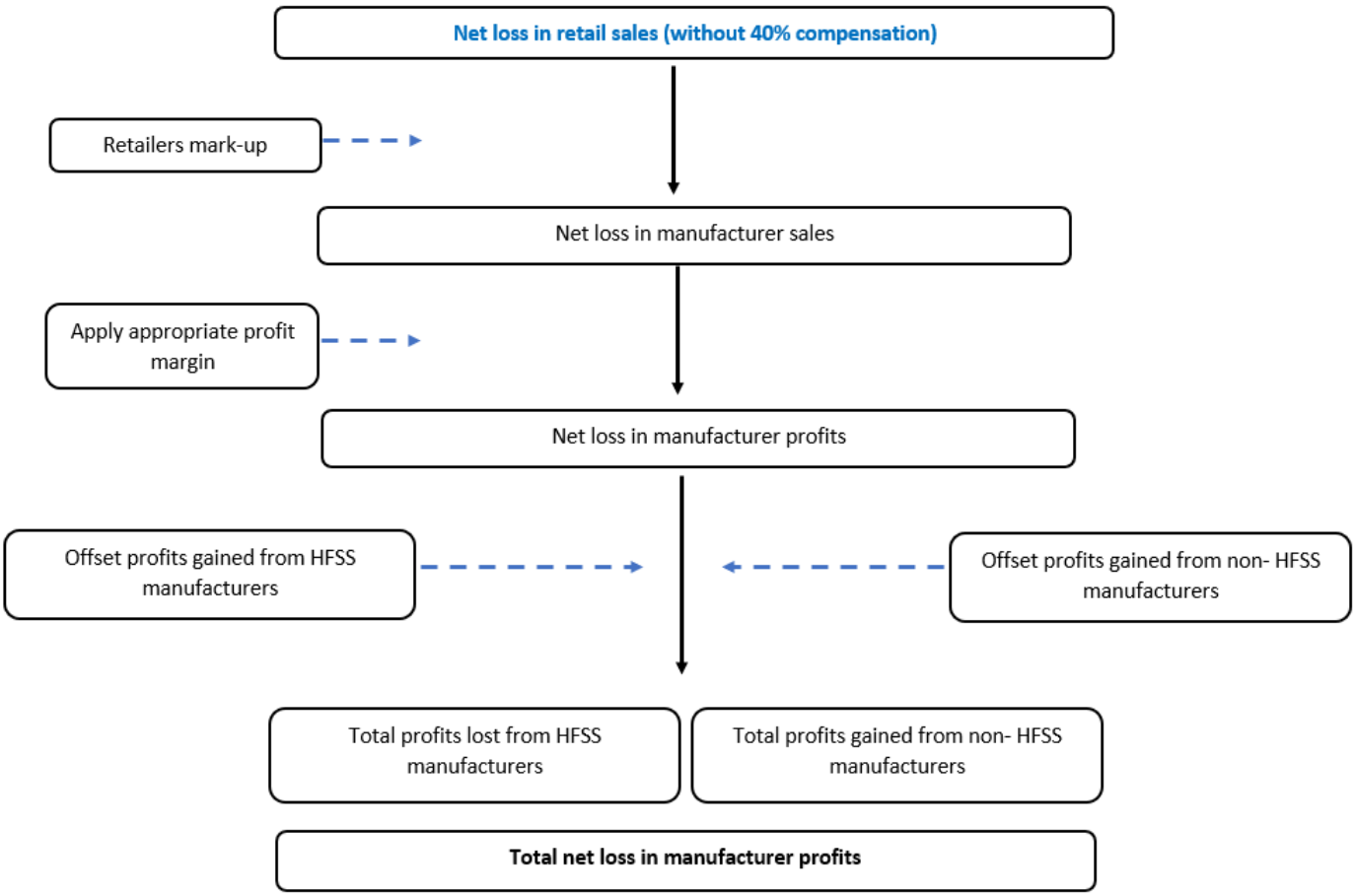
[38] Identifying and understanding the factors that can transform the retail environment to enable healthier purchasing by consumers, Leigh Sparks and Steve Burt, University of Stirling, Food Standards Scotland, 2017. https://www.foodstandards.gov.scot/downloads/FSS-_Final_Report_June_1st_2017.pdf (last accessed 05/03/2020)

[39] Identifying and understanding the factors that can transform the retail environment to enable healthier purchasing by consumers, Leigh Sparks and Steve Burt, University of Stirling, Food Standards Scotland, 2017. https://www.foodstandards.gov.scot/downloads/FSS-_Final_Report_June_1st_2017.pdf (last accessed 05/03/2020)

Loss in manufacturer profit

254. To estimate the impact on manufacturer profits we follow a three-stage process outlined in Figure 7 below. First, we estimate the manufacturers lost revenue by applying an assumption for the retailers mark up to the reduction in retail sales. Using the manufacturer's profit margin, we can then estimate the change in profits. The lost profit for ingredient suppliers and other manufacturers involved in the supply chain has not been monetised as it is a second order effect and not in scope of IAs.

Figure 9 Estimating the reduction in manufacturer profits



Text-only description:

Step 1: First, we estimate the manufacturers lost revenue by applying an assumption for the retailers mark up to the reduction in retail sales.

Step 2: The manufacturer's profit margin is then applied to the loss in manufacturer sales to calculate the loss in manufacturers profits.

Step 3: To calculate the net loss in manufactures profit, we assume some of the lost profit is offset through gains for non-HFSS manufactures.

255. We estimate that restricting the use of volume promotions would reduce retailer sales by £100m per year. UK supermarket mark-ups are estimated to be between 35% and 70%[41] - assuming the mid-point of this range implies lost manufacturer sales of £65m per year.

[41] Retailers Foods, USDA Foreign Agricultural Service,2011. https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=retail%20foods_london_united%20kingdom_2-3-2011.pdf (last accessed 05/03/2020)

256. Over the past decade or so, food and drink producers' profit margins have ranged between 5 and 7%[42]. Evidence from OC&C that the average net profit margin for manufacturers is around 6% [43]. Consultation did not provide further evidence on the difference in profit margins of manufacturers selling HFSS and non-HFSS products nor were we able to get any further information through stakeholder engagement, due to the commercially sensitive nature of the data. Due to this, we apply a 6% net profit margin to both the loss in manufacturer sales and any sales that have been offset. The net profit margin takes into account fixed costs and given that we are appraising the policy over a 25-year appraisal period, it is possible that fixed costs would be impacted if there is a reduction in sales. In addition, we did not receive any evidence through the consultation or further stakeholder engagement on what the gross profit margin is for manufacturers in order to take the midpoint between the two.

257. Applying a profit margin of 6%, implies a net lost profit of approximately £3.4m per annum for manufacturers of HFSS products.

258. We previously estimated in paragraph 189 that restricting the use of volume promotions would cause a net reduction in retailer sales of £166m per year, when accounting for the loss in sales offset by the switch to temporary price cuts. Sales are further offset by £66m as consumers purchase HFSS and non-HFSS products to compensate for loss in calories and due to alternative marketing strategies. Hence, there will be a partial gain to both HFSS and non-HFSS manufacturers as a result of this policy.

259. Using Kantar data, we have calculated that 57% of all products are HFSS and 43% are non-HFSS regardless of option. These estimates has been used to estimate what proportion of the 40% offset is HFSS and non-HFSS. We have used this dataset to represent the food retail market. Given this database is of the top selling products, and therefore may not be a true representation of the market, we have adjusted for this in the sensitivity analysis. We have explored whether other databases could be used to represent the type of products in the market, but as the Kantar data has been used alongside the 2004/05 NPM, we were able to identify the proportion of products that are HFSS and non-HFSS, something which wasn't possible with other datasets.

260. There is a possibility that the proportion of all products that are HFSS and non-HFSS may vary by size of store. However, as we are unable to get that breakdown from Kantar data, as it captures all take home products and does not record where products were purchased, we have not been able to factor this into our calculations. It is possible that smaller stores may have more HFSS products, however given the disproportionate burden on small and micro stores, they have been excluded from the preferred option regardless of size of store.

261. Using these proportions, we were able to calculate the offset in retail sales that are HFSS (£38m) and non-HFSS (£29m) respectively.

262. Using the UK supermarket mark-ups (52.2%) implies an offsetting to HFSS manufacturer sales of £25m and £19m for non-HFSS manufacturer sales.

263. Applying a profit margin (6%), implies an offset in lost profit of approximately £1.3m per annum for manufacturers of HFSS products, and a gain of £1m per annum for non-HFSS manufacturers, having adjusted for the expected size of the English market, based on England's 86.7% share of the GB population.

264. Taking these offsets into account, the overall impact to HFSS manufacturers is a profit loss of £4.4m (£5.7m net reduction in profits without offsetting - £1.3m). The overall impact on non-HFSS manufacturers is a gain of £1m. Hence, the overall net impact on manufacturers is a profit loss of £3.4m (£4.4m –£ 1m).

265. The direct loss to manufacturers would not take into consideration this offset in sales as it is a secondary action to compensate your calories and for businesses to substitute multibuys with temporary price cuts. Previously estimated in paragraph 241, the direct reduction in sales to retailers is £656m per annuum. Taking in to account the supermarket mark-up, the direct reduction in manufacturer sales is £430m. Applying the 6% profit margin and accounting for the England population size, the total direct reduction in manufacturer profits is approximately £22.4m.

[42] OC&C/ The Grocer Food and Drink 150 (2018) 150 2018 Infographic, https://www.occstrategy.com/en/news-and-media/2018/09/occ-and-the-grocer-food-and-drink-150-2018 (accessed 23/10/2018)

[43] https://www.occstrategy.com/media/1700/food-and-drink-150-infographic-2018-3.pdf

266. Over the 25-year appraisal period, the net total lost profit to manufacturers would be approximately £64.4m, while the total direct lost profit would be £424m.

267. The above calculations do not form a full general equilibrium assessment of the impact of a restriction on price promotions for HFSS goods. Money no longer spent by consumers on promoted food and drink products will be distributed to other areas of the economy. It is not possible to assess what the impact of these indirect changes would be.

Summary

268. Table 18 below outlines the expected impact of the policy on manufacturer profits, with the calculations at each stage of the methodology performed above split out.

Table 18:Option 1: Summary of the reduction in profits for manufacturers of HFSS products, (£m per annuum)

Direct/indirect impact	Reduced retail sales of food and drink	Reduced HFSS manufacturer sales of food and drink	Additional non-HFSS manufacturer sales of food and drink	HFSS manufacturer loss profits	Non-HFSS manufacturer additional profits	Loss manufacturer profits
Direct	£656	£430	NA	£22	NA	£22
Direct and indirect	£100	£84	£19	£4	£1	£3

Non-Monetised cost to business

Reformulation

269. Some manufacturers might respond to these restrictions by reformulating their products in order to be able to promote them in restricted locations. Feedback from the consultation highlighted that products where the NPM scores are far from the threshold should be excluded from the policy, as there would be little incentive for manufacturers to reformulate products. There may be an incentive to reformulate products that are close to the NPM threshold, but for products such as confectionery, which are inherently HFSS, reformulation will be more challenging.

270. Business may be able to adopt innovative technology, opening up the possibility to reformulate historically unhealthy products. However, it is recognised that it may not always be possible to achieve an NPM score that would allow them to be promoted in restricted locations.

271. There are other voluntary programmes in place which are designed to encourage manufacturers to meet their corporate social responsibilities and reformulate their products to reduce calories, sugar and salt. Public Health England's sugar reduction programme has seen a 13% reduction in the average sugar content of breakfast cereals and yoghurts.

272. Polling shows there is consumer demand for healthier products with fewer calories[44]. In addition, the Nutrition and Health Claims Regulation (EU) No. 1924/2006 permits nutrition claims such as "less sugar" or "reduced fat" on pack subject to certain criteria being met, which may offer an alternative incentive for businesses to reformulate.

273. This demonstrates that although this policy may not incentivise the reformulation of some products that are significantly above the NPM threshold, there are other factors, including consumer demand, which will encourage further reformulation, even if it will not mean they can promote their products using volume promotions. Therefore, we do not consider that this policy will disincentivise reformulation of these types of products.

274. The frequency in which manufacturers may reformulate their products will also vary substantially from one product and manufacturer to another. Previous industry engagement suggests that

[44] Public Health England. (2016) *Attitudes to obesity: Findings from the 2015 British Social Attitudes survey*. Available at: http://www.bsa.natcen.ac.uk/latest-report/british-social-attitudes-33/obesity.aspx (accessed 23/10/2020)

reformulation occurs on a regular basis. Stakeholder engagement revealed this can be anywhere from every 6 months to every 3 years depending on the product in question.

275. Having a live reformulation programme for a particular nutrient or ingredient which is present in a food or drink may also mean that some products are reviewed and reformulated more (including changes to portion size) than would be the case if there wasn't a live programme. Manufacturers introducing a 'reduced' product would also make changes to the standard product and introduction of other new products to a company's portfolio may also lead them to review and reformulate an existing product.

276. The costs of any reformulation will vary substantially from one product to another, depending on the amount of changes that need to be made, the cost of alternative ingredients, time taken to reformulate the products and the cost associated with revising labels and advertising reformulated products. Due to the uncertainties surrounding these costs and the lack of evidence from consultation responses we have not been able estimate the cost of any potential reformulation.

277. In addition, the commercial sensitive nature of this information means that we have not been able to gather any further estimates through further stakeholder engagement. Furthermore, any effort by manufacturers to reformulate their products would only be pursued if the expected returns were greater than not doing so. As such, we would expect the benefits of reformulation to outweigh the costs to retailers and manufacturers. The cost reformulation would also be considered as indirect cost, as there is no requirement under this policy for manufacturers to reformulate.

278. There are also other policies in place to encourage reformulation, and meaning the cost of reformulation could be driven as a result of this policy or other policies outlined in the 'Interaction of policy effects' section.

Retailer-manufacturer relationship

279. The estimates above take a somewhat simplistic view of the relationship between manufacturers and retailers. Decisions about the timings and types of promotions which are offered during any given week will be the result of a series of negotiations between retailers and manufacturers.

280. Restricting the use of volume promotions for HFSS products would clearly have substantial implications for this relationship. However, due to the lack of publicly available information in this area, it has not been possible to assess the implications of these restrictions on this relationship.

281. Our calculations have assumed that the costs of adjusting to these restrictions would be felt by retailers. It is possible that retailers would attempt to pass this cost on to manufacturers. Retailers may need nutrition information from manufacturers to understand whether a product is in scope, and if may pass the task of assessing a product to manufacturers. We have not been able to quantify this impact as it is unclear whether retailers will pass the cost on to manufacturers and no further evidence was provided through the consultation or further stakeholder engagement.

The impact on wholesalers

282. In addition to the impact on manufacturers and retailers, there could be an impact on wholesalers as the reduction in sale of HFSS products would reduce their profits. This would be a direct cost as a result of the policy but would only apply if small and micro businesses are in scope. Larger retailers would deal directly with manufacturers, and therefore wholesalers are not usually part of the supply chain for large retailers. However, if smaller manufactures do supply larger supermarkets it is possible that there could be a potential cost to wholesalers. The impact on small and micro wholesales is outlined in the 'Cost to small and micro manufacturers, wholesalers and ingredient suppliers' section. As we were not able to gather information through the consultation on the number of manufactures or who they supplied to, this has not been quantified.

The impact on ingredient suppliers

283. The lost profit for ingredient suppliers involved in the supply chain has not been monetised as it is a second order effect. We do not think its proportionate to monetise this impact as the impact on profit to these businesses could be due to a number of other factors (e.g. reformulation programmes) making it difficult to understand the impact on their profits as a result of this policy alone. In addition, we currently do not have data on the number of ingredient suppliers working with manufactures affected by this policy and this information was not possible to gather from stakeholders. It is possible

that ingredient suppliers are small and micro businesses who may be disproportionally impacted by the policy, however without any further data this impact has been captured as a non-monetised cost. This is discussed in further detail in the 'Cost to small and micro manufacturers, wholesalers and ingredient suppliers' section.

Wider economic impacts

284. We recognise that the loss in profits for retailers, manufacturers, wholesalers and ingredient suppliers could have wider economic impacts.

285. For example, lower profits for these types of businesses could lead to them decreasing investment in new machinery or premises and/or reducing the number of staff they employ. This would have a negative knock-on impact on the aggregate demand and employment in the economy. It is also possible that this policy creates an opportunity for non-HFSS manufactures, who may see a increase in demand if volume promotions are used to promote non-HFSS products, which could increase employment and investment.

286. These types of wider economic impacts have not been monetised. We do not think it is proportionate to monetise them as investment and employment decisions by retailers, manufacturers, wholesalers and ingredient suppliers is likely to be influenced by a wide range of factors (e.g. interest rates, wage costs and implications on trade). This means it would be very difficult to identify the specific wider economic impact of restrictions on location promotions of HFSS products.

287. The 'Inequality Test' section looks at the impact the policy will have on different socioeconomic groups. The evidence highlights that households with children spend more on promotions compared to those without, however the difference is quite small. It also shows that less affluent shoppers are less likely to buy products on promotions compared to those with income greater than £30k.

Free refills

288. As explained above, due to free refills of SSBs in the OOH environment also encouraging excess consumption and the positive correlation between the consumption of SSBs and increased obesity and chronic diseases, Government decided that the price promotion restrictions will also apply to free refills of SSBs (that are in scope of the SDIL). It would mean that free refills will only be available for low/no sugar soft drinks.

289. Although the consultation responses were largely supportive of the proposal to include free refills of SSBs in the restrictions, we did not receive any evidence on the costs it would impose on businesses. Following the consultation, we contacted several stakeholders, including, food and drink manufacturing and hospitality trade associations. We asked for more information on the potential cost impact of applying restrictions to free refills of SSBs. Specifically, we asked for information on:

- The number of businesses that offer refills and the number outlets these businesses have.
- A description of the current offer, such as, the price per customer for a refillable cup, whether there is any price difference for drinks in scope and out of scope of SDIL, what soft drink options are available, the size of cup provided, whether they are included within meal deals or other offers and any seasonal or one-off offers related to free refills.
- The total volume consumed across all customers through a free refill offer, including the amount consumed per customer that purchases a refillable drink. In addition, if there are businesses where some outlets provide free refills and some do not, we asked for a comparison of average volume consumed per customer visit.
- Information from any customer surveys that have been undertaken, to help us understand the extent to which free refills is a factor for choosing a restaurant, what drinks are consumed and to what extent they are willing to swap to a low sugar/zero sugar soft drinks (if free refills are available only on those drinks) versus remaining on a high sugar drink without free refills.
- The impact SDIL has had on free refills, for example, whether it has led to an increase in the low sugar/ no sugar options on offer and whether there is a price differential between drinks subject to SDIL and those that are not.

- The actions restaurants may take in response to the restrictions, for example, would they introduce other types of promotions on these drinks, provide new drinks sizes, or simply remove this promotion.
- Any evidence on the costs businesses would incur due to the restrictions.

290. They were unable to provide such information to us.

291. In the absence of comprehensive industry data or other evidence to inform an estimate of the costs to business, we have based our assessment of the magnitude of impact on a high-level knowledge of the restaurant market acquired from desk-top research. This has led us to believe the costs to business will be low. Our reasoning is as follows:

a. Firstly, we expect the restriction on free refills to have a limited impact on OOH businesses revenues. We know that since the introduction of SDIL a number of soft drinks have been reformulated and there has been a shift in sales to lower-sugar soft drinks. We expect that most businesses that currently offer free refills already include low/zero sugar drinks. As a result, OOH businesses would still be able to use free refills as a promotional technique and would not need to remove the free refill offer entirely, but simply change the drinks it includes. We would expect this policy to shift some customer's choices towards low/zero sugar drinks to take advantage of the free refills offer. For those that still wish to consume a soft drink subject to SDIL, they will be able to purchase these in single portions. Both changes in behaviour can be reasonably expected to reduce calories consumed from beverages.

b. Secondly, the restrictions would only apply to large businesses and our understanding is that only a small proportion would be affected. Although the further stakeholder engagement did not provide information on the number of businesses and outlets that offer free refills it did confirm that a number of large businesses do not offer them in any of their outlets, specifically, Asda, Boots Greggs, McDonalds, Pret-a-manger and Sainsbury's. Based on desk-based research we are aware of 6 OOH businesses that offer free refills, set out in Table 19 with the number of outlets each business has. We realise it may be the case that other large businesses offer free refills.

Table 19: Businesses that offer free refills and the number of outlets for each business

Business	Number of UK outlets[45]
Five Guys	100
Harvester	180
Nando's	424
Pizza Hut Restaurants	260
Taco Bell	29
Toby Carvery	100

c. Thirdly, unlike retailers, the OOH businesses that are affected by the restriction would not face any additional product assessment costs. The SSBs subject to the free refills restrictions are only the drinks in scope of SDIL. Therefore, businesses that currently offer free refills would already have to assess the SSBs it sells to determine if they are in scope of SDIL.

292. The only costs we do expect businesses that offer free refills to incur are the time to familiarise themselves with the regulations and distribute the information to outlets, however we also expect these to be low. Using the same approach as we have to estimate the familiarisation costs for retailers, we

[45] MCA (2018) "UK Eating Out Market". Subscription required to view online.

can provide an illustrative estimate of the familiarisation costs we expect the OOH businesses that we are aware offer free refills to incur.

Estimate of familiarisation costs for applying regulations to free refills of SSBs

293. As with retailers, we assume that each business will have one manager at the head office who is responsible for understanding the regulations and making their stores aware of the changes, we assume this will take 10 hours. In practice this might take much less time for OOH businesses as it is a less complex regulation than the restrictions to volume promotions for retailers, in which case this would be an over-estimate.

294. We assume the wage for a manager in an OOH business will be similar to the wage of a manager at head office. We therefore use the median hourly wage rate for a manager of £21.00, uplifted by 30% to £27.30 to account for non-wage labour costs. Based on the 6 businesses that we are aware offer free refills we estimate that the total familiarisation costs for all of these businesses to be £1,638.

295. The manager at the head office is expected to pass the familiarisation information to each outlet manager. Again, we assume the wage of a store manager for a retailer is similar to the wage of an outlet manager for an OOH business. We therefore use the average hourly wage rate for a manager or director in retail and wholesale (store manager) of £13.12, uplifted by 30% to £17.10.

296. The number of outlets for each business in Table 19 are at the UK level, assuming the number of outlets scales with the population size we estimate that there are 921 outlets in England for these 6 businesses.

297. Assuming it takes one hour for the manager at the head office to pass the familiarisation information to the outlet manager we estimate that the total cost of distributing information between the head office and individual outlets is £15,871.

298. We also assume that every store will also have 2 employees in addition to the store manager responsible for understanding the regulations. We assume the employees will be briefed by the store manager. We assume that, on average, this will take one hour of employee and manager time.

299. We assume the wage for the additional employees in each outlet is similar to the wage for employees in a retailer. We therefore use the median hourly wage for stock control clerks and assistants, £10.72, and uplifted by 30% to £13.94. Our estimate for the total cost of this additional time spent on briefing store staff is £41,376.

300. Overall, we estimate that the total familiarisation costs for the OOH businesses that we are aware offer free refills is £58,885.

Total costs and benefits for applying regulations to free refills of SSBs

301. The estimate of familiarisation costs for the OOH businesses of £58,885 is very small relative to the total turnover of the businesses in question, given they are large businesses with outlets across the country. This is a one-off cost and we do not anticipate any significant additional, annual costs in relation to complying with this regulation.

302. As stated earlier, consumption of SSBs has been positively correlated with increased obesity and chronic diseases and is a significant contributor to free sugar consumption for children and young people. However, there is no data available to allow us to estimate the amount that is consumed via free refills of SSBs. Therefore, we are unable to meaningfully estimate the benefits of applying restrictions to free refills of SSBs. Due to this and the uncertainties and lack of evidence around the number of businesses and outlets that offer free refills, we have treated the estimate of familiarisation costs to be illustrative and have not included them in our central estimate of the costs to businesses or EANDCB. Instead, we treat the costs and benefits of restricting free refills of SSBs as non-monetised.

Costs to Government

Enforcement costs

303. To enforce the legislation, the promotion of these products will need to be checked as part of normal inspection visits. These are the primary method of enforcement used by local authorities and are carried out on the basis of a combination of risk and intelligence, which was highlighted through consultation. Given the difficulty in estimating the cost of enforcement if visits are done on an ad-hoc basis, we have assumed that a visit will be done once every 3.5 years[46].

304. There will be one-off transition costs to local authorities as trading standards officers familiarise themselves with the new regulations. According to the National Careers Service, a trading standards officer works around 38 to 40 hours per week and earns between £19k and £90k a year[47]. Using the midpoint of this range we estimate an hourly salary assuming a 39-hour working week, 5 weeks holiday and 8 days of bank holidays. Uplifting this hourly wage for 30% on cost implies the hourly cost of Trading Standards Office is £40.01. Assuming familiarisation and dissemination of information to other TSOs will take a total of three hours per Local Authority, we estimate that familiarisation costs for all 326 Local Authorities would be around £39k.

305. We have previously estimated, using ACS and IGD data, that there are approximately 22,310 relevant retail stores within in England, and 336 online retail buisnesess (this includes online only buisnessess and those with a online offering).

306. Assuming retail outlets are visited once every 3.5 years, we estimate there will be 6,754 visits per year. We estimate the additional time required at each outlet for paperwork-based checks is 15 minutes per inspection. By multiplying visits by time required and the uprated hourly wage of £40.01, we estimate that total staff costs for enforcement in retail stores are around £68k per annum. Wages are grown in real terms over time by projected GDP per capita growth which represents an increase in productivity and therefore opportunity cost[48].

307. We acknowledge that there will also be an additional burden on businesses in order to accommodate extra time during inspections. However, given the workload will fall predominantly on the TSO rather than an employee at the business, we have chosen not to monetise this potential cost to businesses.

308. Since ongoing enforcement costs are based on the number of stores subject to this regulation, any change to this number will impact on costs to local authorities. Furthermore, if businesses fail to comply with the regulation, then there may be additional costs through the issuing of sanctions. We assume full compliance with the regulations for the purposes of these costs. This is an unevidenced assumption as we are unable to determine the level of non-compliance in advance of the regulations being in place.

309. These costs were tested through the consultation and have been revised appropriately. Responses were limited but highlighted that the cost to local authorities should be reimbursed by the Government.

310. The Government will further consult on the detailed enforcement provisions for this policy in due course, to ensure a fair and proportionate enforcement regime is in place. This means the specific legislative apparatus and penalties for non-compliance will be tested with stakeholders. However, it is envisaged that this will not alter the estimated burden on enforcement officers as the general inspection requirements will remain. We will invite views through the enforcement consultation as to whether our estimates represent a fair assessment of the costs local authorities face. We will revise the IA and return to the RPC should we need to change the enforcement costs as a result.

311. The enforcement regime will be finalised when the Regulations are laid.

Monetised benefits

Health benefits consequent upon reduced consumption

[46] This is a plausible assumptions based on several webpages http://www.tradingstandardswales.org.uk/help/foodinspect.cfm and http://www.hullcc.gov.uk/portal/page?_pageid=221,52448&_dad=portal&_schema=PORTAL (all accessed 13/06/2018)

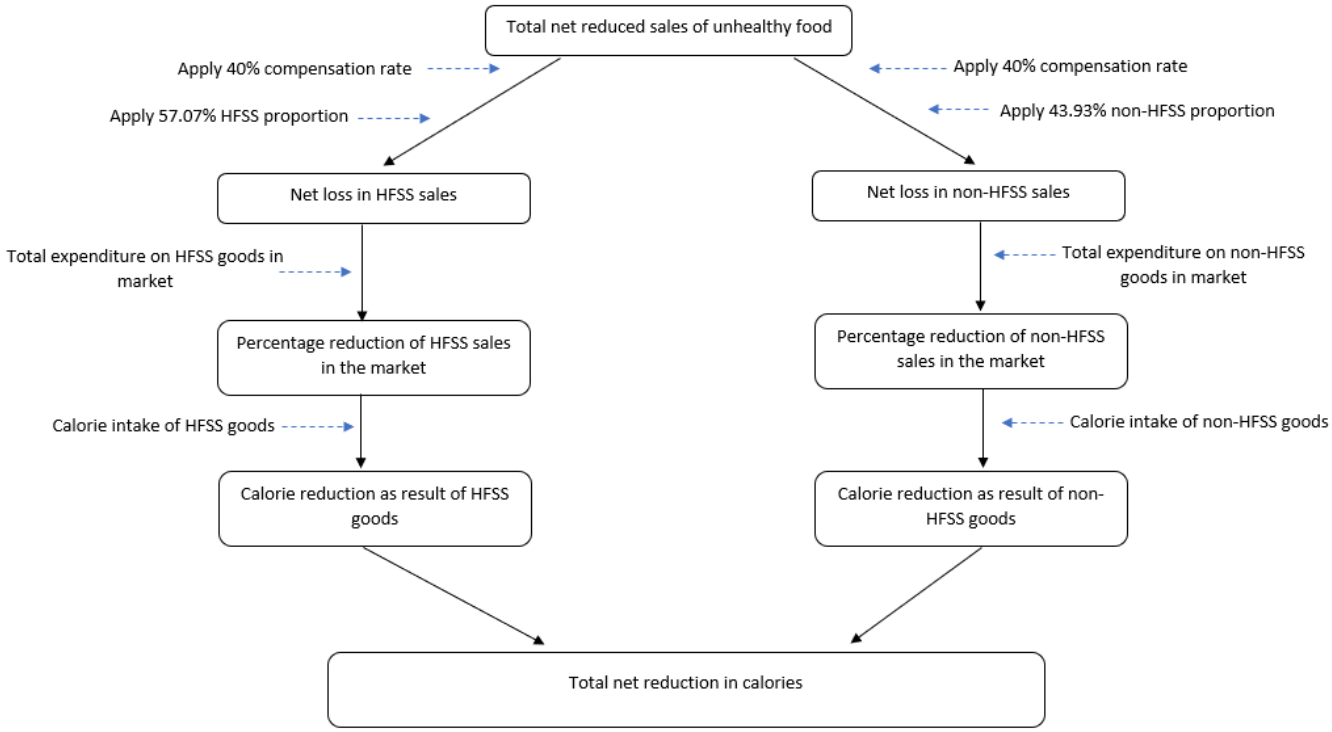
[47] Trading standards officer, National Careers Service (ND), https://nationalcareersservice.direct.gov.uk/job-profiles/trading-standards-officer (last accessed 05/03/2020)

[48] Office for Budget Responsibility (2017, November). Retrieved from http://cdn.budgetresponsibility.org.uk/Nov2017EFOwebversion-2.pdf , Up to 2022 and WebTAG 2022-2066 from OBR FSR Jan 17, table 1.1, published 17/01/2017 (adjustment made to convert from FY to CY), from 2023- 2027

312. The calculations of the quantified benefits (including QALYs) are done within the "DHSC Calorie Model". This model simulates a "control" group of would-be overweight and obese adult population, compared with an "intervention" group. The "intervention" group has a lower average BMI, as calculated from the reduced daily calorie intake. The simulation is over 25 years.

313. The average BMI determines the likelihood of the following six conditions associated with obesity, which in turn have a fatality rate and a reduced quality of life: type 2 diabetes, coronary heart disease, stroke, liver disease, colorectal cancer, and breast cancer. The savings to the NHS are calculated from the reduced treatment of each disease. Reductions in mortality are used to calculate the impact on economic output from an increased workforce. The costs of social care savings are calculated due to a reduced proportion of overweight, obese, and morbidly obese individuals and hence fewer people needing social care in the treatment scenario. Changes in QALYs are calculated from the reduced number of deaths and the reduction of people living with the diseases. These are then converted into monetised QALY using a conversion of how much society values a QALY. For a full description of the calculations and the set of assumptions see Annex A – DHSC Calorie Model and the DHSC Calorie Model Technical Consultation Document published alongside this document.

Figure 10 Estimating the health benefits of restricting volume promotions.



Text-only description:

Step 1: The net loss in sales is split into two parts, the net loss in HFSS and non-HFSS sales, taking into account the sales that are offset from volume promotions being replaced with temporary price cuts and changes in consumer behaviour and marketing techniques used by retailers.

Step 2: The loss in HFSS and non-HFSS sales is applied to the total expenditure of HFSS and non-HFSS products in the market, to calculate the percentage reduction in HFSS and non-HFSS sales.

Step 3: The percentage reduction in HFSS and non-HFSS sales is applied to the calorie intake of HFSS and non-HFSS products to calculate the calorie reduction from changes in consumption of HFSS and non-HFSS products, to get the net reduction in calories.

314. It is estimated that approximately 37.47% of all take home food and drink spend purchased falls under Option 1[49].

[49] An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, a research project for Public Health England conducted by Kantar Worldpanel UK, 2020. Availble here: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action
It is an update of Sugar Reduction: The evidence for action - Annexe 4: An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, Public Health England, 2015.

315. In the sections above, we estimate the net loss in sales, taking into account the sales that are offset from volume promotions being replaced with temporary price cuts and changes in consumer behaviour and marketing techniques used by retailers. We can split this by HFSS sales and non-HFSS sales, resulting in a net loss in HFSS sales (taking into account offsetting) of £111.2m and an increase in non-HFSS sales £24.7m per annum.

316. Using Kantar data, we calculated that the proportion of calories purchased that are HFSS and non-HFSS food and drink is 57% and 43% respectively. These proportions can then be applied the total GB expenditure on take home food and drink (adjusted for England to get £87.15bn) to get the number of sales that are HFSS (£49.7bn) and non HFSS (£37.4bn). We then divide the net loss in HFSS sales by the value of the market that is HFSS to get the percentage reduction in the HFSS market of 0.22%. Similar calculation is done for sales gain from non-HFSS products to get a percentage increase of 0.07%.

317. Using the proportion of calories purchased that are HFSS and non-HFSS we assume that 57% of an individual's calories consumed are HFSS, and 43% are non-HFSS. We then assume a 0.22% reduction to the HFSS calories consumed and a 0.07% increase in non-HFSS calories consumed, given an overall net reduction in calories consumed. This proportions are the same across age-gender subgroups.

318. The calculation uses mean daily calorie consumptions reported in the National Diet and Nutrition Survey (NDNS). The data suggests, for example, that most age-gender subgroups are not meeting the recommended number of calories per day. Given current obesity levels in the UK, it is evident that energy consumed must be under-reported in the survey. This is a common problem in all dietary surveys relying on self-reported food intake and therefore an adjustment of 32%[50] has been applied to the final calorie reduction.

319. The impacts for specific age-gender groups are displayed in Table 20.

Table 20: Current calorie consumption and expected reductions[51]

	Males				Females			
	4-10	11-18	19-64	65+	4-10	11-18	19-64	65+
Mean daily calorie intake (Source: NDNS)	1521	1933	2107	1838	1401	1617	1596	1491
Mean daily calorie intake (NDNS adjusted for under-reporting)	2008	2552	2781	2426	1849	2134	2107	1968
Calorie intake of HFSS goods	1146	1456	1587	1385	1055	1218	1202	1123
Calorie reduction from HFSS goods	2.56	3.26	3.55	3.10	2.36	2.72	2.69	2.51
Calorie intake of non-HFSS goods	862	1095	1194	1042	794	916	904	845
Calorie reduction from non-HFSS goods	-0.57	-0.72	-0.79	-0.69	-0.53	-0.61	-0.60	-0.56
Net calorie reduction	**1.99**	**2.53**	**2.76**	**2.41**	**1.83**	**2.12**	**2.09**	**1.95**

Results

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470175/Annexe_4._Analysis_of_price_promotions.pdf (last accessed 05/03/2020)

[50] This adjustment factor of 32% is the mean value from 221 data points where the doubly-labelled water test was used to determine the difference between actual calorie intake and recorded calorie intake. A Government Statistical Service perspective on official estimates of calorie consumption: 2019 update, Office for National Statistics, 2019.https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/methodologies/agovernmentstatisticalserviceperspectiveonofficialestimatesofcalorieconsumption2019update (last accessed 05/03/2020)

[51] Current mean daily calorie consumption is based on DHSC analysis of years 5-6 of the National Diet and Nutrition Survey. As discussed below, self-reported data such as the NDNS suffer from considerable underreporting.

320. Over 25 years, discounted health benefits through reduced mortality and morbidity are estimated at around 43,000 QALYS, or at £60,000 per QALY. Reduced morbidity would also result in reduced cost pressures to the NHS, resulting in NHS savings of £154m over the 25-year assessment period[52]. The health benefits to the population are estimated to be worth around £2,038m. Social care savings would amount to £181m and reduced premature mortality would be expected to deliver an additional £241m economic output through additional labour force participation. Further information on what is captured when calculating the different types of benefits in outlined in Annex A.

Table 21: Option 1: Monetised health benefits - figures discounted over 25 years

Benefit	NPV over 25Y (£m)
Monetised health benefit (QALYs at £60,000)	£2,038
NHS savings	£154
Social care savings	£181
Economic output	£241

Non-monetised benefits

321. There are a number of additional health benefits which we have either not been able to monetise and/or include in our assessment of the overall net present value of the policy. These are outlined in turn below:

Impact on consumers

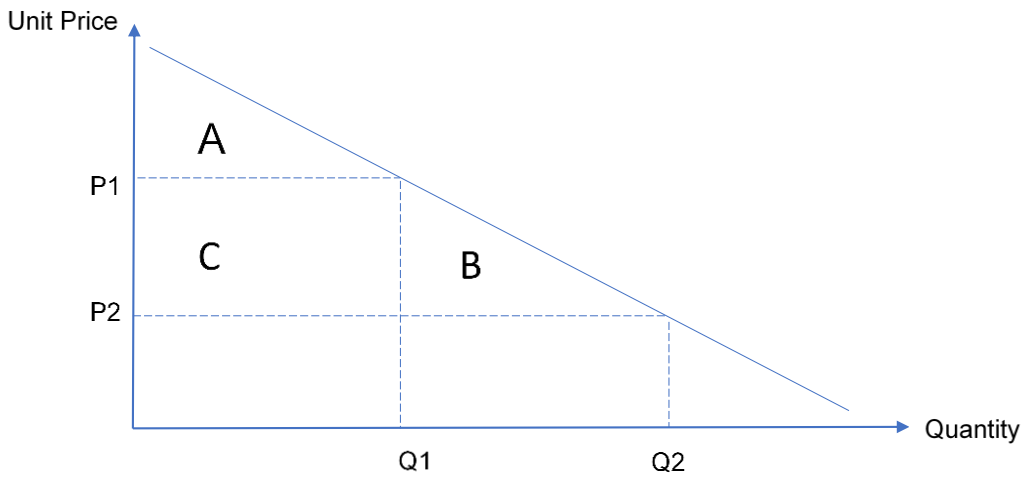
322. To assess the impact of these restrictions on consumers, we consider how the policy will affect consumer surplus. Consumer surplus describes the additional utility consumers gain from having a personal valuation of a product that is greater than the price they paid.

323. In economic terms, price promotions are an example of differential pricing, where businesses are able to segment the market into different groups of consumers and charge different prices to each group for the same product. This allows businesses to transfer some of the market's consumer surplus into additional revenue and profits. Volume promotions work on the same principle and allow retailers to increase revenues by splitting consumers into those who are willing to take part in promotions and those who are not. Individuals who take part in the promotion benefit from the lower price being offered and purchase more than they otherwise would have. Those who do not take part pay the higher full price and purchase less.

324. This is displayed graphically in Figure 9 below, where Q1 represents the quantity sold to individuals who do not take part in the promotion at the higher full price. The difference between Q1 and Q2 represents the additional quantity sold to consumers who take part in volume promotions. Areas A and B represent the consumer surplus for these two groups respectively, with area C being the additional revenue the retailer gains by segmenting the market. If the retailer offered the lower price P1 then it would sell the same quantity and area C would be converted into additional consumer surplus.

[52] To calculate the additional health benefits to the population from reinvesting savings back into the NHS we adjust the estimates produced by the modelling process in the sensitivity analysis.

Figure 11: Differential pricing and consumer surplus



325. Under the restrictions being considered in this Impact Assessment, individuals will no longer be able to buy HFSS products on volume promotion. If businesses did not change their pricing strategies, this would increase the price of HFSS goods and reduce consumer surplus. This would be represented by the loss of area B on Figure 9 above. However, as mentioned previously when discussing the impact on retailer profits, due to the competitive nature of the sector, we expect firms to use price cuts to promote HFSS items lowering average prices back down to their level before the restrictions. Switching to price cuts removes the need to purchase more in order to benefit from the discount, allowing both groups of consumers to take advantage of the lower price. This converts some of the retailer's revenue into additional consumer surplus.

326. As outlined previously, despite this switch from volume promotions to temporary price discounts we still expect a reduction in sales of HFSS products. Ordinarily this would represent a reduction in consumer surplus. However, as we assume average prices remain the same, consumers could continue to purchase the same quantity of HFSS items as before for the same cost if they desired. As a result, any reduction in sales must be from unwanted products that individuals were previously encouraged to buy as part of a volume promotion. This would suggest there is no loss in consumer surplus from reducing purchases of these products.

327. As discussed above, due to the competition in the grocery and food retail market we consider it reasonable to expect retailers to switch to price cuts following these restrictions and consider it most likely that price cuts would be used to reduce average prices to their level before the restrictions. However, we recognise that there is some uncertainty regarding the effect of the policy on individuals, with some people possibly losing out if certain products are not offered at a reduced price or to the level offered when products were on volume promotions. We did not receive evidence through the consultation or further stakeholder engagement on the products temporary price cuts would be used on or the how the size of the price cuts would vary between products. As a result, our assumption that there would be no loss in consumer surplus may not apply for all consumers. Although, it is likely that the impact of this is likely to be greater for lower income households who tend to spend a greater proportion of their incomes on food and drink than average[53].

Reformulation

328. As mentioned above, some manufacturers might respond to these restrictions by reformulating. If businesses were to reformulate or create new healthier products, this would lead to further indirect health benefits for consumers, however as the decision for a business to reformulate could be dependent on a number of factors including other active reformulation programmes, the benefits to consumers from reformulation could be as a result of a number of factors, not this policy alone.

[53] Family Food 2016/17, Department for Environment Food and Rural Affairs, 2018.
: https://www.gov.uk/government/publications/family-food-201617/summary

329. However, due to the uncertainties surrounding how much reformulation might take place we have not estimated the impact of any potential reformulation. Consequently, it is possible that the health benefits presented above are an underestimate.

Free refills

330. As mentioned above, free refills of SSBs are also restricted under Option 1. This restriction would reduce the consumption of SSBs, which would lead to further health benefits.

331. However, due to the uncertainties and lack of evidence on the current consumption of SSBs due to free refills, and the number of OOH businesses and outlets that currently offer free refills of SSBs, we have not been able to quantify the impact of this restriction. Consequently, it is possible that the health benefits presented above are an underestimate.

Productivity

332. The estimated economic benefits only estimate the additional economic output that would arise from avoiding obesity-related premature deaths, and hence losing the economic output of those individuals. However, preventing obesity related ill health will also result in a healthier workforce, which is likely to be more productive, take fewer sick days and reduce illness related to early retirement. This impact is not quantified in the model due to the difficulties in putting in parameters to quantify this improvement in productivity. We currently do not have strong evidence to justify these parameters and as a result remains unmonetized.

Reinvesting NHS savings back into the health service

333. As highlighted earlier, lower levels of obesity related ill health are expected to reduce demand for NHS healthcare compared to the counterfactual, generating cost savings for the health service and additional resources which can be used to treat patients. Given there are waiting lists for NHS treatments and demand for care overall is expected to continue to increase as the population ages, it seems likely that any spare capacity in the system would be backfilled with additional treatments. The estimated monetised value of the additional health benefits these treatments would generate is outlined in the sensitivity analysis section below. This would be an indirect benefit and be contingent on government spending decisions.

Summary of costs and benefits

334. It has not been possible to quantify every aspect of the proposed policy. The table below outlines the expected impact of the policy, with quantifications where currently possible. These impacts have been estimated over a 25-year assessment period.

Table 22: Summary of monetised costs and benefits – Option 1 (£m)

Group affected	Impact	Central estimate (£m)
Retailers	Transition - Familiarisation	-0.2
	Transition - HFSS assessment	-1.0
	Transition - Knowledge sharing	-1.5
	Transition- Changes to IT systems	-2.0
	Transition- Sharing information with staff (online businesses)	-0.02
	On-going - HFSS assessment	-6.3
	Lost profit	-49
Total retailer impact		**-60**
HFSS manufacturers	Lost profit - retail sales	-83
Total HFSS manufacturer impact		**-83**
Non-HFSS Manufacturers	Lost profit – retail sales	**18**

Total Non-HFSS manufacturer impact		**18**
Government	NHS savings	154
	Social care savings	181
	Familiarisation	-0.04
	Enforcement	-1.2
Total Government impact		**334**
Wider society	Health benefits	2,038
	Economic output	241
Total wider society impact		**2,279**
NPV		**2,488**

Option 2: End all volume offers for HFSS products which contribute the most sugar and calories to children's' diets and are of most concern for childhood obesity, in the retail sector small and micro businesses.

Cost to businesses

Transition Costs

335. Familiarisation costs to retailers are the same as calculated under Option 1, giving a central cost estimate of £0.2m.

336. The costs to retailers of assessing the nutritional content of products are unchanged from those estimated under Option 1. We estimate the product assessment cost will be £1m, having adjusted for double-counting between policies.

337. The cost is unchanged as we assume, they would assess all products, so the number of products in scope of the restrictions doesn't affect the amount of time it takes.

338. The distributing cost of sharing both the familiarisation and product assessment knowledge will cost approximately £1.5m.

339. The cost of updating websites will be the same as option 1, giving a central estimate of £2m.

340. Overall, the total transition costs for businesses in Option 2 is £4.6m.

On-going costs

341. The on-going cost to retailers of assessing the nutritional content of new and reformulated products is unchanged from those estimated under Option 1. This suggests on-going product assessment costs of around £21.5m and distribution of knowledge cost of £2.1m, making the total ongoing cost £23.6m over the 25-year appraisal period. To avoid double-counting we have deducted the equivalent costs occurred in the location restriction IA from the estimate in this IA. Therefore, the revised estimate for on-going costs to business is £6.3m. This is considered as a direct cost and therefore captured in the EANDCB.

Loss in retailer sales and profit

342. A potential loss in profit for retailers and manufacturers resulting from a restriction on volume promotions for all HFSS products as defined by the 2004/05 Nutrient Profile Model (NPM) was estimated under Option 1. As Option 2 focuses on more products the impact will be greater.

343. Evidence is not available to assess if consumer responses to promotions offered on HFSS products differ systematically in response to promotions on this subset of products. Therefore, the percentage impact on sales of these restrictions is assumed to be the same regardless of food and drink categories within HFSS products.

344. DHSC analysis of 2014 Kantar data suggests that around 58.44% of GB food sales fall under Option 2. We previously estimated that 80% of GB food sales under Option 1 would be considered HFSS by the 2004/05 NPM. This is revised to 62% under Option 2. Using these figures, we estimate that sales of the included products are worth £36.37bn per year and the net loss in sales once volume promotions are replaced by temporary price cuts is £201m per year, with direct loss in sales of £792m per year.

345. Using this figure and following the same methodology as outlined previously implies a reduction in sales of around £120m, taking in to account the 40% offsetting for consumer and retailer response. Applying a 3% profit margin, and England's 86.7% population adjustment, suggests annual net lost profits of around £3.13m.

346. In order to calculate the EANCB we only capture the direct cost to business. Using the same methodology as outlined in Option 1, the direct loss in retailer profit in England is around £20.6m.

347. Over the 25-year appraisal period, the total loss in retailer profit equals £59m, with the direct cost equalling £390m approximately.

Loss in manufacturer sales and profit

348. We previously estimated that restricting the use of volume promotions would reduce retailer sales by £792m per year. Applying the supermarket mark-up (52.2%), implies a direct loss in manufacturer sales of £519m. Applying the net profit margin and adjusting for the England population, implies a direct loss profit of approximately £27m per annum for manufacturers of HFSS products.

349. We previously estimated in paragraph 344 that restricting the use of volume promotions would cause a net reduction in retailer sales of £201m per annum, when accounting for the loss in sales offset by the switch to temporary price cuts. Sales are further offset by £80m as consumers purchase HFSS and non-HFSS products to compensate for loss in calories and due to alternative marketing strategies. Like in Option 1, using Kantar data we calculated the proportion of sales that are HFSS (57.07%) and non-HFSS (42.93%), resulting in the offset in retail sales that are HFSS and non-HFSS, £45.8m and £34.5m respectively.

350. Using the UK supermarket mark-up (52.2%), implies an offsetting to HFSS manufacturer sales of £30m and £23m for non-HFSS manufacturer sales. Applying a profit margin (6%) and adjusting the to the expected size of the English market, results in an offsetting of £1.6m for HFSS manufacturers and £1.2m to non-HFSS manufacturers.

351. Taking these offsets into account, the overall impact to HFSS manufacturers is a profit loss of £5.3m (£6.9m net reduction in profits without compensation - £1.6m). The overall impact on non-HFSS manufacturers is a gain of £1.2m. Hence, the overall net impact on manufacturers is a profit loss of £4.1m (£5.3m –£1.2m).

352. The direct loss to manufacturers would not take into consideration this offset in sales. The direct reduction in sales to retailers is £792m per annuum. Taking in to account the supermarket mark-up, the direct reduction in manufacturer sales is £519m. Applying the 6% profit margin and accounting for the England population size, the total direct reduction in manufacturer profits is approximately £27m.

353. Over the 25-year appraisal period, the net total lost profit to manufacturers would be approximately £78m, while the total direct lost profit would be £512m.

Non-monetised cost to businesses

354. As mentioned previously some manufacturers might respond to these restrictions by reformulating their products. The costs of any reformulation will likely vary substantially from one product to another, depending on the amount of changes that need to be made and the cost of alternative ingredients added to products.

355. As highlighted above, due to the commercial sensitive nature of the information we have not been able to gather any further estimates through stakeholder engagement. Furthermore, any effort by manufacturers to reformulate their products would only be pursued if the expected returns were greater than not doing so. As such, we would expect the benefits of reformulation to outweigh the costs to

retailers and manufacturers. The cost reformulation would also be considered as indirect cost, as there is no requirement under this policy for manufacturers to reformulate.

356. Other non-monetised cost to businesses are the same as those outlined in Option 1.

Costs to Government

Enforcement costs

357. The cost from DHSC covering the enforcement costs generated by this policy are considered equal to those estimated under Option 1, at £1.2m over the 25-year appraisal period, with familiarisation costs of £0.04m.

Monetised benefits

Health benefits consequent upon reduced consumption

358. It is estimated that approximately 58.44% of all take home food and drink spend purchased falls under Option 2[54].

359. In the sections above, we estimate the net loss in sales, taking into account the sales that are offset from volume promotions being replaced with temporary price cuts and changes in consumer behaviour and marketing techniques used by retailers. We can split this by HFSS sales and non-HFSS sales, resulting in a net loss in HFSS sales (taking into account offsetting) of £130.5m and an increase in non-HFSS sales £29m per annum.

360. Using Kantar data, we calculated that the proportion of calories purchased that are HFSS and non-HFSS food and drink is 57% and 43% respectively. These proportions can then be applied the total GB expenditure on take home food and drink (adjusted for England to get £87.15bn) to get the number of sales that are HFSS (£49.7bn) and non HFSS (£37.4bn). We then divide the net loss in HFSS sales by the value of the market that is HFSS to get the percentage reduction in the HFSS market of 0.26%. Similar calculation is done for sales gain from non-HFSS products to get a percentage increase of 0.08%.

361. Using the proportion of calories purchased that are HFSS and non-HFSS we assume that 57% of an individual's calories consumed are HFSS, and 43% are non-HFSS. We then assume a 0.26% reduction to the HFSS calories consumed and a 0.08% increase in non-HFSS calories consumed, given an overall net reduction in calories consumed. This proportions are the same across age-gender subgroups.

362. NDNS record the mean daily calorie intake of individuals, split by age groups and gender. The results of which can be seen in Table 23. However, due to NDNS underreporting we have adjusted our figures with an increase of 32%. Using the HFSS (57.07%) and non-HFSS (42.93%) market shares as before calculates our final calorie reductions from both categories of goods. These figures conclude a net reduction in calories as a result of this policy, as shown in the table below.

363. The impacts for specific age-gender groups are displayed in Table 23.

Table 23: Current calorie consumption and expected reductions[55]

	Males				Females			
	4-10	11-18	19-64	65+	4-10	11-18	19-64	65+

[54] An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, a research project for Public Health England conducted by Kantar Worldpanel UK, 2020. Availble here: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action
It is an update of Sugar Reduction: The evidence for action - Annexe 4: An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, Public Health England, 2015.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470175/Annexe_4._Analysis_of_price_promotions.pdf (last accessed 05/03/2020)

[55] Current mean daily calorie consumption is based on DHSC analysis of years 5-6 of the National Diet and Nutrition Survey. As discussed below, self-reported data such as the NDNS suffer from considerable underreporting.

Mean daily calorie intake (Source: NDNS)	1521	1933	2107	1838	1401	1617	1596	1491
Mean daily calorie intake (NDNS adjusted for under-reporting)	2008	2552	2781	2426	1849	2134	2107	1968
Calorie intake of HFSS goods	1146	1456	1587	1385	1055	1218	1202	1123
Calorie reduction from HFSS goods	3.01	3.82	4.16	3.63	2.77	3.20	3.15	2.95
Calorie intake of non-HFSS goods	862	1095	1194	1042	794	916	904	845
Calorie reduction from non-HFSS goods	-0.67	-0.85	-0.93	-0.81	-0.62	-0.71	-0.70	-0.66
Net calorie reduction	2.34	2.97	3.24	2.82	2.15	2.48	2.45	2.29

364. Over 25 years, discounted health benefits through reduced mortality and morbidity are estimated at around 51,000 QALYS, or at £60,000 per QALY. Reduced morbidity would also result in reduced cost pressures to the NHS, resulting in NHS savings of £180m over the 25-year assessment period[56]. The health benefits to the population are estimated to be worth around £2,390m. Social care savings would amount to £212m and reduced premature mortality would be expected to deliver an additional £283m economic output through additional labour force participation. Further information on what is captured when calculating the different types of benefits in outlined in Annex A.

Table 24: Option 2: Monetised health benefits - figures discounted over 25 years

Benefit	Central (£m)
Monetised health benefit	£2,390
NHS savings	£180
Social care savings	£212
Economic output	£283

Non-monetised benefits

365. There additional health benefits which we have either not been able to monetise and/or include in our assessment are the same as those highlighted in Option 1.

366. As mentioned previously, there is some uncertainty regarding the effect of the policy on individuals, with some people possibly losing out if certain products are not offered at a reduced price.

367. If businesses reformulated their products or created new healthier products, this would lead to further indirect health benefits for consumers as highlighted earlier. However, due to the uncertainties surrounding how much reformulation might take place we have not estimated the impact of any potential reformulation. Consequently, it is possible that the health benefits presented above are an underestimate.

Summary of costs and benefits

368. It has not been possible to quantify every aspect of the proposed policy. The table below outlines the expected impact of the policy, with quantifications where currently possible. These impacts have been estimated over a 25-year assessment period.

[56] To calculate the additional health benefits to the population from reinvesting savings back into the NHS we adjust the estimates produced by the modelling process in the sensitivity analysis.

Table 25: Summary of costs and benefits – Option 2 (£m)

Group affected	Impact	Central estimate (£m)
Retailers	Transition – Familiarisation	-0.2
	Transition – HFSS assessment	-1.0
	Transition – Knowledge sharing	-1.5
	Transition- Changes to IT systems	-2.0
	Transition- Sharing information with staff (online businesses)	-0.02
	On-going -HFSS assessment	-6.3
	Lost profit	-59
Total retailer impact		**-70**
HFSS manufacturers	Lost profit - retail sales	-100
Total HFSS manufacturer impact		**-100**
Non-HFSS Manufacturers	Lost profit- retail sales	22
Total non-HFSS manufacturer impact		**22**
Government	NHS savings	180
	Social care savings	212
	Familiarisation	-0.04
	Enforcement	-1.2
Total Government impact		**391**
Wider society	Health benefits	2,390
	Economic output	283
Total wider society impact		**2,673**
NPV		**2,916**

Equivalent annual net direct cost to business (EANDCB)

369. The direct costs have been included in the EANDCB, and only captures the activity occurring in the UK. These include:

- Familiarisation costs (includes cost of sharing information about the regulation with stores and cost of sharing information with IT professionals)
- Changes to IT systems
- Product assessment cost (initial and on-going cost)
- Sharing product assessment with individual stores (initial and on-going cost)
- Loss of sales and profit to retailers from removing volume promotions on HFSS products
- Loss of sales and profit to manufacturers of HFSS products

370. It has not been possible to quantify all direct impacts to businesses, and therefore the EANDCB does not include:

- Familiarisation costs for applying regulations to free refills of SSBs
- Loss in sales and profit to OOH businesses from removing free refills of SSBs

- Loss in sales and profit to manufactures of SSBs
- Loss in sales and profit to small and micro manufacturers and wholesalers

371. The costs to Government have not been included in these calculations as they are not a direct cost to business. Our assessment of EANDCB is £53.5m per year in 2019 prices and 2020 present value base year.

Option 3: End all volume offers for HFSS products which contribute the most sugar and calories to children's diets and are of most concern for childhood obesity, in the retail sector excluding micro businesses only.

Cost to businesses

372. The cost to business of Option 3 is calculated using the same methodology as Option 2 but it only excludes micro businesses. This will therefore place a cost on small businesses, in terms of both transition and on-going costs, that is not present in Options 1, 2 and 4. These are explained below.

Transition Costs

373. Transition costs to retailers are calculated using the same methodology as Option 2 but only excludes micro businesses compared to excluding both small and micro businesses. Hence, the estimated number of businesses and stores captured under this option has increased to approximately 6,364 businesses and 43,230 stores in England. Due to this increase in businesses, stores, and consequently number of products, the transition costs to business will be larger.

374. The familiarisation cost to businesses is calculated to be £1.74m. The product assessment cost is around £19m and distribution of knowledge cost will cost £3m, taking double counting into account between policies. The total transition costs are estimated to be £31.2m, of which £29m of this is borne by small businesses, based on small businesses' 92.5% revenue share in the market. The cost of updating websites will be the same as option 1, giving a central estimate of £7.7m.

On-going costs

375. The on-going cost to retailers of assessing the nutritional content of products as they are reformulated is calculated using the same methodology as Option 2 but with a greater number of businesses in scope, as we are now including small businesses. This suggests on-going product assessment cost, which will be incurred every two years, totalling to approximately £128m over the 25-year appraisal period. There will also be distribution cost of sharing this product assessment with retailers of approximately £4.2m, making the total on-going cost £128m over the 25-year appraisal period. To avoid double-counting we have deducted the equivalent costs occurred in the location restriction IA from the estimate in this IA. Therefore, the revised estimate for on-going costs to business is £102m. This is considered as a direct cost and therefore captured in the EANDCB.

376. Option 3 will therefore put an additional ongoing cost on small businesses of £96m, compared to Option 2 where they are not in scope of the policy.

Loss in retailer sales and profits

377. A potential loss in profit for retailers and manufacturers resulting from a restriction on volume promotions for all HFSS products as defined by the 2004/05 Nutrient Profile Model (NPM) was estimated under Option 2. As Option 3 includes a larger proportion of the retail market, the impact will be greater.

378. DHSC analysis of 2014 Kantar data suggests that around 58.44% of GB food sales would be fall under Option 3. We estimate that 62% of GB food sales under Option 3 would be considered HFSS by the 2004/05 NPM. Using these figures, we estimate that sales of the included products are worth £36.37bn per year and the net reduction in sales of the included products is £207m per year, with direct loss in sales of £816m per year.

379. Using this figure, the proportion of turnover of businesses in scope from IDBR[57] (96.7%) and following the same methodology as outlined in Option 2, implies a net reduction in sales of around £124m, taking in to account the 40% offsetting for consumer and retailer response. Applying a 3% profit margin and considering England's 86.7% share of the GB population suggests annual lost profits of around £3.23m.

380. To calculate the EANCB we only capture the direct cost to business. Using the same methodology as outlined above, the direct loss in retailer profit in England is around £21.22m.

381. Over the 25-year appraisal period, the total lost profit to retailers is £61m, with the direct loss in profit equalling £402m.

Loss in manufacturer sales and profit

382. We previously estimated that restricting the use of volume promotions would reduce retailer sales by £816m per year. Applying the supermarket mark-up (52.2%), implies a direct loss in manufacturer sale of £535m. Applying the net profit margin and adjusting for the England population, implies a direct lost profit of approximately £27.8m per annum for manufacturers of HFSS products.

383. We previously estimated in paragraph 378 that restricting the use of volume promotions would cause a net reduction in retailer sales of £207m per annum, when accounting for the loss in sales offset by the switch to temporary price cuts. Sales are further offset by £83m as consumers purchase HFSS and non-HFSS products to compensate for loss in calories and due to alternative marketing strategies. Like in Option 1 and 2, using Kantar data we calculated the proportion of sales that are HFSS (57.07%) and non-HFSS (42.93%), resulting in the offset in retail sales that are HFSS and non-HFSS, £47m and £36m respectively.

384. Using the UK supermarket mark-up (52.2%), implies an offsetting to HFSS manufacturer sales of £31m and £24m for non-HFSS manufacturer sales. Applying a profit margin (6%) and adjusting the to the expected size of the English market, results in an offsetting of £1.6m for HFSS manufacturers and £1.2m to non-HFSS manufacturers.

385. Taking these offsets into account, the overall impact to HFSS manufacturers is a profit loss of £5.4m (£7m net reduction in profits without offset - £1.6m). The overall impact on non-HFSS manufacturers is a gain of £1.2m. Hence, the overall net impact on manufacturers is a profit loss of £4.2m (£5.4m –£ 1.2m).

386. The direct loss to manufacturers would not take into consideration this offset in sales. The direct reduction in sales to retailers is £816m per annum. Taking in to account the supermarket mark-up, the direct reduction in manufacturer sales is £535m. Applying the 6% profit margin and accounting for the England population size, the total direct reduction in manufacturer profits is approximately £27.8m.

387. Over the 25-year appraisal period, the net total lost profit to manufacturers would be approximately £80m, while the total direct lost profit would be £527m.

Non-monetised cost to businesses

189. Non-monetised cost to businesses are the same as those outlined in Option 1 and 2. All assumptions regarding business costs have been applied to all businesses due to a lack of evidence on whether these would vary by size of business. It is possible that the costs experienced by small businesses will be proportionately different to those costs experienced by medium and large businesses.

Costs to Government

Enforcement costs

388. The cost from DHSC covering the enforcement costs generated under this option is estimated at £2.2m over the 25-year appraisal period, with transition costs of £0.04m. The methodology to calculate

[57] Business population estimates 2018, Department for Business, Energy and Industrial Strategy, 2018. https://www.gov.uk/government/statistics/business-population-estimates-2018 (last accessed 05/03/2020)

this cost is the same as outlined in Option 1 and 2, however there are 43,230 stores in scope under Option 3 compared to 23,304 in Option 2 and 1,323 online retail buisnesess (this includes online only buisnessess and those with a online offering).

Monetised benefits

Health benefits consequent upon reduced consumption

389. Like Option 2, it is estimated that approximately 58.44% of all take home food and drink spend purchased falls under Option 3[58].

390. In the sections above, we estimate the net loss in sales, taking into account the sales that are offset from volume promotions being replaced with temporary price cuts and changes in consumer behaviour and marketing techniques used by retailers. We can split this by HFSS sales and non-HFSS sales, resulting in a net loss in HFSS sales (taking into account offsetting) of £134.4m and an increase in non-HFSS sales £30m per annum.

391. Using Kantar data, we calculated that the proportion of calories purchased that are HFSS and non-HFSS food and drink is 57% and 43% respectively. These proportions can then be applied the total GB expenditure on take home food and drink (adjusted for England to get £87.15bn) to get the number of sales that are HFSS (£49.7bn) and non HFSS (£37.4bn). We then divide the net loss in HFSS sales by the value of the market that is HFSS to get the percentage reduction in the HFSS market of 0.27%. Similar calculation is done for sales gain from non-HFSS products to get a percentage increase of 0.08%.

392. Using the proportion of calories purchased that are HFSS and non-HFSS we assume that 57% of an individual's calories consumed are HFSS, and 43% are non-HFSS. We then assume a 0.27% reduction to the HFSS calories consumed and a 0.08% increase in non-HFSS calories consumed, given an overall net reduction in calories consumed. This proportions are the same across age-gender subgroups.

393. NDNS record the mean daily calorie intake of individuals, split by age groups and gender. The results of which can be seen in Table 26. However, due to NDNS underreporting we have adjusted our figures with an increase of 32%. Using the HFSS (57.07%) and non-HFSS (42.93%) market shares as before calculates our final calorie reductions from both categories of goods. These figures conclude a net reduction in calories as a result of this policy, as shown in the table below.

394. The impacts for specific age-gender groups are displayed in Table 26.

Table 26: Current calorie consumption and expected reductions[59]

	Males				Females			
	4-10	11-18	19-64	65+	4-10	11-18	19-64	65+
Mean daily calorie intake (Source: NDNS)	1521	1933	2107	1838	1401	1617	1596	1491
Mean daily calorie intake (NDNS adjusted for under-reporting)	2008	2552	2781	2426	1849	2134	2107	1968
Calorie intake of HFSS goods	1146	1456	1587	1385	1055	1218	1202	1123
Calorie reduction from HFSS goods	3.10	3.93	4.29	3.74	2.85	3.29	3.25	3.03

[58] An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, a research project for Public Health England conducted by Kantar Worldpanel UK, 2020. Availble here: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action. It is an update of Sugar Reduction: The evidence for action - Annexe 4: An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, Public Health England, 2015. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470175/Annexe_4._Analysis_of_price_promotions.pdf (last accessed 05/03/2020)

[59] Current mean daily calorie consumption is based on DHSC analysis of years 5-6 of the National Diet and Nutrition Survey. As discussed below, self-reported data such as the NDNS suffer from considerable underreporting.

Calorie intake of non-HFSS goods	862	1095	1194	1042	794	916	904	845
Calorie reduction from non-HFSS goods	-0.69	0.88	0.95	0.83	0.63	0.73	0.72	0.68
Net calorie reduction	2.41	3.06	3.33	2.91	2.22	2.56	2.53	2.36

395. Over 25 years, discounted health benefits through reduced mortality and morbidity are estimated at around 52,000 QALYS, or at £60,000 per QALY. Reduced morbidity would also result in reduced cost pressures to the NHS, resulting in NHS savings of £186m over the 25-year assessment period[60]. The health benefits to the population are estimated to be worth around £2,462m. Social care savings would amount to £219m and reduced premature mortality would be expected to deliver an additional £291m economic output through additional labour force participation. Further information on what is captured when calculating the different types of benefits in outlined in Annex A.

Table 27: Option 3: Monetised health benefits - figures discounted over 25 years

Benefit	Central (£m)
Monetised health benefit	£2,462
NHS savings	£186
Social care savings	£219
Economic output	£291

Non-monetised benefits

396. There additional health benefits which we have either not been able to monetise and/or include in our assessment are the same as those highlighted in Option 1 and 2.

Summary of costs and benefits

397. It has not been possible to quantify every aspect of the proposed policy. The table below outlines the expected impact of the policy, with quantifications where currently possible. These impacts have been estimated over a 25-year assessment period.

Table 28: Summary of costs and benefits – Option 3 (£m)

Group affected	Impact	Central estimate (£m)
Retailers	Transition – Familiarisation	-1.7
	Transition – HFSS assessment	-19
	Transition – Knowledge sharing	-2.9
	Transition- Changes to IT systems	-7.7
	Transition- Sharing information with staff (online businesses)	-0.1
	On-going - HFSS assessment	-102
	Lost profit	-61
Total retailer impact		**-194**
HFSS manufacturers	Lost profit - retail sales	-103
Total HFSS manufacturer impact		**-103**
Non-HFSS manufacturers	Lost profit- retail sales	23

[60] To calculate the additional health benefits to the population from reinvesting savings back into the NHS we adjust the estimates produced by the modelling process in the sensitivity analysis.

Total non-HFSS manufacturer sales		**23**
Government	NHS savings	186
	Social care savings	219
	Familiarisation	-0.04
	Enforcement	-2.2
Total Government impact		**403**
Wider society	Health benefits	2,462
	Economic output	291
Total wider society impact		**2,753**
NPV		**2,881**

Option 4: End all volume offers for HFSS products included in original list of categories consulted on in all retailers who sell food and drink in the retail sector excluding small and micro businesses

Cost to businesses

Transition Costs

398. Familiarisation costs to retailers are the same as calculated under Option 1 and 2, giving a central cost estimate of £0.2m.

399. The costs to retailers of assessing the nutritional content of products are unchanged from those estimated under Option 1 and 2. We estimate the product assessment cost will be £1m, having adjusted for double-counting between policies.

400. The distributing cost of sharing both the familiarisation and product assessment knowledge will cost approximately £2m.

401. The cost of updating websites will be the same as option 1, giving a central estimate of £1.5m.

402. Overall, the total transition cost to business under Option 4 is approximately £4.6m.

On-going costs

403. The on-going cost to retailers of assessing the nutritional content of new and reformulated products is unchanged from those estimated under Option 1 and 2. This suggests on-going product assessment costs of around £21.5m and distribution of knowledge cost of £2.1m, making the total ongoing cost £23.6m over the 25-year appraisal period. To avoid double-counting we have deducted the equivalent costs occurred in the location restriction IA from the estimate in this IA. Therefore, the revised estimate for on-going costs to business is £6.3m. This is considered as a direct cost and therefore captured in the EANDCB.

Loss in retailer sales and profit

404. A potential loss in profit for retailers and manufacturers resulting from a restriction on volume promotions for all HFSS products as defined by the 2004/05 Nutrient Profile Model (NPM) was estimated under Option 1. As Option 4 focuses on more products the impact will be greater.

405. Evidence is not available to assess if consumer responses to promotions offered on HFSS products differ systematically in response to promotions on this subset of products. Therefore, the percentage impact on sales of these restrictions is assumed to be the same regardless of food and drink categories within HFSS products.

406. DHSC analysis of 2014 Kantar data suggests that around 64.91% of GB food sales fall under Option 4. We previously estimated that 80% of GB food sales under Option 1 would be considered

HFSS by the 2004/05 NPM. This is revised to 62% under Option 4. Using these figures, we estimate that sales of the included products are worth £40.67bn per year and the net reduction in sales has a value of £224m per year, with direct loss in sales of £885m per year.

407. Using this figure and following the same methodology as outlined previously implies a reduction in sales of around £135m, taking in to account the 40% offsetting for consumer and retailer response. Applying a 3% profit margin suggests annual lost profits of around £3.5m, reducing the costs in proportion with England's 86.7% share of the GB population.

408. In order to calculate the EANCB we only capture the direct cost to business. Using the same methodology as outlined in Option 1, the direct loss in retailer profit in England is around £23m.

409. Over the 25-year appraisal period, the total loss in retailer profit equals £66m, with the direct cost equalling £436m approximately.

Loss in manufacturer sales and profit

410. We previously estimated that restricting the use of volume promotions would reduce retailer sales by £886m per year. Applying the supermarket mark-up (52.2%), implies a direct loss in manufacturer sale of £147m. Applying the net profit margin and adjusting for the England population, implies a direct lost profit of approximately £30.2m per annum for manufacturers of HFSS products.

411. We previously estimated in paragraph 407 that restricting the use of volume promotions would cause a net reduction in retailer sales of £224m per annum, when accounting for the loss in sales offset by the switch to temporary price cuts. Sales are further offset by £90m as consumers purchase HFSS and non-HFSS products to compensate for loss in calories and due to alternative marketing strategies. Like in Option 1, using Kantar data we calculated the proportion of sales that are HFSS (57.07%) and non-HFSS (42.93%), resulting in the offset in retail sales that are HFSS and non-HFSS, £51m and £39m respectively.

412. Using the UK supermarket mark-up (52.2%), implies an offsetting to HFSS manufacturer sales of £34m and £25m for non-HFSS manufacturer sales. Applying a profit margin (6%) and adjusting the to the expected size of the English market, results in an offsetting of £1.8m for HFSS manufacturers and £1.3m to non-HFSS manufacturers.

413. Taking these offsets into account, the overall impact to HFSS manufacturers is a profit loss of £5.9m (£7.7m net reduction in profits without compensation - £1.7m). The overall impact on non-HFSS manufacturers is a gain of £1.3m. Hence, the overall net impact on manufacturers is a profit loss of £4.6m (£5.9m –£ 1.3m).

414. The direct loss to manufacturers would not take into consideration this offset in sales. The direct reduction in sales to retailers is £886m per annuum. Taking in to account the supermarket mark-up, the direct reduction in manufacturer sales is £581m. Applying the 6% profit margin and accounting for the England population size, the total direct reduction in manufacturer profits is approximately £30.2m.

415. Over the 25-year appraisal period, the net total lost profit to manufacturers would be approximately £87m, while the total direct lost profit would be £572m.

Non-monetised cost to businesses

416. Non-monetised cost to businesses as the same as those outlined in Option 1, 2 and 3.

Costs to Government

Enforcement costs

417. The cost from DHSC covering the enforcement costs generated by this policy are considered equal to those estimated under Option 1 and 2, at £1.2m over the 25-year appraisal period, with transition costs of £0.04m.

Monetised benefits

Health benefits consequent upon reduced consumption

418. It is estimated that approximately 64.91% of all take home food and drink spend purchased falls under Option 4[61].

419. In the sections above, we estimate the net loss in sales, taking into account the sales that are offset from volume promotions being replaced with temporary price cuts and changes in consumer behaviour and marketing techniques used by retailers. We can split this by HFSS sales and non-HFSS sales, resulting in a net loss in HFSS sales (taking into account offsetting) of £150.2m and an increase in non-HFSS sales £33.4m per annum.

420. Using Kantar data, we calculated that the proportion of calories purchased that are HFSS and non-HFSS food and drink is 57% and 43% respectively. These proportions can then be applied the total GB expenditure on take home food and drink (adjusted for England to get £87.15bn) to get the number of sales that are HFSS (£49.7bn) and non HFSS (£37.4bn). We then divide the net loss in HFSS sales by the value of the market that is HFSS to get the percentage reduction in the HFSS market of 0.3%. Similar calculation is done for sales gain from non-HFSS products to get a percentage increase of 0.09%.

421. Using the proportion of calories purchased that are HFSS and non-HFSS we assume that 57% of an individual's calories consumed are HFSS, and 43% are non-HFSS. We then assume a 0.3% reduction to the HFSS calories consumed and a 0.09% increase in non-HFSS calories consumed, given an overall net reduction in calories consumed. This proportions are the same across age-gender subgroups.

422. NDNS record the mean daily calorie intake of individuals, split by age groups and gender. The results of which can be seen in Table 29. However, due to NDNS underreporting we have adjusted our figures with an increase of 32%. These figures conclude a net reduction in calories as a result of this policy, as shown in the table below.

423. The impacts for specific age-gender groups are displayed in Table 29.

Table 29: Current calorie consumption and expected reductions[62]

	Males				Females			
	4-10	11-18	19-64	65+	4-10	11-18	19-64	65+
Mean daily calorie intake (Source: NDNS)	1521	1933	2107	1838	1401	1617	1596	1491
Mean daily calorie intake (NDNS adjusted for under-reporting)	2008	2552	2781	2426	1849	2134	2107	1968
Calorie intake of HFSS goods	1146	1456	1587	1385	1055	1218	1202	1123
Calorie reduction from HFSS goods	3.46	4.40	4.79	4.18	3.19	3.68	3.63	3.39
Calorie intake of non-HFSS goods	862	1095	1194	1042	794	916	904	845
Calorie reduction from non-HFSS goods	-0.77	-0.98	-1.07	-0.93	-0.71	-0.82	-0.81	-0.75
Net calorie reduction	2.69	3.42	3.73	3.25	2.48	2.86	2.82	2.64

[61] An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, a research project for Public Health England conducted by Kantar Worldpanel UK, 2020. Availble here: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action.
It is an update of Sugar Reduction: The evidence for action - Annexe 4: An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, Public Health England, 2015.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470175/Annexe_4._Analysis_of_price_promotions.pdf (last accessed 05/03/2020)

[62] Current mean daily calorie consumption is based on DHSC analysis of years 5-6 of the National Diet and Nutrition Survey. As discussed below, self-reported data such as the NDNS suffer from considerable underreporting.

424. Over 25 years, discounted health benefits through reduced mortality and morbidity are estimated at around 58,000 QALYS, or at £60,000 per QALY. Reduced morbidity would also result in reduced cost pressures to the NHS, resulting in NHS savings of £208m over the 25-year assessment period[63]. The health benefits to the population are estimated to be worth around £2,752m. Social care savings would amount to £244m and reduced premature mortality would be expected to deliver an additional £325m economic output through additional labour force participation. Further information on what is captured when calculating the different types of benefits in outlined in Annex A.

Table 30: Option 4: Monetised health benefits - figures discounted over 25 years

Benefit	Central (£m)
Monetised health benefit	£2,752
NHS savings	£208
Social care savings	£244
Economic output	£325

Non-monetised benefits

425. There additional health benefits which we have either not been able to monetise and/or include in our assessment are the same as those highlighted in Option 1,2 and 3.

Summary of costs and benefits

426. It has not been possible to quantify every aspect of the proposed policy. The table below outlines the expected impact of the policy, with quantifications where currently possible. These impacts have been estimated over a 25-year assessment period.

Table 31: Summary of costs and benefits – Option 4 (£m)

Group affected	Impact	Central estimate (£m)
Retailers	Transition – Familiarisation	-0.2
	Transition – HFSS assessment	-1.0
	Transition – Knowledge sharing	-1.5
	Transition- Changes to IT systems	-2.0
	Transition- Sharing information with staff (online businesses)	-0.02
	On-going - HFSS assessment	-6.3
	Lost profit	-66
Total retailer impact		**-77**
HFSS manufacturers	Lost profit - retail sales	-112
Total HFSS manufacturer impact		**-112**
Non-HFSS manufacturers	Lost profit- retail sales	25
Total Non-HFSS manufacturer impact		**25**
Government	NHS savings	208
	Social care savings	244
	Familiarisation	-0.04
	Enforcement	-1.2

[63] To calculate the additional health benefits to the population from reinvesting savings back into the NHS we adjust the estimates produced by the modelling process in the sensitivity analysis.

Total Government impact		**451**
Wider society	Health benefits	2,752
	Economic output	325
Total wider society impact		**3,077**
NPV		**3,364**

Sensitivity and risk analysis

Interaction of policy effects

427. As mentioned previously, the estimates presented above consider the impact of restricting the placement of HFSS products in isolation to the other policies announced as part of the *Childhood obesity: a plan for action* or any possible future actions by government. It is recognised that there will be interactive effects between this policy and others being proposed or already enacted. However, no quantitative adjustment has been made. This section considers what form these interactive effects are likely to take, and what impact this might have both on reducing obesity and on imposing costs to business. We will continue to look at how these policies interact going forward.

Interaction with the Sugar Drinks Levy (SDIL)

428. The Soft Drinks Industry Levy[64] (SDIL) was introduced in 2018 and is a levy on manufacturers of soft drinks with added sugar. Many soft drinks have already been reformulated and sales shifted to lower-sugar soft drinks as a result of the levy and the average sugar content of drinks subject to the SDIL decreased by 28.8% between 2015 and 2018[65]

429. We considered whether this warrants explicit adjustment within the estimate of calorie reduction from the volume promotion restrictions . We decided it does not warrant explicit adjustment. From initial calculations based on a subset of Kantar data of 2,500 products showed that for our preferred option, only 2% of the products in Option 2 are part of SDIL. Given that calories in products have reduced 25% as a result of SDIL, the impact on calorie reduction would be less than 1%. We therefore have not adjusted for it in the main estimates, so that the modelling is streamlined.

Interaction with the Sugar Reduction Programme and Calorie Reduction Programme

430. As part of the *Childhood obesity – a plan for action* Public Health England are responsible for delivered voluntary sugar and calorie reduction and reformulation programmes with industry. These programmes aim to encourage food manufacturers to remove 20% of the sugar and calories in certain products. If successful, these schemes will make some HFSS products that are in scope of this policy healthier. If this happens it will mean the estimates of the benefits from this policy will be over-estimated. However, as these are voluntary policies and still in progress and are not due to be reported on until 2021 and 2025 respectively, we have not adjusted the calculations here to account for this.

Interaction with ban on sales of Energy Drinks to Under 16s

431. Chapter 3 of the Government's Childhood Obesity Strategy announced it will end the sale of energy drinks to under 16s. Ending the sale of energy drinks will have a very modest interaction with this policy. This is because it is assumed that most children will replace their purchases of energy drinks with soft drinks or spend it on other items in the economy. There is a small calorie decrease assumed from children switching from energy drinks to soft drinks; however, the overlap between this

[64] The Sugar Drink Industry Levy is a levy on soft drinks that are high in sugar. More information on the levy can be found here https://www.gov.uk/government/news/soft-drinks-industry-levy-12-things-you-should-know

[65] Sugar reduction: progress between 2015 and 2018, Public Health England, 2019. https://www.gov.uk/government/publications/sugar-reduction-progress-between-2015-and-2018 (last accessed 05/03/2020)

policy and the location restrictions is not considered to be significant; and any attempt to adjust for it would be disproportionate given the large number of assumptions that would be needed.

Interaction with restrictions on HFSS advertising

432. Promotions and advertising are two marketing strategies used by food and drink companies, and there will inevitably be some interaction. For example, one potential outcome of further advertising restrictions could be more investment in in-store promotions; including volume and location promotions. Government consulted in 2019 on introducing further advertising restrictions on TV and online for HFSS products. As part of the Tackling Obesity Strategy published in July 2020, Government announced that a 9pm watershed on TV for products high in fat, sugar or salt (HFSS) will be introduced and that we will consult on how to go further online and introduce a total online ban. Government committed to introducing TV and online restrictions together by the end of 2022. A Government response and final IA to the consultation is due to be published. This IA will consider the potential interaction between volume and location promotions.

433. This would also be the case for any future related regulatory policies, such as Front of Pack labelling, which was announced in the Government's Prevention Green Paper[66].

Sensitivity analysis

434. It is recognised that many of the calculations within this Impact Assessment currently only generate illustrative costs based on plausible assumptions. The specific choices of these assumptions can have a substantial impact on the final estimates. We have selected a few variables for sensitivity analysis based on the degree to which they are uncertain, and the extent to which they determine the direction and magnitude of the policy's NPV. These variables are:

- Consumers compensation behaviour
- Retailers' response to the regulation,
- The various factors underlying transitional cost calculations,
- The various factors underlying the lost profit calculations,
- The proportion of calories from included products.

435. The calculations performed below are for the costs and benefits of the preferred Option 2. Similar uncertainties exist around the figures calculated for all other options. As the same calculation methodology has been used across each option, we would expect the impact of variables differing from our central assumptions to be similar for all options.

Business costs

436. Transitional costs to retailers have been identified as one-off initial costs due to the need to assess whether products are considered HFSS and are included in the policy or not. These costs are defined as familiarisation, distribution of knowledge, IT costs and initial product assessment costs (on-going product assessment costs are outlined in Table 33). All costs are dependent on the time taken to assess products, the number of products requiring assessment and the wage costs of employees involved.

437. Additionally, we also consider the uncertainty in the number of businesses whose primary function is not to sell food. In the low and central scenario, we assume we capture all businesses in scope. Under the high scenario, we acknowledge that there may be some additional businesses whose primary function is not to sell food, but there is a possibility they do sell food on volume offer. Given the likely nature that many of these businesses do not sell food or drink we have captured these businesses in the high scenario and down weighted the number of businesses by 50%. These businesses include: retail sale of music and video recordings in specialised stores (47.63) and retail sale of games and toys in specialised stores (47.65). These additional businesses in the high

[66] Advancing our health: prevention in the 2020s – consultation document, Cabinet office and Department for Health and Social Care, 2019. https://www.gov.uk/government/consultations/advancing-our-health-prevention-in-the-2020s/advancing-our-health-prevention-in-the-2020s-consultation-document

scenario have not been factored into the cost to businesses with an online presence, as it is less likely that these businesses will sell food and drink on their online websites.

438. To calculate the number of medium and large businesses with an online offering, we have assumed that 60% of these businesses would have an online offering. This assumption is based on stakeholder engagement with 5 retailers and therefore is not a conclusive estimate representing the whole sector and has been adjusted in the table below. In the high scenario, we assume that 70% of retailers would have an online offering and in the low scenario 30%.

439. IT costs are calculated by multiplying the number of online only retailers and retailers with an online offering by the average wage of an IT professional and the time taken to make these changes. We have used the median, maximum and minimum percentiles for an IT professional's wage as detailed in the Annual Survey of Hours and Earnings[67] uprated for on-costs to perform sensitivity analysis on our estimates. Stakeholder engagement identified that it could take an IT professional 20-30 days to make these changes and implement them across their online system. We therefore have assumed that in the low scenario it would take 20 days (160 hours based on 8 hour working days) and in the high scenario 30 days (240 hours based on 8 hour working days) for an IT professional to make these changes.

440. For the retail sector, the high and low-cost scenarios have been adjusted according to the grey figures in Table 32. While there is a clear impact on costs faced by industry, these remain small relative to the benefits when considered over a 25-year assessment period.

Table 32: Varying transition cost assumptions, 25-year present values

Option 2	Low	Base case	High
Input: Number of businesses whose prime function isn't to sell food and drink	170	170	178
Input: Number of stores whose prime function isn't to sell food and drink	1,038	1,038	1,040
Input: Manager and director wage[68]	£13.18	£27.30	£64.73
Input: Number of employees	2	2	4
Input: Store Clerk wage	£10.95	£13.94	£20.93
Input: Knowledge sharing from HQ to store (hours)	0.5	1	2
Input: Time taken to share information within stores	0.5	1	2
Input: Products per chain	7,500/4,950/ 300	7,500/4,950/ 300	15,000/9,900/600
Input: Product Assessment time (hours)	0.5	0.5	1
Input: Proportion of retailers with an online offering	30%	60%	70%
Input: Time taken to make changes to IT systems	160 hours	200 hours	240 hours
Input: Uplifted wage of IT professional	£17.30	£29.10	£47.50
Familiarisation cost	£0.08m	£0.2m	£0.38m
Distribution of knowledge cost	£0.6m	£1.5m	£7.4m
Product assessment cost	£1.9m	£4.1m	£38.6m

[67] ONS (2018) Annual Survey of Hours and Earnings , Table 14.5 https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/occupation4digitsoc2010ashetable14 (last accessed 07/01/2019)

[68] All wages are sourced from the UK 2019 Annual Survey of Hours and Earnings (ASHE), which the 'low cost' representing the 10th percentile, 'base case' representing the median wage and 'high cost' representing the 90th percentile.

Total cost of making changes to IT systems	£0.9m	£2m	£3.8m
Total transition costs	**£3.5m**	**£7.6m**	**£50.2m**

441. The on-going cost to business must also be considered as it is also affected by the same assumptions as above. The figures for the low, base and high case have been adjusted according to the grey figures in Table 33 below.

442. As discussed in paragraph 202, stakeholders indicated that they tend to reformulate their products on cycles that range from anywhere from 6 months to 3 years, hence we have also tested this assumption in Table 33.

443. Likewise, while there is a clear impact on costs faced by industry, these remain small relative to the benefits when considered over a 25-year assessment period.

Table 33: Varying on-going cost assumptions, 25-year present values

Option 2	Low case	Base case	High case
Input: Frequency	3 years	2 years	1 year
Input: Store Clerk wage	£10.95	£13.94	£20.93
Input: Products per chain	7,500/4,950/300	7,500/4,950/300	15,000/9,900/600
Input: Manager and director wage	£13.18	£27.30	£64.73
Input: Retail manager wage	£11.65	£17.06	£36.47
Input: Product assessment time (hours)	1	1	2
Input: Uplifted wage of IT professional	£17.30	£29.10	£47.50
Total product assessment cost	£12m	£33.2m	£472.5m
Total distribution of knowledge	£1.7m	£3.3m	£21.7m
Total ongoing cost (discounted)	**£8.7m**	**£23.6m**	**£324.3m**

Proportion of products which fails the NPM

444. In the central estimate, we assume that 58% of all products are covered under option 2 and 62% of these products would fail the NPM. This is calculated by taking a subset of Kantar dataset of 2,500 products[69] and working with PHE to identify what proportion of these products failed the NPM. As this subset of Kantar dataset is of the top selling products, it may not be a true representation of the market, and have adjusted for the percentages in the table below.

Table 34: Varying the proportion of products that fail NPM

	Low	Central	High
Proportion of food sales that are covered in option 2	40%	58%	70%
Proportion of sales included in option 2 that fails the NPM	50%	62%	70%

[69] Some of these products were removed due to lack of nutritional content.

Manufacturer and retailer profits

445. To estimate the impact on profits for retailers and manufacturers we have first considered the retailers' response to regulation.

446. Instead of converting volume offers into price cuts, retailers could also decrease general prices to achieve the pre-regulation level[70]. This would result in higher costs for businesses and higher health benefits as can be seen in Table 35.

Table 35: Retailers decrease the general price level instead of switching to price cuts, 25-year present values

Option 2, £m	Central case	Reduction in price level
Input: Retailer price reduction	3.45%	1.78%
Retailer profit	-59.3	- 68.9
Manufacturer profit	-77.8	- 90.4
Total benefits	3,066	3,954

447. The base case modelling has assumed a 3% profit margin for retailers. With average profits varying by retailer, we vary the profit margins between 1% and 5% below. Results for each of these scenarios can be found in Table 36 below.

Table 36: Varying profit margins for manufacturers and retailers, 25-year present values

Option 2, £m	Low cost	Base case	High cost
Input: Profit margin retailer	1%	3%	5%
Retailer profit	-19.8	-59.3	-98.9
Input: Profit margin manufacturer	5%	6%	7%
Manufacturer profit	-64.8	-77.8	-82.7

448. We consider a case in which prices are not fully reduced. Although it is possible that retailers use price cuts to reduce prices below the current average price level, we have not considered this scenario, as explained above, this situation appears very unlikely due to the negative impact price cuts have on brand equity.

449. Overall, varying this assumption results in greater lost profit for retailers but higher health benefits (see Table 37).

Table 37: Varying the price reduction by retailers after promotions are banned, 25-year present value

Option 2, £m	Base case	High cost
Input: Retailer price reduction	3.45%	1.78%
Retailer profit	-59.3	- 68.9
Manufacturer profit	-77.8	-90.4
NHS savings	180	233
Social care savings	212	273
Health Benefits	2,390	3,083
Economic output	283	365

[70] To estimate the impact of a permanent change in the price level on demand for HFSS products, we use a report by Tiffin et al. This report was commissioned by the Department for Environment, Food and Rural Affairs to provide detailed evidence of how UK consumers' food and drink purchases respond to price changes. Taking the average of the 'fats' and 'sweets' food groups over this time suggests that HFSS products have a price elasticity of demand of -0.53.

450. We would also expect any compensation to decrease the costs of the policy. As a result, we have also assumed that the lost profit to industry decreases in proportion with the amount of calorie compensation, with all other costs remaining the same. The calorie compensation adjusted lost profit figures are presented below in Table 38.

Table 38: Option 2: Calorie compensation adjusted lost profit figures over 25 years

Group affected	**Low** (100% compensation)	**Central** (40% compensation)	**High** (0% compensation)
Retailers Lost profit	0	£59.3m	£98.9m
Manufacturers Lost profit	0	£77.8m	£129.7m

Adjusting for change in consumer and retailer responses

451. Our high NPV scenario assumes that consumers and businesses do not alter their behaviour over time. We have assumed that the compensation will act as an offsetting in sales, hence 40% of sales will be offset to account for uncertainty around consumers compensating their calories and businesses switching alternative marketing strategies.

452. We expect benefits from reduced consumption to fall in proportion with the level of compensation. For the central scenario, a 40% consumption rate means that the monetised health benefit is £3,066m. Similarly, the low NPV, which assumes 100% compensation behaviour, means the monetised health benefit is zero. The compensation-adjusted benefits are presented in the table below.

Benefits

453. In our calculations for Option 2 we estimate the proportion of calories purchased that are HFSS and non-HFSS food and drink is 57% and 43% respectively. The calorie reductions are sensitive to these estimates and are based on market data of the top selling products. Given this, the data may overestimate the number of HFSS products and therefore a sensitivity analysis has been applied.

Table 39: Varying the calorie purchased that are HFSS and non-HFSS

Option 2, £m	Low 100% compensation)	Central (40% compensation)	High (0% compensation)
Proportion of HFSS calories purchased	40%	57%	70%
Proportion of non-HFSS calories purchased	60%	43%	30%
NHS savings	0	180	525
Social care savings	0	212	615
Health Benefits	0	2,390	6,953
Economic output	0	283	822

454. It seems likely that any spare capacity in the NHS generated by lower levels of obesity related ill health would be backfilled with additional health treatments. This would be an indirect benefit and be contingent on government spending decisions.

455. To calculate the health benefits to the population from reinvesting savings back into the NHS we adjust the NHS savings estimates produced by the modelling process outlined in Annex A. At the margin, it is estimated that the NHS can purchase a QALY for £15,000, which in turn is then valued at £60,000 by society. Therefore, dividing the yearly NHS savings by this figure and multiplying by society's valuation of a QALY allows us to estimate the additional health benefits these savings would generate. The additional health benefits are then discounted at 1.5% in accordance with the standard practice

outlined in the HMT Green Book. It is the Department's policy to consider the opportunity cost of the spending, as this could represent a displacement from the fixed NHS health budget and therefore has been captured in the sensitivity analysis.

456. The potential benefits of reinvesting these health costs compared with the base scenario of no reinvestment, are shown in Table 40.

Table 40: Varying the key paraments in the health benefit calculations

	Base Case (monetary value of NHS savings)	**High Scenario** **(value of NHS savings assuming they are reinvested in health care)**
NHS Cost Savings (£m)	180m	944m

NPV

457. By varying the key assumptions in calculating the costs and benefits detailed above simultaneously, we can estimate a range for the Net Present Value (NPV).

458. It's not thought likely that these situations would occur, but they can give some indication as to the extremes of the expected outcomes. The table below presents the range of estimates for the NPV for Option 2, as estimated over a 25-year assessment period, on an England only basis. The product assessment cost for location promotions have been deducted from the figures below to avoid double counting.

459. The table shows that if we assume high costs (high scenario) and medium impact (central scenario benefits), the policy will still generate a positive NPV of £2,729m. In the high cost (high scenario), low impact (low scenario) there would be a negative NPV of -£6m.

Table 41: Summary of costs and benefits – Option 2 (£m)

Group affected	**Impact**	**Low estimate**	**Central estimate**	**High estimate**
Retailers	Transition – Familiarisation	-0.08	-0.2	-0.4
	Transition – HFSS assessment	-0.5	-1	-9
	Transition – Knowledge sharing	-0.5	-1.5	-7.4
	Transition- Changes to IT systems	-0.9	-2.0	-3.9
	Transition- Sharing information with staff (online businesses)	-0.01	-0.02	-0.04
	On-going - HFSS assessment	-2.4	-6.3	-85.4
	Lost profit	0	-59	-99
Total retailer impact		**-4**	**-70**	**-205**
HFSS manufacturers	Lost profit - retail sales	0	-100	-130
Total HFSS manufacturer impact		**0**	**-100**	**-130**
Non-HFSS manufacturer	Additional profit- retail sales	0	22	0
Total non-HFSS manufacturer impact		**0**	**22**	**0**
Government	NHS savings	0	180	525
	Social care savings	0	212	615
	Familiarisation	-0.04	-0.04	-0.04
	Enforcement	-1.2	-1.2	-1.2
Total Government impact		**-1**	**391**	**1,139**
Wider society	Health benefits	0	2,390	6,953
	Economic output	0	283	822
Total wider society impact		**0**	**2,673**	**7,775**
NPV		**-6**	**2,916**	**8,579**

Optimism Bias

460. We did consider including an optimism bias to our calculation of the costs for each option. However, the generic optimism bias adjustment percentages included in the HMT Green Book do not include a spending category that is closely related to the costs for this policy. In addition, we did not receive anything in response to the consultation to suggest an appropriate optimism bias adjustment percentage.

461. As a result, we have not adjusted the costs of each option to account for optimism bias, but, as set out above, we have considered several the costs in our sensitivity analysis to reflect the uncertainty around our assumptions.

Specific Impact Tests

Small and Micro Business Assessment

462. This section considers the estimated impact specifically on small and micro businesses in Option 2. There are three parts to this section:

- costs to symbols
- costs to manufacturers, wholesalers and ingredient suppliers
- costs to small and micro businesses out of scope.

463. The first part of this section considers the estimated impact specifically on small and micro businesses under option 2. Small and micro businesses captured in this option would be symbol stores (see paragraph 152 and 162). It is possible that small and micro manufacturers, wholesalers and ingredient suppliers are captured in this option, and potential impact to these businesses are outlined in the second part of this section.

464. The third part of this section considers what the impact would have been on small and micro businesses who are currently out of scope of Option 2 and why they have been excluded.

Cost to small and micro businesses that belong to Symbols groups

465. Small and micro retailers are excluded from the proposed regulations (except for symbols) as they bear disproportionate cost burdens.

466. To our understanding, although individual symbol stores may be classified as small or micro businesses, symbols are more similar to larger supermarkets as promotional guidance and support is accessible to them through their ‘head office’, mitigating some of the policy implementation costs for these businesses. The regulation would therefore be less burdensome on stores who are part of a symbol group compared to other micro and small businesses in the sector

467. The calculations below consider the costs under our central estimate and our preferred Option 2, taking a more detailed look at the impact on symbols:

- Transition costs to retailers associated with familiarisation and the assessment of products
- On-going costs for product assessment
- Retailer lost profits arising from the sale of HFSS products
- Profits for manufacturers of HFSS products

468. The calculations in this section do not take into account the double counting of product assessment costs as a result of the location promotion restrictions in order to see the impact on small and micro symbol stores as a result of this policy. The cost to small micro businesses as a result of the location restrictions is smaller as less businesses are in scope compared to these restrictions (location

promotions has a floor size restriction, therefore stores below 2,000 sq.ft are out of scope, where all stores regardless of size will be in scope of this policy).

Table 42: Summary of costs

Option 2	All symbols	Cost per symbol HQ	Cost per store
Transition costs	£0.9m	£4.4k	£62
On-going costs	£1.5m	£22k	£90
Lost retailer profit	£2.7m	£0.18m	£203
Total	**£5.2m**	**£0.24m**	**£355**

Transition costs

469. Transition costs fall on both the Symbol HQ of the business and the store. On average we assume that each of the 15 symbol businesses have 896 stores, so a total of 13,433 symbol stores in scope of our policy.

470. The transition costs falling on a symbol business' HQ are a familiarisation cost, a product assessment cost and a distribution of information cost. Firstly, head office managers familiarise themselves with the new regulation, costing one symbol business a total of £273. The head office will then need to assess products to establish which products the new restrictions will affect, costing one symbol businesses a total of £4,095. Both the familiarisation and product assessment knowledge will then need to be passed to store managers, costing one symbol businesses a total of £27 and a symbol store £17. Symbol stores will then incur a distribution of knowledge cost, from distributing the information to store employees, costing one symbol store a total of £45.

471. The summarised total transition costs to both symbol businesses and their individual stores are above in Table 42.

Ongoing costs

472. The on-going costs, that symbols would incur every two years, can again be split in to the cost to business HQ and their individual stores, the results of which are summarised above in Table 42.

473. The on-going cost to symbol businesses' HQ would be a product assessment cost and then a distribution of this knowledge to symbol store managers. This would cost one symbol business' HQ a total cost of £22k over the 25-year appraisal period.

474. This knowledge would then need to be shared with individual stores, costing one symbol business' HQ a total cost of £144 and the symbol store £90 over the 25-year appraisal period.

Retailer profits

475. Symbols represent 15 business and 13,433 stores, which represent 6% of the market, in terms of revenue. Taking this proportion and the total lost profit to retailers, we can conclude that the approximate total lost profit for symbol businesses is £2.7m over the 25-year appraisal period. This is approximately £0.18m per business and £203 per store.

Profits for manufacturers of HFSS products

476. Small and micro manufacturers have not been excluded from our policy, and therefore could be impacted from policy. The current estimated profit loss to manufacturers is £78m, calculated buy a profit loss of £100m to HFSS manufacturers, but a potential offsetting of this by a gain to non-HFSS manufacturers of £22m. However, it is not currently clear what proportion of HFSS items sold in retailers are sourced from small and micro manufacturers.

477. Stakeholder engagement indicated that the majority of manufacturers that supply products to medium and large retailers would also tend to be medium and large manufacturers. There may be a small number of cases where micro and small manufactures supply medium and large supermarkets, but we are unable to quantify this.

Cost to small and micro manufacturers, wholesalers and ingredient suppliers

Product assessment costs

478. Although in option 2, we highlight that our calculations have assumed that the costs of adjusting to these restrictions would be felt by retailers. It is possible that retailers would attempt to pass this cost on to manufacturers. Retailers may need nutrition information from manufacturers to understand whether a product is in scope, and may pass the task of assessing a product to manufacturers. Any small or micro manufacturers working with retailers in scope of option 2 may be affected if costs of understanding whether a product is HFSS or not is passed to them. We have not been able to quantify this impact as it is unclear whether retailers will pass the cost to manufacturers and no further evidence was provided through the consultation or further stakeholder engagement.

Loss in sales and profit

479. Stakeholder engagement identified that 37% of retailers work with 'smaller' suppliers. This estimate is based on the proportion of suppliers whose products generate less than £250k in sales. This definition of 'small' suppliers could include larger manufacturers as the size of the businesses is based on FTEs. This estimate is also based on feedback from one retailer, so it is not clear whether other larger retailers work with the same number of 'smaller' suppliers. Another retailer provided a similar estimate, but did highlight that their estimate included medium manufacturers. Given the uncertainties with this estimate and stakeholders not being able to share the number of small and micro manufacturers they work with, this assumption has been downweighed to 20% and has not been factored into the main analysis. The downweight is not based on any evidence but captures the limitations in the evidence. We do not have any evidence to suggest whether 20% is a realistic assumption, however as the estimate provided by retailers included larger manufactures, a downweight seemed approporiate.

480. In option 2 we assume there are 557 businesses in scope of the policy, if we assume 20% of those work with small and micro manufacturers, the gives an estimate of 111 businesses. Following stakeholder engagement, we were not able to identify what proportion of loss profit would fall on small and micro manufacturers. In option 2, it is estimated that the net loss in profit to manufacturers is £78m across the 25-year appraisal period. We assume that majority of medium and large retailers work with larger manufacturers. Without any further evidence, we have assumed that 20% of loss profit to manufacturers could fall on small and micro manufacturers, given a net loss profit of £16m. This calculation assumes that the retailer mark-up and the profit margins would be the same for small and micro manufacturers as for medium and large manufacturers, as outlined in option 2.

481. As outlined earlier, there could be an impact on wholesalers as the reduction in sales of HFSS products would reduce their profits. This would be a direct cost as a result of the policy but would only apply if small and micro retailers are in scope. Stakeholders have highlighted that larger manufactures will work directly with retailers, and therefore wholesalers are not usually part of the supply chain. However, if smaller manufacturers do supply larger supermarkets it is possible that there could be a potential cost to wholesales. Stakeholder engagement highlighted that in instances where larger retailers work with small and micro manufacturers, the supply chain could vary from smaller manufacturers being part of active programmes to attract challenger brands or supply could be localised to a couple of stores. Due to commercial sensitivity of the data, stakeholders were not able to share information on the 1:1 business relationship. As we were not able to gather any further information, the impact on small and micro wholesalers has not been quantified.

482. There could also be an impact to small and micro ingredient suppliers who supply manufacturers affected by this policy, as the reduction in sale of HFSS products would reduce their profits. As outlined above, the impact on ingredient suppliers is a second order effect and out of scope of the EANDCB, and therefore we do not think its proportionate to monetise this impact. In addition, for small and micro ingredient suppliers we do not have data on the number of small and micro ingredient suppliers working with manufacturers affected by this policy. It is possible that these businesses may be disproportionally impacted by the policy, however, we do not have the data to quantify this impact .

Cost to small and micro businesses out of scope of option 2

483. Whilst consultation responses highlighted the need for an even playing field, those representing smaller businesses said that the policy could disproportionately impact small businesses which the estimate below highlight. Stakeholders explained that, compared to large businesses, the policy could be more burdensome for small and micro businesses to:

- familiarise themselves with the new regulation;
- assess which products are in scope of the restrictions; and
- implement the policy.

484. Following this consultation feedback, we recognise that the small businesses might find the requirement more challenging and burdensome and therefore are exempted from the restriction. The analysis below highlights the potential cost to small and micro businesses if they were in scope of option 2.

485. Small and micro businesses with the exception of symbols are excluded from the proposed regulations. These businesses represent 13% of the turnover of the market and consist of 42,461 micro businesses and 4,714 small businesses. In addition, using the same methodology as outlined in option 2, there would be an additional 7,815 micro businesses and 1,093 small businesses that are non-food retailers who sell HFSS products. As outlined in the 'Interactions with location promotion restrictions' section, many businesses captured under this policy are also in scope of the location restrictions, therefore the product assessment costs have been adjusted in this IA to avoid double counting with the costs in the location promotions IA.

Familiarisation

486. As with all other businesses in scope of option 2, we would assume that each small and micro business would take 10 hours to familiarise themselves with the regulations and businesses with an online offering will take an additional 0.5 hours.

487. Using the same methodology outlined in option 2, we estimate that there are around 56,583 small and micro businesses out of scope. We also assume that 17%[71] of these businesses would have an online offering and therefore our central estimate using the median average wage indicates that familiarisation cost to business will be £15.5m.

488. There would be additional cost to these businesses passing information to store managers and IT professionals. We estimate the cost of sharing this information to be £3.3m using the same methodology outlined in option 2. We have assumed that information on what products can be on volume promotion (following product assessment at a head office level) will also be shared at the same time.

Product assessment

489. In order to assess whether a product is in scope of the regulation, an individual assessment is required. In the main analysis, we have assumed that it would take 30 minutes per product to assess and record the outcome. The cost will depend on the number of products stocked by each business. For stores that aren't supermarkets, we assume they will stock 1,000 products. Applying the 30%[72] assumption to those products, as not all food and drink products will need to be assessed, we assume that 300 products will need to be assessed.

490. As we assume product assessment is conducted at a business level, we use the uplifted managers wage of £27.30[73] and calculate a cost per business of approximately £4k, or a total cost of £231.7m across 56,583 businesses out of scope (breakdown in Table 7**Error! Reference source not found.**). This is revised down to £213.3m when factoring in double counting from the locations policy. We assume this information would be shared with individual stores at the same time as they are briefed about the regulation by the business manager. We have assumed that businesses whose primary

[71] ACS (2020) *The Local shop report.* Available online: https://www.acs.org.uk/sites/default/files/acs_local_shop_report_2020.pdf (Accessed 08/10/2020)

[72] Kantar panel data of 30,000 housholds

[73] Annual Survey of Hours and Earnings, Provisional 2019 (provisional) data (https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/occupation4digitsoc2010ashetable14)

function is not to sell food would not have to calculate the NPM score as it would be more apparent what is HFSS and what is not due to the limited range of food products.

Distributing information

491. We assume that every store will also have 1 manager and 2 employees responsible for understanding the regulations. We assume that, on average, this will take one hour. By multiplying the hourly wage for a 'stock control clerks and assistant' and the hourly wage of 'manager or director in retail and wholesale' with the number of stores out of scope (73,145 stores outlined in **Error! Reference source not found.**), the central estimate is £2.8m.

Changes to online offering

492. For businesses with an online offering, retailers need to re-plan website layouts so HFSS items are no longer on volume promotions. As highlighted in option to, in the central scenario we assume that it would take 25 days (200 hours based on 8 hour working days) for an IT professional to make these changes, giving an estimate of £56m, across 9,619 businesses out of scope (assuming 17% of small and micro businesses have an online offering).

On-going product assessment cost

493. The on-going cost of product assessment, following new products that come into the market or products that are reformulated, also falls on the businesses rather than the individual store. This would cost £215m every two years to businesses out of scope, or £1,338m over the 25-year appraisal period.

Retailer profits

494. Small and micro retailers out of scope make up 13% of the turnover from the sector, but include 56,583 businesses and 73,145 stores. Using the same methodology outlined in option 2, these businesses could experience a reduction in direct profits of £2.82m per year and a net reduction in profits of £0.43m per year.

Table 43 Summary of costs to small and micro businesses out of scope of option 2

Option 2	Total cost over 25-year appraisal period
Transition costs	£291m
On-going product assessment costs	£1,338m
Net lost retailer profit	£8m
Total	£1,637m

Equality Test

495. To assess the potential impact of the proposed polices against the governments duties under the Equality Act 2010 a separate Equality Analysis[74] has been produced. This considers the effect of all the policies being considered as part of the second chapter of the governments' childhood obesity plan. An Equalities Assessment for this policy will be published alongside this final IA.

[74] Childhood obesity: a plan for action, chapter 2, Department for Health and Social Care, 2018. https://www.gov.uk/government/publications/childhood-obesity-a-plan-for-action-chapter-2 (last accessed 05/03/2020)

Inequality Test

496. A consideration has been made to consider the Secretary of State for Health and Social Care's duty to reduce inequalities with respect to benefits from the health service (under section 1C of the NHS Act 2006).

497. Included in *Childhood obesity - a plan for action: Chapter 2*, is a commitment to significantly reduce the gap in obesity between children from the most and least deprived areas by 2030. The best data source for inequalities in childhood obesity is the National Child Measurement Programme, which measures children in reception and in year 6. The latest data shows us that obesity rates are significantly higher in more deprived areas of the UK at reception and year 6. Furthermore, the obesity rate inequality gap grows as children move from reception to year 6 and both years' gaps in obesity prevalence have increased significantly over the last 12 years.

Table 44 Childhood obesity prevalence by deprivation [75]

Obesity Rate Prevalence by IMD2015 Decile				
		Most Deprived	Least Deprived	Gap
4-5 years old	2006/07	12.3%	7.1%	5.1%
	2018/19	12.9%	6.4%	6.5%
10-11 years old	2006/07	21.5%	12.1%	9.4%
	2018/19	26.9%	13.0%	13.9%

498. We believe the way in which multi-buy offers are used only differs slightly across all socioeconomic groups. The evidence for this is outlined below.

499. Demographic information in Kantar's report[76] on price promotions shows that households with children spend more on promotions compared to those without, however the difference is quite small. This could be as a result of discount stores increasing their market share-especially among families. Differences between more affluent (ABC1) and less affluent (C2DE) occupational grades are that those in the ABC1 group spend slightly more on promotions than C2DE group, however the differences are small. A summary of these findings is shown in Figure 10 below.

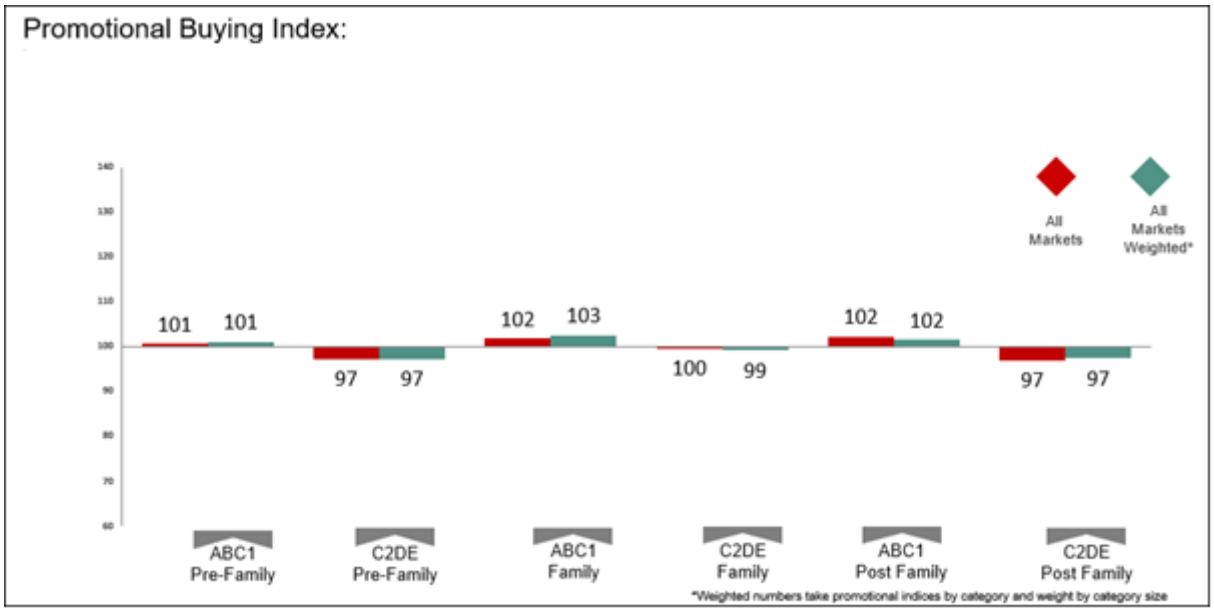
500. Overall, given the differences are small, this suggests that promotions appeal to people from all demographic groups, with the way in which they are used being similar across all groups. This is also supported by the findings of a recent report by Food Standards Scotland, which found that there was "*little or no difference in the proportion of energy purchased on promotion according to the household Social Index of Multiple Deprivation (SIMD) quintile*"[77].

[75] 2006/07 data based on PHE analysis of National Child Measurment Programme. 2018/19 data is available here: https://digital.nhs.uk/data-and-information/publications/statistical/national-child-measurement-programme/2018-19-school-year

[76] An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, a research project for Public Health England conducted by Kantar Worldpanel UK, 2020. Availble here: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action.
It is an update of Sugar Reduction: The evidence for action - Annexe 4: An analysis of the role of price promotions on the household purchases of food and drinks high in sugar, Public Health England, 2015.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470175/Annexe_4._Analysis_of_price_promotions.pdf (last accessed 05/03/2020)

[77] Foods and drinks purchased into the home in Scotland using data from Kantar Worldpanel, Food Standards Scotland, 2016.
http://www.foodstandards.gov.scot/downloads/Food_and_Drinks_Purchased_into_The_Home_in_Scotland_report.pdf (last accessed 05/03/2020)

Figure 12 Demographic social class and life stage biases towards promotional purchasing for total food & drink



501. Figure 11 below highlights that less affluent shoppers are less likely to buy products on promotions compared to those with income greater than £30k.

Figure 13 Promotional Buyers by income, for all promotions and for multibuys only

502. We also reviewed the wider literature on differences in uptake of promotions by socioeconomic status or deprivation. We found that, similar with the Kantar data, some of the findings in the academic literature suggest that higher socioeconomic status (SES) groups are more likely to have a greater uptake of price promotions than lower SES groups.[78] This is possibly due to individuals in higher SES groups having a greater financial understanding and greater human capital to seek out and use promotions.[79,80] Along with greater financial literacy, it is also possible that higher SES groups may have access to greater financial and spatial resources, enabling them to make greater use of price promotions[81].

[78] Nakamura R, Suhrcke M, Jebb S et al. (2015) Price promotions on healthier compared to less healthy foods: a hierarchical regression analysis of the impact on sales and social patterning of responses to promotions in Great Britain. American Journal of Clinical Nutrition 2015. 10.3945

[79] Tan, P. J., & Bogomolova, S. (2016). A descriptive analysis of consumer's price promotion literacy skills. International Journal of Retail & Distribution Management, 44(12), 1223-1244.

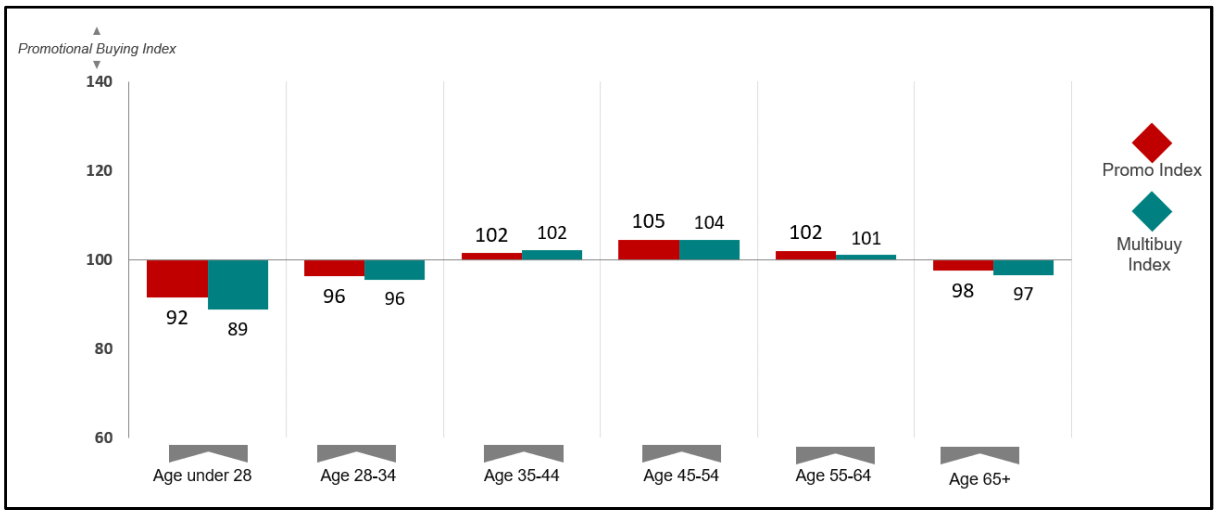
[80] Kwon, K. N., & Kwon, Y. J. (2007). Demographics in sales promotion proneness: a socio-cultural approach. ACR North American Advances.

[81] Nakamura R, Suhrcke M, Jebb S et al. (2015) Price promotions on healthier compared to less healthy foods: a hierarchical regression analysis of the impact on sales and social patterning of responses to promotions in Great Britain. American Journal of Clinical Nutrition 2015. 10.3945

503. However, the evidence did suggest that the higher uptake was accounted for by promotions on healthier products – whilst uptake for less healthy foods was similar across all SES groups.[82]

504. In terms of age of consumer, analysis from Kantar shows that all ages by into promotions. Overall the 35+ age groups buys more on promotion, with those aged 45-54 being the largest promotional buyers within this demographic though overall behavioural differences by age are small. This is outlined in Figure 14 below.

Figure 14 Promotional Buyers by age group, for all promotions and for multibuys only



505. Given the evidence is mixed, it is not possible to assess the overall likely impact on inequalities at this stage. The post-implementation review will gather evidence of impact and will consider evidence of any differential impact by deprivation as part of this.

506. It is possible that the policy could have different impacts on different groups in society, not just based on socioeconomic status. Data from ACS[83] shows that around that 37% of convenience stores are in rural communities where the store is often providing the only shopping option for the local community. 34% of convenience stores are part of a symbol group, which are in scope of the policy, while convenience stores not part of a symbol group are excluded. Therefore, rural communities where symbol stores are present will benefit from these restrictions.

507. Evidence from the National Child Measurement Programme[84] highlights that obesity prevalence is higher in urban areas than rural areas outlined in Table 45. This highlights that although many convenience stores (those that are small or micro, or below 2,000 sq. ft) are excluded from the policy, and are stores which are often the only shopping option in rural areas, obesity prevalence is lower in rural communities. The enforcement consultation will further explore the impact the policy could have on urban and rural areas.

[82] Ibid.

[83] ACS (2019) *The Local shop report.* Available online: https://www.acs.org.uk/sites/default/files/acs_local_shop_report_2019.pdf (Accessed 05/03/2019)

[84] National Child Measurement Programme (2019) *National Child Measurement Programme, England 2018/19 School Year*. Availabe at: https://digital.nhs.uk/data-and-information/publications/statistical/national-child-measurement-programme/2018-19-school-year (Accessed 13/10/2020)

Table 45 Prevalence of obesity in children in Reception, by rural/urban classification[85] (based on the postcode of the child)

	Obese - Reception		Obese – Year 6	
Rural/urban classification	Number	**Prevalence**	Number	**Prevalence**
Total[2]	**57,869**	***9.7***	121,409	20.2
Village, Hamlet & Isolated Dwellings	3,729	*7.9*	7,686	15.0
Town and Fringe	4,014	*8.2*	8,217	16.6
Urban	50,040	*10.0*	105,231	21.1

Competition Test

Does the proposal:

1. *Directly limit the number or range of suppliers?*
    - The proposal places no direct limit on the number of retailers which can operate in the market.

2. *Indirectly limit the number or range of suppliers?*
    - The illustrative preferred policy option applies to all medium and large food retailers equally. However, the costs to individual businesses may vary, for example due to the number of products on offer.
    - Manufacturers often discount new products to penetrate the market. Therefore, we should consider whether this policy benefits existing product lines by introducing barriers to entry.
    - Since businesses will still be able to compete on grounds of absolute price level, we do not believe this to be the case.

3. *Limit the ability of suppliers to compete?*
    - The proposal does not limit businesses ability to compete on grounds of quality, geographic location, absolute price, advertisement and many other aspects on which businesses frequently compete.
    - Volume promotions are a method of competition, which will be restricted under this proposal, but we believe firms will adapt to compete on absolute price level instead.
    - Some businesses may use price discounts to a greater extent than others and therefore the policy may have a disproportionate impact on these businesses.

4. *Reduce suppliers' incentives to compete vigorously?*
    - The proposal does not exempt businesses from general competition law, introduce or amend intellectual property regime or increase the costs to customers of switching between suppliers.
    - The policy does restrict businesses in their ability to offer promotional prices, and this may make pricing strategies easier for rivals to predict. This is, at least partially, offset by a benefit to consumers of more transparent pricing allowing them to make easier assessment of relative prices.

[85] 1. The Office for National Statistics (ONS) produced the Rural and Urban Classification in consultation with the Department for Environment, Food and Rural Affairs (DEFRA), the Department for Communities and Local Government (DCLG) and the Countryside Agency.
Further details are available at: http://www.ons.gov.uk/ons/guide-method/geography/products/area-classifications/rural-urban-definition-and-la/rural-and-urban-statistics-guidance-notes.pdf (Accessed 13/10/2020)

Sustainability Test

508. There is no evidence to suggest that a restriction on price promotions for HFSS products will have an impact on the sustainability of the market.

Environmental Test

509. The relationship between price promotions and food waste has been examined by Waste and resources action program (WRAP)[86]. Their report found that there was no "evidence to prove that food bought on promotion is more likely to be wasted, at least for those products covered by the research. However, due to the challenges encountered in achieving accurate self-reporting of food waste, this finding must be regarded as tentative". This suggests there would be no substantial impact on the environment as a result of restricting price promotions.

510. However, supermarkets often use promotions to sell products which are close to their expiry date. It's possible that restricting volume promotions of HFSS products could make it more difficult to sell these items before their expiry dates, thereby increasing the amount of food waste.

511. Restricting volume promotions could also have an impact on the amount of plastic and packaging used in the food and drink industry. As explained above we expect the restrictions to volume promotions to result in a decrease in the consumption of HFSS products, which will be partly offset by an increase in the consumption of non-HFSS products. We expect there to be less plastic and packaging for non-HFSS products, particularly products such as fruit and vegetables, compared to HFSS products. Therefore, this shift in expenditure from HFSS to non-HFSS products could lead to a reduction in the amount of plastic and packaging that is used, which would have a positive impact on the environment. However, we do not have evidence to quantify this impact.

Justice Impact Test

512. A full justice impact test for this proposal will be conducted and agreed with Ministry of Justice.

Rural Proofing

513. There is no evidence to suggest that a restriction on the placement of HFSS products will have a significant impact on those living in rural areas. It is possible that a greater proportion of outlets located in rural areas belong to micro and small businesses which is excluded under this policy. As a result, it is possible that these restrictions have a smaller impact on rural communities compared to those living in more urban areas.

Human Rights Assessment

514. We recognise that there may be an impact on businesses in terms of Articles 10, 14, and Article 1 of Protocol 1 of the European Convention on Human Rights.

[86] Investigation into the possible impact of promotions on food waste, WRAP, 2011. http://www.wrap.org.uk/sites/files/wrap/WRAP%20promotions%20report%20FINAL%20241111.pdf (last accessed 05/03/2020)

Annex A – DHSC Calorie Model

THE DHSC CALORIE MODEL

1. This document explains what the Calorie Model is, how it works and how it supports policy development. It also provides a brief history of how the model has developed over time.

What is the Calorie Model?

2. The Calorie Model is a simulation model, written in R, developed by analysts within the Department of Health & Social Care (DHSC). It draws on earlier modelling work developed by Public Health England (PHE).

3. Its purpose is to model the long-term impacts of policies that affect calorie intake at a population level. It uses estimates of change in calorie intake, along with other assumptions, to estimate the effect on health outcomes, NHS treatment costs, social care costs and changes in economic output.

4. Typically, the model is used to quantify the benefits associated with reductions in calories, but it can also model increases.

5. The model is calibrated for the population in England[87] using 2016 data as the baseline[88].

How does the model work (in overview)?

6. The Calorie Model is a cohort-based Markov model[89]. That means that the population is divided into annual cohorts based on their year of birth, and the health of each cohort is modelled over time based on their expected body mass index (BMI) and the associated chances of acquiring an obesity-related condition. A change in calorie intake will affect BMI, which in turn affects the likelihood of ill health.

7. To track health over time, the members of each cohort are divided into one of several states: healthy, diagnosed with an obesity-related disease, or deceased. Each year, transitional probabilities are used to estimate how many people will change state, and new births are added in. The expected prevalence of obesity-related conditions, and associated impacts, can be estimated accordingly.

8. The effects of a policy intervention are modelled using a control and treatment approach, with a control scenario assuming no policy implementation, and a treatment scenario(s) assuming a change in calorie intake. The effects of the policy are measured by comparing the two scenarios over time.

What outputs does the model produce?

9. The main outputs for any given scenario are:

    - total net benefit (or cost) in net present value terms, likely to result from a calorie change, comprising:
        - monetised value of any net change in health (measured in QALYs);[90]
        - net change in NHS treatment costs;

[87] Model results can be applied to the rest of the UK by applying a pro-rata adjustment based on population size. This may not take full account of demographic and health-related differences but should suffice on an indicative basis.

[88] We use Health Survey for England (HSE) and Office for National Statistics (ONS) population data and projections.

[89] Further background information about this type of model is available at https://arxiv.org/abs/1702.03252.

[90] Quality-adjusted life years (QALYs) are the standard currency used in health evaluations to measure the duration and quality of life combined. A value of 1.00 represents a year of life in perfect health. Someone living with an obesity-related condition is assumed on average to have a lower quality of life and/or a lower life expectancy than someone of similar age without that condition. The social value of QALYs (i.e. the value placed on them by the public) is £60,000 each. Further detail on how and why QALYs are used is provided in the Treasury Green Book (page 72) at:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf

    - net change in social care costs; and
    - net change in (some) economic productivity impacts.
- a timeline, showing when these effects are expected to occur.
- the number of premature (under age 75) deaths expected in the scenario and compared with the control.

10. The model also allows more detailed interrogation of (for example) different age groups or BMI changes, and it can also provide sensitivity analysis around input parameters.

How does the model work (in detail) and what assumptions are used?

11. The main input parameter is the expected **change in calorie intake** per person per day.[91]

12. This value (or range of values) must be created outside the model, using whatever research, analysis or estimation techniques are available. The calorie model can explore the effect of a calorie change and perform sensitivity analysis around any assumed figure. But it cannot identify the correct calorie value to use.

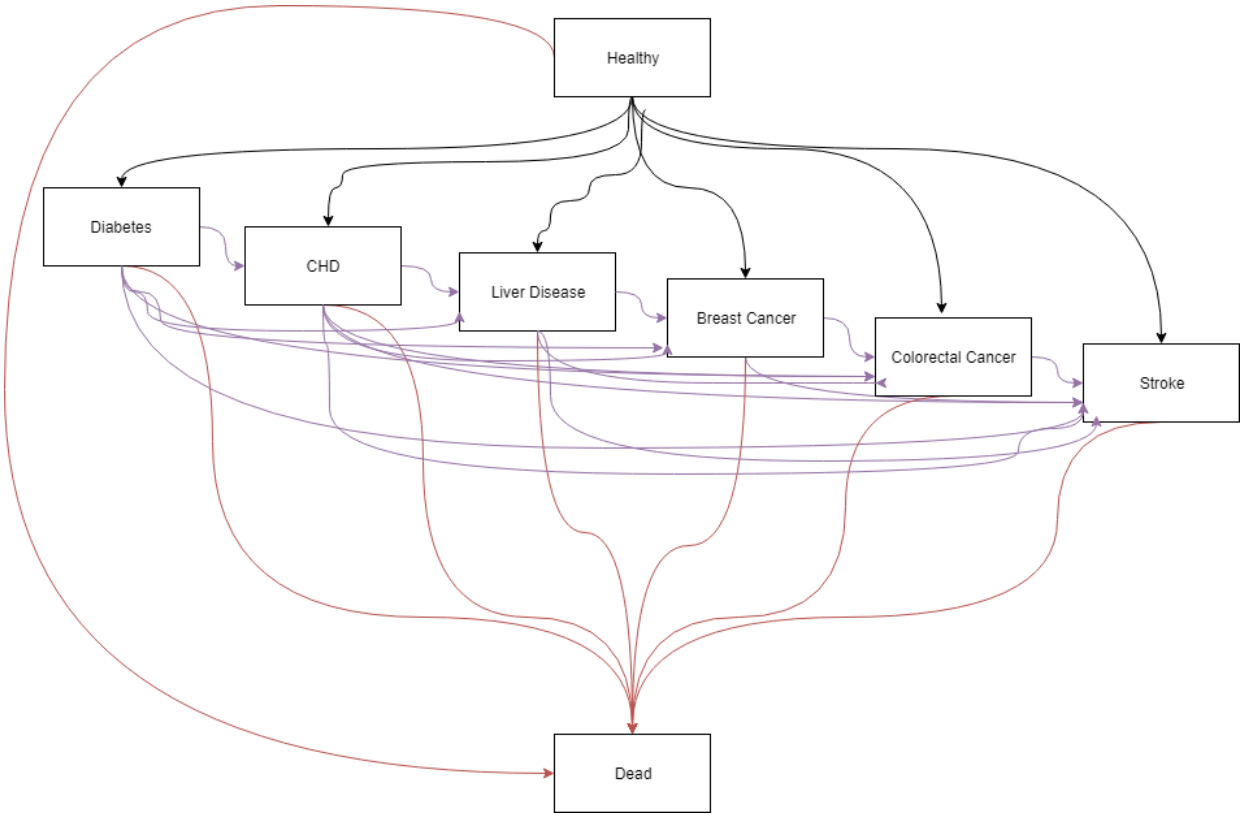
13. The calorie change can be varied according to the **age and gender of the population affected**. This allows (for example) policies that focus on children only to be assessed.

14. Changes in weight and BMI caused by the reduction in daily calories are calculated (see para 17 and footnote 6 for the methodology) and are used as a starting point for the remainder of the analysis within the model.

15. The model then considers the implications of the calorie imbalance reduction on six diseases associated with obesity: **type 2 diabetes, coronary heart disease, stroke, colorectal cancer, breast cancer and liver disease**. This is done by considering changes in prevalence and mortality rates for each disease caused by changes in BMI to calculate the number of deaths avoided in the treatment scenario.

16. The model makes some allowance for comorbidities. In previous versions, the only transition an individual in a disease state could make was to move to the dead state or else stay in the relevant disease state, the possibility of disease to disease transition has since been added to model comorbidities. However, the model has no state memory and so when an individual undergoes a disease to disease transition, they no longer incur the costs associated with their first disease. To reduce the impact of this lack of state memory disease to disease transitions are only allowed from less severe to more severe diseases. The order of severity is shown here, with severity increasing from left to right:

[91] Equivalent inputs (such as an expected change in weight or BMI status) can also be used with appropriate conversion upfront.



Text-only description: The order of severity in the model is: type 2 diabetes, coronary heart disease, liver disease, breast cancer, colorectal cancer, stroke.

BMI analysis

17. Individual weights are modelled using the differential equations from Hall et al.[92] This approach assumes an individual's weight to consist of body fat, and fat-free mass (summed together to give the total body weight). The BMI projection through life is done by considering the imbalance between energy in and energy out, and by assuming that an individual will remain on the same BMI percentile through life. The model also draws on research from Ara et al.[93] to model how the BMI of the control group would change over time. This evidence was based on an overweight and obese population but is assumed in the absence of anything superior to provide a reasonable approximation for those with a healthy BMI.

18. Differential equations were implemented in the model using the deSolve[94] package in R. The original model predicted the same weight loss per kcal reduction regardless of original body weight, which was noted at the time as being a necessary simplification. This limitation has been removed and the use of the differential equations in the new model forecasts a greater reduction in body weight per kcal reduction in diet in individuals with more excess weight.

19. These updates allow us to model changes in weight that occur in childhood. The equations include a growth term which tends to zero at age 18, meaning the model naturally transitions from childhood into adulthood.

[92] Hall KD, Butte NF, Swinburn BA, Chow CC. Dynamics of childhood growth and obesity: development and validation of a quantitative mathematical model. The lancet Diabetes & endocrinology. 2013 Oct 1;1(2):97-105.

[93] Ara, R., L. Blake, L. Gray, M. Hernández, M. Crowther, A. Dunkley, F. Warren et al. "What is the clinical effectiveness and cost-effectiveness of using drugs in treating obese patients in primary care? A systematic review." Health technology assessment (Winchester, England) 16, no. 5 (2012)

[94] "deSolve: Solvers for Initial Value Problems of Differential Equations". [Online]. Available: https://cran.rproject.org/web/packages/deSolve/index.html 134

20. There is no evidence available to link excess weight to the modelled conditions during childhood and hence no health benefits have been modelled during childhood. If any undiscovered associations exist, this would imply our calculations underestimate the benefits.

Groups of people considered within the model

21. The model splits the population by age, sex, and 5 BMI categories: underweight, healthy weight, overweight, obese, and very obese. Age can be modelled in individual years or in grouped categories as desired. Age-specific parameters (such as mortality rate, or incidence of a condition) are applied at the correct time as required.

22. Some weight loss health benefits occur in adults that are not overweight but have a BMI greater than 22 kg/m^2. The risk of the six health conditions modelled increases linearly with a BMI level of 22 upwards, and so including a healthy weight group in the model allows the extra benefits to be modelled. Underweight is modelled as a separate group to avoid any bias.

23. The starting population is defined by the user, meaning a policy can be considered that only applies a calorie reduction to children, to children and adults, or only applies to adults.

24. The new model utilises Markov modelling to calculate the transitions of the population between states, where states are defined as healthy, having a condition (where each condition is a separate state), or deceased. The Markov modelling was handled by the heemod[95] package in R. The probabilities of being in a state are used as inputs into the heemod package, which can then simulate how the states will develop over time, starting the model with 100% of the population in the healthy state.

25. For every cycle of the Markov model (equivalent to one year), the model calculates what proportion of the population will be in each state using the predicted probabilities (which as in the original model, are BMI-dependent). This gives a trajectory of the proportion of the total population in each state every year.

26. The previous model considered the possibility of people living with one condition but dying of another. This version of the model has made the simplification that people have no more than one condition given there is currently a lack of evidence on the health effects of having several of these conditions.

Calculating results

27. **Savings to the NHS** are calculated from the reduced treatment requirements for each disease.

28. **Economic productivity effects** are assessed in two categories. First, reductions in mortality are used to calculate the impact of mortality on economic output from an increased workforce. This is done by considering everyone within a cohort to earn the median wage of a person of that age and gender, with a larger workforce present in the treatment scenario.

29. Secondly, the model calculates the impact of morbidity on economic output using an employment rate that varies with disease state. This change has been made to reflect the lower productivity and rates of employment seen for individuals with one of the six modelled diseases.

30. **Costs of social care** savings are calculated due to a reduced proportion of overweight, obese, and morbidly obese individuals and hence fewer people needing social care in the treatment scenario. This assumes that the probability of requiring social care increases with BMI.

31. **Changes in QALYs** are calculated from the reduced number of deaths and the reduction of people living with the diseases. These are then converted into monetised QALY using a conversion of how much society values a QALY.

[95] "heemod: Markov Models for Health Economic Evaluations". [Online]. Available: https://cran.rproject.org/web/packages/heemod/index.html 135

32. People who fall ill with an obesity-related illness in later life may already be in less than perfect health. Accordingly, the model does not assume a QALY value of one for individuals in the "healthy" state (which in model terms means they are free of obesity-related illness). Instead, an age detriment is applied to all QALY values. This is done to allow for the increased prevalence of diseases not explicitly included in the model at older ages.

33. The model uses a QALY disease detriment to calculate the QALY value for an individual in the disease state.

34. **Discount rates** are applied to monetary values to account for changes in the treatment of costs and benefits that arise over different periods of time. This allows future values to be considered at present value in line with Treasury Green Book principles.

35. Results can be modelled over a **user-defined timeframe**. For most analysis, a longer timescale is considered appropriate, as many of the health benefits do not arise until middle age or older. Equally, uncertainty increases as the forecast period widens. Typically, a timescale of between 20 and 50 years is considered reasonable.

36. The model can be run for a longer time-period and (based on ONS population projections) will add new children each year who will be born into the model. This means a policy that runs for multiple years can be modelled on children who will be born during the duration of the policy.

37. Once a policy has finished running, the model will stop adding new children to the population. However, it will continue to model benefits on the existing population for as long as the user defines. This allows the benefits that do not occur until much later in life to be modelled over the lifetime of the population.

How robust and reliable is the model?

38. The model has been developed and enhanced over several years, reflecting both changes in evidence and improvements in modelling capabilities. The model has been independently assured and the results have been used to support economic analysis in published Impact Assessments on a regular basis. The analysis is best available.

39. However, the model does have several significant limitations.

    - It predicts the effect of a given change in calorie intake. It cannot predict the effect of policy on calorie intake, and so is reliant on the external analysis used to produce such estimates.
    - The model, of necessity is a simplified representation of real-world events. It does not consider all potential health conditions, all types of individual circumstances and all types of economic impact.
    - The model assumes that past performance (in terms of treatment costs, transition probabilities, population profiles and many other parameters) are a reasonable basis from which to predict the future.
    - Results will vary according to the evaluation period chosen.

40. Work continues over time to refine and improve the model and mitigate any limitations. Sensitivity analysis and optimism bias are both regularly used to ensure any model results are interpreted and used appropriately.

Developmental history of the model

41. PHE first developed a weight management economic assessment tool in 2014.[96]

42. This was used to support analysis on sugar reduction and later calorie reduction, and through a series of changes eventually became Version 1 of the Calorie Model, developed by DHSC and PHE working together.

43. The model and its assumptions were the subject of a Technical Consultation Document[97] which DHSC published in 2018.

44. The original model was developed in Microsoft Excel, but an upgraded version was developed in the "R" programming language, by DHSC analysts following the consultation. This "Version 2" of the model was more flexible and it allowed more accurate modelling of weight loss or gain, a longer evaluation period (if desired) and greater ability to model different groups of people. It became possible to model adults and children separately.

45. These "Version 2" changes were published in 'Further advertising restrictions for products high in fat, salt and sugar: impact assessment': Annex E[98].

46. Version 3 (the current model) was developed by DHSC analysts in late 2019 and is now in use. This version added liver disease to the model, added a limited capability for measuring comorbidities, extended the scope of the economic productivity analysis, and improved the accuracy of the QALY calculations, by reflecting the deterioration in health that naturally occurs as the population ages.

47. Quality assurance (QA) was carried out in line with the principles set out in the Government Aqua book. PHE provided independent assurance to complement the work within DHSC.

48. Further details on the history and development of the model can be found in the published documents mentioned (see footnotes).

[96] https://www.gov.uk/government/news/phe-launch-weight-management-economic-assessment-tool

[97] DHSC, DHSC Calorie Model, August 2018. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/736417/dhsc-calorie-model-technical-document.pdf

[98] DHSC/DCMS, March 2019 [Online]: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/786554/advertising-consultation-impact-assessment.pdf

Annex B – HFSS Food Definition

1. There are a number of possible ways of assessing the nutritional content of food. For the purposes of this policy and Impact Assessment, the healthiness of products will be defined using the Food Standards Agency's 2004/05 Nutrient Profiling Model[99].
2. The Nutrient Profile Model was developed by the FSA to provide Ofcom, the broadcast regulator, with a tool to differentiate foods on the basis of their nutritional composition to regulate the television advertising of foods to children.
3. It scores foods based on their nutritional content. The nutrients considered are split into two categories – A and C. The score for 'C' nutrients is subtracted from the score for 'A' nutrients to give the final score. A higher score indicates a more HFSS food.
4. 'A' nutrient consists of energy, saturated fat, total sugar and sodium. 'C' nutrients consist of fruit, vegetables and nut content, fibre and protein. Therefore, a food scoring highly on 'A' nutrients is not automatically classified as HFSS, only if it additionally scores little on 'C' nutrients.
5. Foods scoring 4 or more points, or drinks scoring 1 or more points, are classified as "less healthy". These 'less healthy' products provide the definition for HFSS food used here.
6. All food and drink are scored, there are no exemptions.

Calculations

7. There are three steps to working out the score: calculating 'A' points, calculating 'C' points and combining these into an overall score.

Calculating 'A' points

8. Total 'A' points are calculated by the following formula: (points for energy) + (points for saturated fat) + (points for sugars) + (points for sodium). The points for each nutrient are determined based on the amount of each per 100g of the food or drink, according to Table A.1 below.

Table A.1 Points scored by 'A' category nutrients per 100g

Points	Energy (kJ)	Sat Fat (g)	Total Sugar (g)	Sodium (mg)
0	≤335	≤1	≤4.5	≤90
1	>335	>1	>4.5	>90
2	>670	>2	>9.0	>180
3	>1005	>3	>13.5	>270
4	>1340	>4	>18.0	>360
5	>1675	>5	>22.5	>450
6	>2010	>6	>27.0	>540
7	>2345	>7	>31.0	>630
8	>2680	>8	>36.0	>720
9	>3015	>9	>40.0	>810
10	>3350	>10	>45.0	>900

9. A maximum of ten points can be awarded for each nutrient.

Calculating 'C' points

10. Total 'C' points are calculated by the formula: (points for % fruit, veg and nut content) + (points for fibre [either NSP or AOAC]) + (points for protein). The points for each nutrient are determined based on the amount of each nutrient per 100g/percentage nutrient component of the food or drink, according to Table A.2 below.

[99] Nutrient Profiling Technical Guidance, Department of Health and Social Care, 2011. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/216094/dh_123492.pdf (last accessed 05/03/2020)

Table A.2 Points scored by 'C' category nutrients per 100g

Points	Fruit Veg and Nuts (%)	NSP Fibre (g)	or AOAC Fibre[a] (g)	Protein[b] (g)
0	≤40	≤0.7	≤0.9	≤1.6
1	>40	>0.7	>0.9	>1.6
2	>60	>1.4	>1.9	>3.2
3	-	>2.1	>2.8	>4.8
4	-	>2.8	>3.7	>6.4
5	>80	>3.5	>4.7	>8.0

a NSP fibre information should be used if possible. However, if this is not available then AOAC fibre information should be used.

b If a food or drink scores 11 or more points for 'A' nutrients then it cannot score points for protein unless it also scores 5 points for fruit, vegetables and nuts.

11. A maximum of five points can be awarded for each nutrient/food component. Note the restrictions on points for protein.

Combining points into an overall score

12. Overall score for a food is dependent on how many 'A' points it scores and how many points for fruit, vegetables, and nuts it scores. There are three possible situations.

    Less than 11 'A' points

    If a food satisfies this criterion then the overall score is calculated as follows:

    Total 'A' points minus total 'C' points = (energy + sat fat + sugars + sodium) – (fruit, vegetables, and nuts + fibre + protein)

    11 or more 'A' points and 5 points for fruit, vegetables and nuts

    If a food satisfies this criterion then the overall score is calculated as the above case.

    11 or more 'A' points and less than 5 points for fruit, vegetables and nuts

    If a food satisfies this criterion then the overall score is calculated as follows:

    Total 'A' points minus points for fruit, veg and nuts and points for fibre = (energy + sat fat + sugars + sodium) – (fruit, vegetables, and nuts + fibre)

    Note that in this case foods are not allowed to score for protein.

Annex C – Products included in the Soft Drinks Industry Levy and the Calorie and Sugar Reduction Programmes

Soft Drinks Industry Levy

1. In 2016, the Government announced the introduction of the Soft Drinks Industry Levy to help reduce children's sugar intakes by encouraging manufacturers to reformulate their drinks. The Levy came into effect on the 6th of April 2018.
2. A drink is liable for the Soft Drinks Industry Levy if it meets all of the following conditions:
    a. It has had sugar added during production, or anything (other than fruit juice, vegetable juice and milk) that contains sugar, such as honey
    b. It contains at least 5 grams (g) of sugar per 100 millilitres (ml) in its ready to drink or diluted form
    c. It is either ready to drink, or to be drunk it must be diluted with water, mixed with crushed ice or processed to make crushed ice, mixed with carbon dioxide, or a combination of these
    d. It is bottled, canned or otherwise packaged so it is ready to drink or be diluted
    e. It has a content of 1.2% alcohol by volume (ABV) or less
3. A detailed list of what is classed as sugar for the purposes of the Levy can be found in the guidance published by HM Revenue & Customs[100].
4. The Levy does not apply to drinks that are:
    - At least 75% milk
    - A milk replacement, like soya or almond milk
    - An alcohol replacement, like de-alcoholised beer or wine
    - Made with fruit juice or vegetable juice and do not have any other added sugar
    - Liquid drink flavouring that's added to food or drinks like coffee or cocktails
    - Infant formula follows on formula or baby foods
    - Formulated food intended as a total diet replacement, or dietary food used for special medical purposes
5. Again, a more detailed explanation of the products excluded from the Levy can be found in the guidance published by HM Revenue & Customs.

Calorie Reduction Programme

6. On average both children and adults are consuming too many calories on a regular basis. Amongst the government's commitments in the 'Childhood obesity: A plan for action' was for Public Health England to lead a structured and closely monitored programme to improve every day food and drink. As part of this Public Health England developed the calorie Reduction Programme to encourage manufacturers to revise and reformulate their products to lower the number of calories they contain.
7. The list of product categories to be included within the calorie reduction programme will be confirmed after engagement with stakeholders. However, Public Health England have indicated that the following product categories will be included in the programme:

    - Bread with additions (e.g. olives, cheese etc.)
    - Crisps and savoury snacks
    - Savoury biscuits, crackers and crispbreads
    - Potato Products (e.g. chips, croquettes, mashed potato etc.)
    - Sausages (raw and cooked) and sausage meat products, frankfurters, hotdogs and burgers
    - Meat, fish and vegetarian pastry pies and other pastry products
    - Cooking sauces and pastes
    - Table sauces and dressings
    - Pasta/ rice/ noodles with added ingredients and flavours
    - Ready meals with carbohydrate accompaniment (potato, rice, noodles, pasta, etc.) – fish, meat and meat alternatives

[100] HM Revenue & Customs Check if your drink is liable for the Soft Drinks Industry Levy, https://www.gov.uk/guidance/check-if-your-drink-is-liable-for-the-soft-drinks-industry-levy (last accessed 05/03/2020)

- Meal centres without carbohydrate accompaniment (potato, rice, noodles, pasta, etc.) – fish, meat and meat alternatives
- Prepared dips and composite salads as meal accompaniments (e.g. coleslaw, potato salad, guacamole, salsa etc.)
- Pizza
- Egg products/ dishes (e.g. quiche)
- Food to go e.g. sandwiches boxed main meal salads etc.

8. These products have been included because they contribute significantly to children's calorie intakes and there is scope for substantial reformulation and/ or portion size reduction. A more detailed list of the products included in the scheme and the reformulation targets can be found in the guidance published by Public Health England[101].

Sugar Reduction Programme

9. A further commitment in the 'Childhood obesity: a plan for action' was to launch a broad structured sugar reduction programme to remove sugar from everyday products. All groups of the population, particularly children, are consuming far too much sugar. This increases the risk of excess calorie consumption and weight gain, which, over time, can lead to obesity.

10. The sugar reduction programme challenges manufacturers to revise and reformulate their products to reduce the amount of sugar they contain. A list of product categories included in the programme is below:

    - Breakfast cereals
    - Yoghurt and fromage frais
    - Biscuits
    - Cakes
    - Morning goods
    - Puddings
    - Ice cream
    - Sweet confectionary
    - Chocolate confectionary
    - Sweet spreads
    - Milk-based drinks and fruit juices

11. These products have been included because they contribute significantly to children's sugar intakes. Again, a more detailed list of the products included in the scheme and the reformulation targets can be found in the guidance published by Public Health England[102].

[101] Calorie reduction: the scope and ambition for action, Public Health England, 2018. https://www.gov.uk/government/publications/calorie-reduction-the-scope-and-ambition-for-action (last accessed 05/03/2020)

[102] Sugar reduction: Achieving the 20%, Public Health England, 2018. (Last accessed 05/03/2020)

Annex D – Revised product categories in scope post consultation

Table *46*below shows the product categories in scope of the volume restrictions as presented in the consultation proposal and the revised categories in scope following consultation feedback. The revised categories are those of most concern to childhood obesity because they contribute the most sugar and calories to children's diets and are typically heavily promoted. These are the categories in scope for Option 2, which is the preferred option in this IA.

Table 46: Products in scope of the preferred option

Products in scope pre-consultation	**Products in scope post consultation – now included in Option 2 and 3**
Soft drinks	Soft drinks
Chocolate confectionery	Chocolate confectionery
Sugar confectionery	Sugar confectionery
Cakes	Cakes
Ice cream	Ice cream
Morning goods (pastries)	Morning goods (pastries)
Puddings and dairy desserts	Puddings and dairy desserts
Sweet biscuits	Sweet biscuits
Breakfast cereals	Breakfast cereals
Yogurts	Yogurts
Milk based drinks with added sugar	Milk based drinks with added sugar
Juice based drinks with added sugar	Juice based drinks with added sugar
Pizza	Pizza
Crisps and savoury snacks	Crisps and savoury snacks
Ready meals and meal centres (e.g. burgers, chicken nuggets, breaded chicken/fish)	Ready meals and meal centres
Chips and potato products	Chips and potato products
Garlic bread	
Pies and quiches	
Bread with additions	
Savoury biscuits crackers and crispbreads	
Cooking sauces and pastes	
Table sauces and dressings	
Processed meat products	
Pasta /rice/ noodles with added ingredients and flavours	
Prepared dips and composite salads as meal accompaniments	
Egg products /dishes	
Sweet spreads	

The lists below outline the products in scope under option 1 and 4:

Option 1:

- Confectionery (Sweets and Chocolate)
- Sweet biscuits
- Cakes
- Puddings
- Dairy desserts
- Crisps
- Savoury snacks

- Pastries
- Soft drinks with added sugar
- Ice-cream

Option 4:

Everything in Option 2, plus

- Sweet spreads
- Processed Meat Products
- Pies and Quiches
- Garlic Bread
- Cooking and serving sauces
- Table sauces and dressings
- Savoury biscuits, crackers, crispbreads etc
- Starters, smaller dishes, sides etc

Annex E – Consultation Response Summary

Summary

In Chapter 2 of the Childhood Obesity Plan, published June 2018, Government set out its intention to ban promotions of HFSS products by location and by price and committed to consult on how this should be implemented. The consultation sought views on:

- which businesses, products and types of price and location promotions should be in scope of the restrictions
- how HFSS products should be defined
- how the proposal should be implemented

The consultation ran from January to April 2019 and received significant interest with 807 responses from individuals, businesses and organisations. 86% of responses were from individuals, 9% from organisations (NGOs, charities, public health bodies) and 3% from businesses (retailers, manufacturers, out of home businesses, food/drink industry trade bodies).

Overall, there was support for Government's proposal to introduce restrictions for promotions of HFSS products by location and by price, with around 60% of respondents agreeing that the restrictions should apply to all retail businesses that sell food and drink products in England. There were noticeable differences between views from individuals, business and organisations. 57% of individuals agreed with introducing restrictions and organisations were overwhelmingly supportive with 95% in agreement. Businesses were not supportive of the proposal with 26% saying that the restrictions should be introduced.

Having carefully considered all consultation responses and after conducting further stakeholder engagement, evidence gathering and data analysis, Government decided to introduce promotion restrictions through legislation, as per the initial consultation proposal, but made revised the businesses and products in scope.

Business in scope

Further data analysis and stakeholder engagement was conducted and as a result Government decided to exempt micro businesses (fewer than 10 employees) and small businesses (10 to 50 employees) from both the price and location restrictions.

With regard to specialist retailers who only sell a specific type of HFSS products (e.g. chocolate or sweets) we recognise the location restrictions would be impractical for them to implement and would likely lead to significant disruption to their business. This however, is not the case for price restrictions if they sell products that are included in the categories in scope of the restrictions. Therefore, specialist retailers are exempt from location restrictions but not from price restrictions.

Having considered industry feedback and conducted further stakeholder engagement with regard to exemptions based on size of store, Government decided that stores 2,000 square ft or greater will be in scope of the location restrictions because they are expected to have distinct checkout and front of store areas and typically have multiple aisles and aisle ends.

Products in scope

We recognise the concerns raised about the wide scope of the consultation proposal and we appreciate the challenges that this may present for businesses. Having conducted further analysis and extensive stakeholder engagement, Government decided that the restrictions will apply to a revised, shorter list of product categories which are the biggest contributors to children's sugar and calorie intakes and are heavily promoted, and are therefore the categories of most concern for childhood obesity.

Government decided that non-pre-packaged products should be out of scope because businesses may not be able to determine whether these products can or cannot be promoted due to the lack of nutritional information on pack.

The restrictions will therefore apply only to HFSS pre-packaged products in the following categories: soft drinks, cakes, chocolate confectionery, sugar confectionery, ice cream, morning goods (e.g. pastries), puddings, sweet biscuits, breakfast cereals, yogurts, milk-based drinks with added sugar, juice based drinks with added sugar, pizza, ready meals and meal centres (e.g. burgers, chicken nuggets, breaded chicken/fish), crisps and savoury snacks, chips and potato products.

Detailed consultation results are presented in the Government's response to the consultation.

Annex F – Post Implementation Review

1. Understanding the impact of any regulatory policy is a key responsibility for government and the Department of Health and Social Care will publish a comprehensive review of the policy within the first 5 years of the policy being enforced.

2. 5 years is considered appropriate to allow sufficient time to understand changes in industry practices and consumer behaviours and effectiveness and consequences of the regulations. The timescale for this review will also allow officials to take account of the impacts of the Covid-19 pandemic. A shorter timescale is not deemed appropriate because these impacts may be short-term and not reflective of the market overall or in the longer term.

3. The review period will be from when the Regulations apply, therefore the enforcement regime will be finalised when the Regulations are laid. The proposed enforcement regime will be tested through the enforcement consultation and the outcome shared in advance of the Regulations being laid. In addition, Statutory Guidance[1] states that generally the deadline will be five years after the date when the measure came into force.

4. The aim of the PIR is to establish whether this regulation:

    a. Has achieved its original objectives
    b. Has objectives that remain appropriate
    c. Is still required and remains the best option for achieving those objectives, and
    d. Could be achieved in another way which involves less onerous regulatory provision to reduce the burden on business and/or increase overall societal welfare.

5. The objective of this policy is to restrict volume promotions on HFSS food and drinks in all medium and large businesses in the retail sector. The intended effect of this restriction is to reduce excess purchases and therefore consumption of HFSS products which is likely to contribute to children's excess weight gain over time. The policy also intends to shift the balance of promotions towards healthier options in stores whilst creating a level playing field across those businesses subject to the restriction. A post implementation review would aim to establish if these objectives have been achieved.

6. We aim to explore the level of sales of HFSS products on different types of price promotion before and after legislation comes into force, in order to monitor any trends in the use of different price promotions on different goods categories and the consequent trends in sales.

7. We have also highlighted several wider points in this impact assessment which we would like to explore as part of a post implementation review. This includes:

    - the impact the restriction on free refills would have on OOH businesses;
    - what products are on volume promotions and sold in key locations part of the location restrictions;
    - the alternative marketing techniques used to promote HFSS products in response to the restrictions on volume promotions;
    - any change to the products or marketing techniques used by micro and small businesses; and
    - any specific impact on symbol businesses;

8. We also intend to re-engage with key stakeholders following the introduction of the ban to better understand the costs that businesses had at that point incurred in relation to the regulations.

[1] Statutory Guidance under s.31 of the Small Business, Enterprise and Employment Act 2015 published by the Department of Business, Energy and Industrial Strategy.