Trading down in quality and the consumption of minerals and vitamins in the UK

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Purpose

- Estimate whether trading down has had any effects on the consumption of selected nutrients.

- UK population are estimated to have a deficit intake of retinol, riboflavin, iron, calcium, magnesium, potassium, folate, fibre and zinc (Public Health England, 2018).

What is trading down

- “trading down” measures consumers switching to purchases of less expensive products within a food group.
- Changes in prices may trigger substitutions in the quality of the purchases (lower prices tend to be associated with lower quality).
- e.g. trading down from beef steak to beef mince due to increase in the price resulting in a change in brand purchased, nutrient content, taste etc.
- Opposite to this - “trading up”.
- Covered within the economic literature (Stiglitz, 1987) (Deaton, 1988).

Background – Hidden hunger

- Lack of vitamins and minerals.
- Occurs when **quality** of food eaten does not meet nutritional requirements.
- Discussed at the **WHO and FAO announce Second International Conference on Nutrition (ICN2)** “Better nutrition, better lives” 19-21 November 2014, Rome, Italy.

Background - Nutrients

- UK population estimated to have deficit intake (Public Health England (2018):
  - Retinol
  - Riboflavin
  - Iron
  - Calcium
  - Magnesium
  - Potassium
  - Folate
  - Fibre
  - Zinc
- Recent PubMed search (concerning UK) revealed majority of nutrient deficiency literature concerned Vitamin D
  - Issues with Vitamin D being sourced solely from food and not supplements

Data

- The computation of the trading up/down in quality was based on:

1. Information from “Family Food” (years 2007 to 2015) for each of the UK countries (per capita weekly expenditures and purchases).

2. Retail price indices for the studied groups (base 1987=100).

- The information about nutrients per food category was from disaggregated data underpinning “Family Food” that can be found in the UK Data Archive as part of the Living Costs and Food Survey.

- The data also provided household purchases and nutritional coefficients per year
    - transform food and drink purchases into the 9 nutrients

Methods

- The methods consisted in:

1. Computing trading down/up in quality for all the UK countries for the period 2007 to 2015

$$\left[1 + \begin{array}{c}\text{Change in}\\ \text{expenditure}\\ \text{in food}\\ \text{category}\end{array}\right] = \left[1 + \begin{array}{c}\text{Change in}\\ \text{price}\\ \text{in food}\\ \text{category}\end{array}\right] \times \left[1 + \begin{array}{c}\text{Change in}\\ \text{quantity}\\ \text{in food}\\ \text{category}\end{array}\right] \times \left[1 + \begin{array}{c}\text{Trading}\\ \text{up/down}\\ \text{in food}\\ \text{category}\end{array}\right]$$

$$\left[\begin{array}{c}\text{Trading}\\ \text{up/down}\end{array}\right] = \left[\begin{array}{c}\text{Change in}\\ \text{unit values}\\ \text{deflated by}\\ \text{prices}\end{array}\right]$$

2. Compute the change in different nutrients by food category

$$\left[1 + \begin{array}{c}\text{Change in}\\ \text{nutrients}\end{array}\right] = \left[1 + \begin{array}{c}\text{Change in}\\ \text{quantity}\\ \text{in food}\\ \text{category}\end{array}\right] \times \left[1 + \begin{array}{c}\text{Nutrient}\\ \text{coeffients}\end{array}\right]$$

Methods (con)

3. Pooling the annual percent changes by country per food and drink category and regress it by the trading down by food and drink category (32 observations by category)

$$\begin{bmatrix}\text{Change in nutrients in food category}\end{bmatrix} = \alpha_0 + \beta_0 \times \begin{bmatrix}\text{Trading up/down in food category}\end{bmatrix}$$

4. Check whether there were differences by country including intercept dummies (Suits, 1984)

$$\begin{bmatrix}\text{Change in nutrients in food category}\end{bmatrix} = \alpha_0 + \alpha_{Eng} + \alpha_{Wal} + \alpha_{Scot} + \alpha_{NIr} + \beta_0 \times \begin{bmatrix}\text{Trading up/down in food category}\end{bmatrix}$$

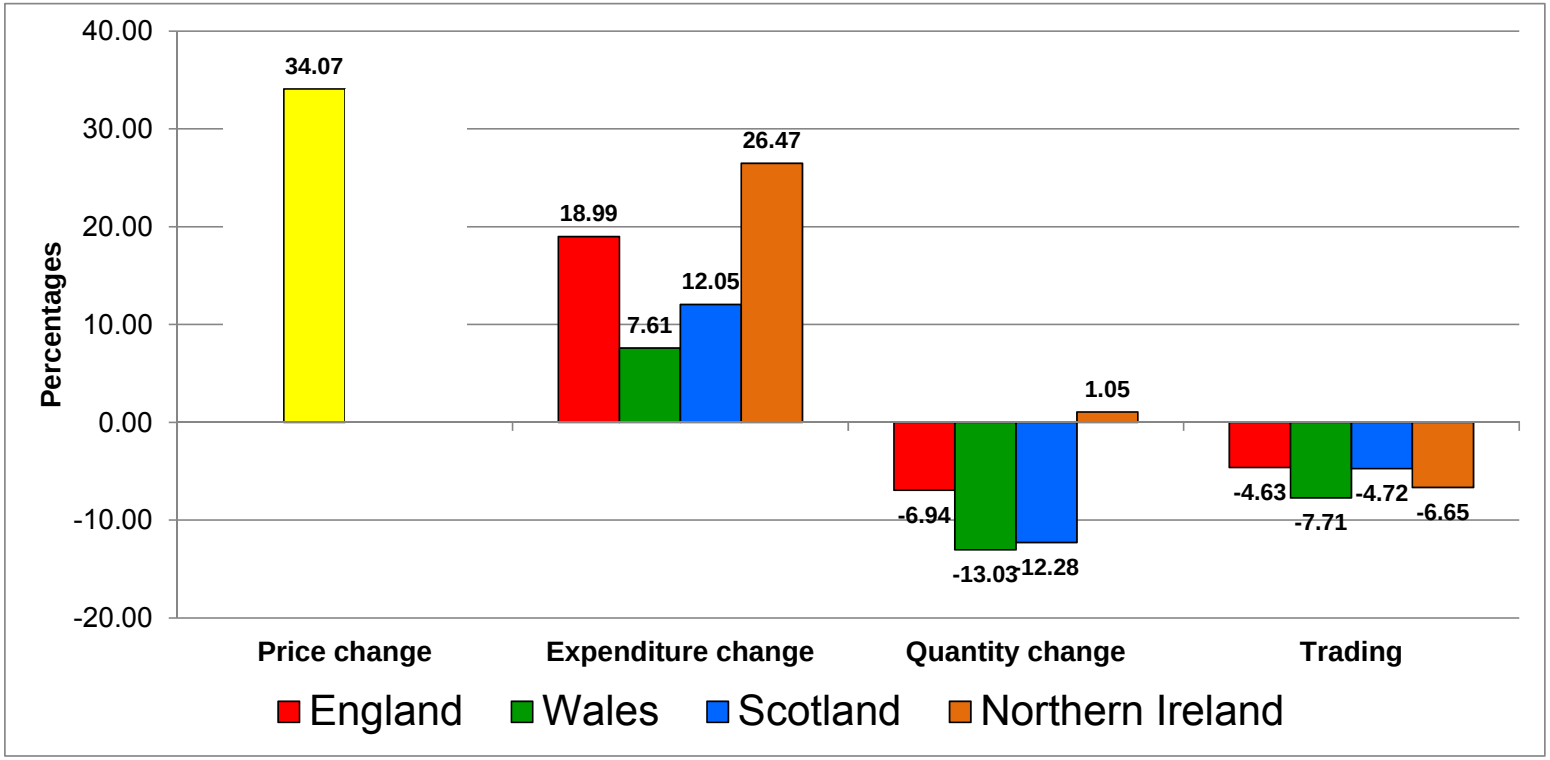
Results - Trading down

Food category	Nutrient	Regression coefficients β	t-stat.
Food and drink *	Retinol	-3.03	-4.03
Food and drink *	Riboflavin	-0.92	-3.96
Food and drink *	Calcium	-0.78	-4.70
Other cereals and cereal products	Retinol	-0.76	-2.10
Biscuits and cakes	Retinol	-1.33	-2.87
Biscuits and cakes	Riboflavin	-0.52	-4.39
Biscuits and cakes	Calcium	-0.36	-3.07
Biscuits and cakes	Folate	-0.41	-2.45
Biscuits and cakes	Fibre	-0.36	-2.10
Biscuits and cakes	Zinc	-0.36	-2.22
Eggs	Retinol	-0.81	-2.11
Milk and milk products (no cheese)	Riboflavin	-0.35	-2.63
Milk and milk products (no cheese)	Calcium	-0.30	-2.32
Processed potatoes	Retinol	-0.92	-2.23
Processed vegetables	Retinol	-0.97	-2.09
Processed vegetables	Riboflavin	-0.49	-3.49
Processed vegetables	Calcium	-0.45	-4.22
Processed vegetables	Potassium	-0.32	-2.07
Processed vegetables	Folate	-0.36	-2.64
Processed vegetables	Fibre	-0.29	-2.06
Processed vegetables	Zinc	-0.36	-2.27
Other foods and drinks	Folate	-0.37	-2.92

1% in trading down of aggregated food and drink:

- increase in three nutrients (retinol, riboflavin and calcium), without any change in the other nutrients.

Results – Food and drinks 2007/14



For the aggregated F&D category, the reaction to the increase in prices is very similar in all countries. Increase in expenditure, decrease in quantities (except NI) and trading down in quality.

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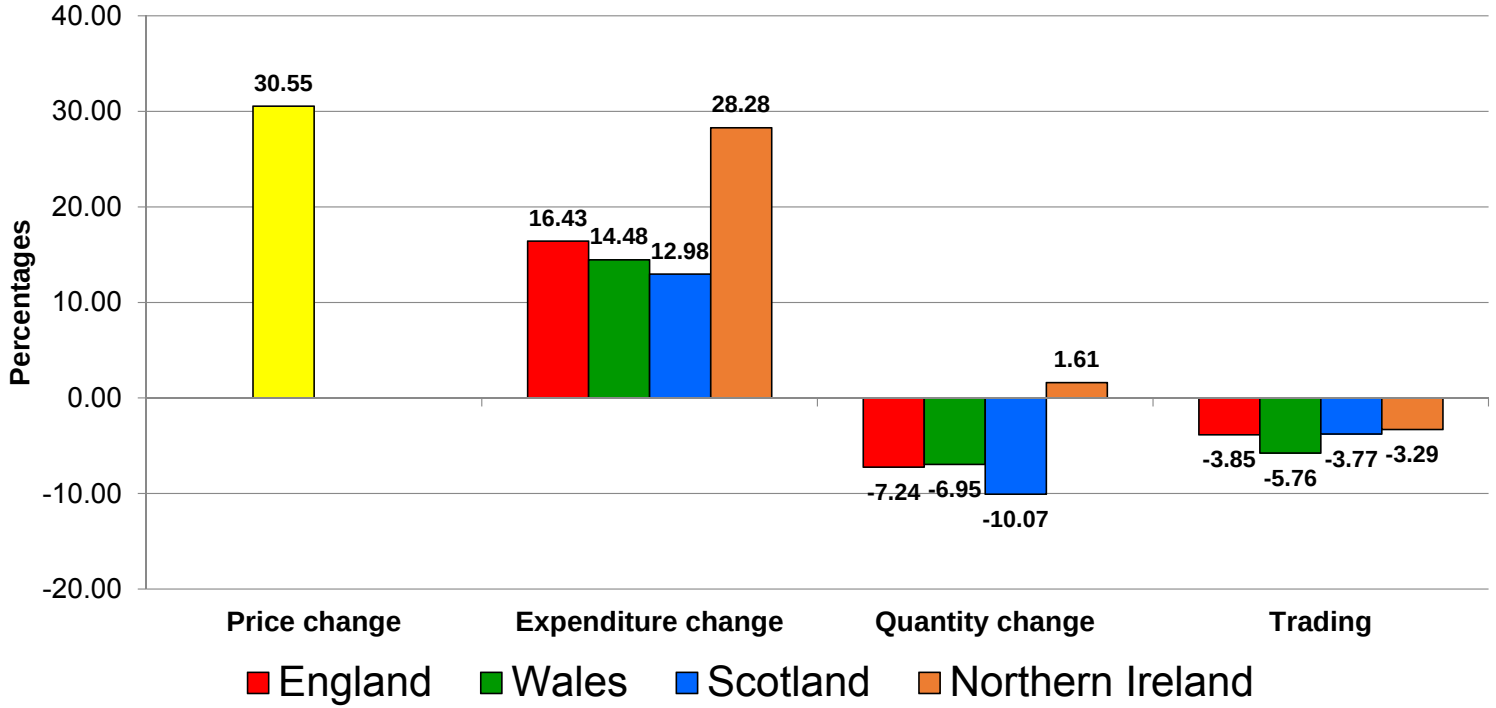

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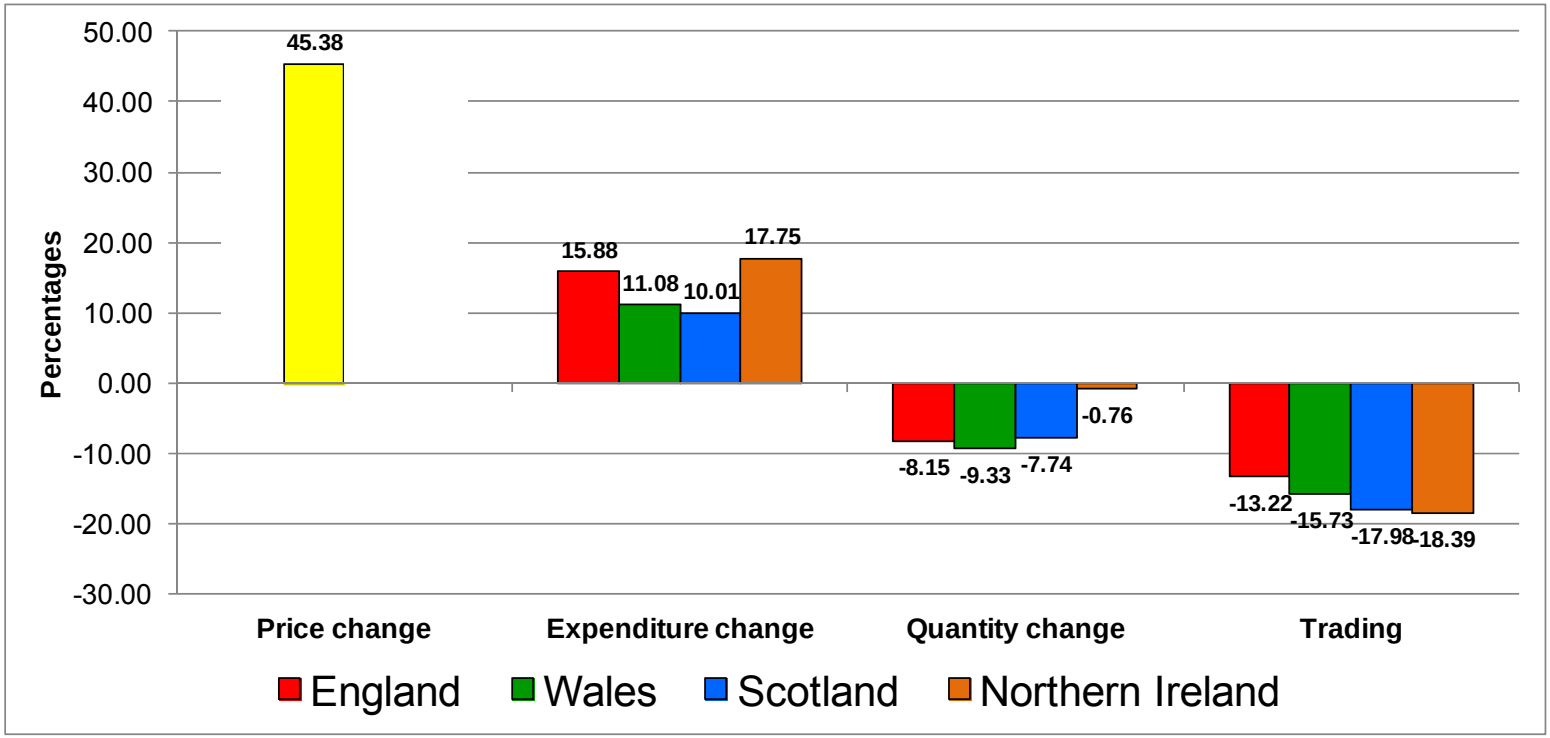
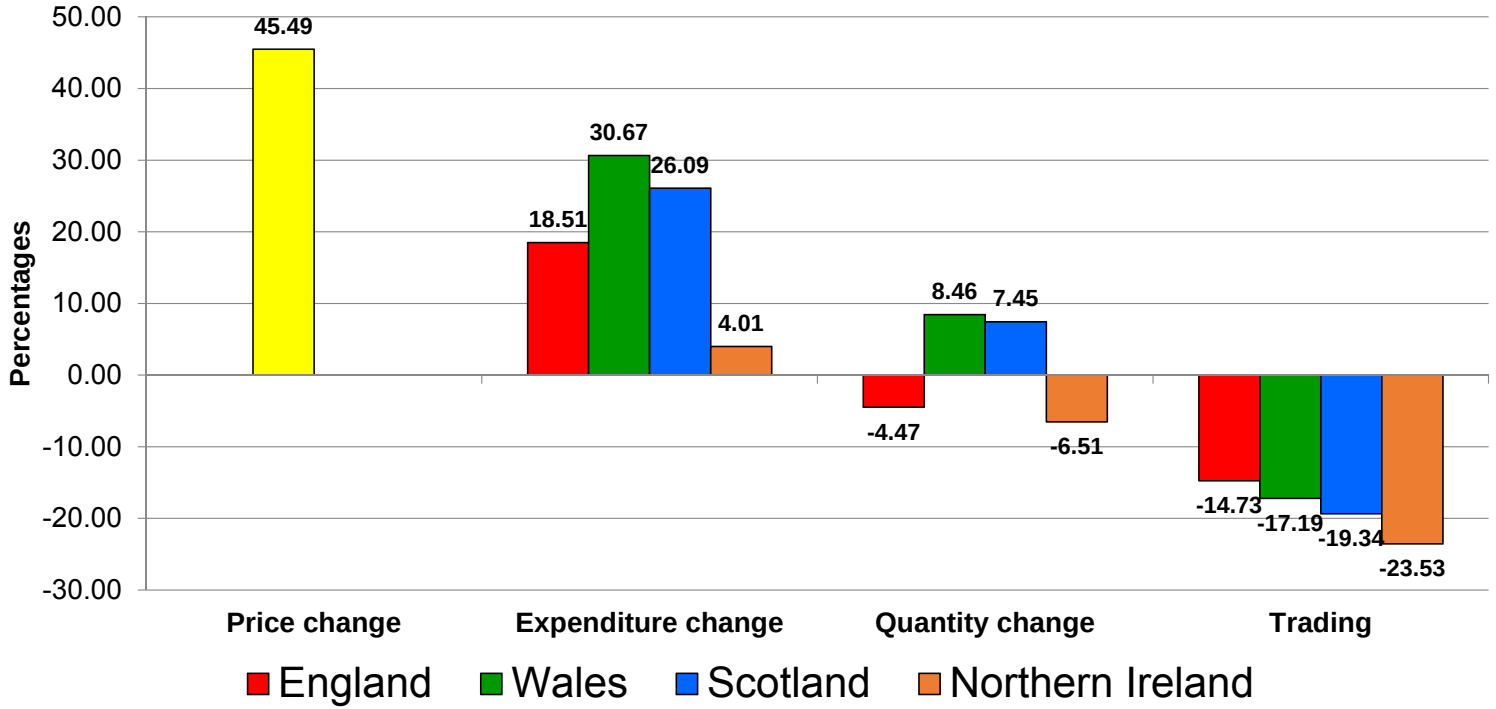
Biscuits and cakes 2007/2014



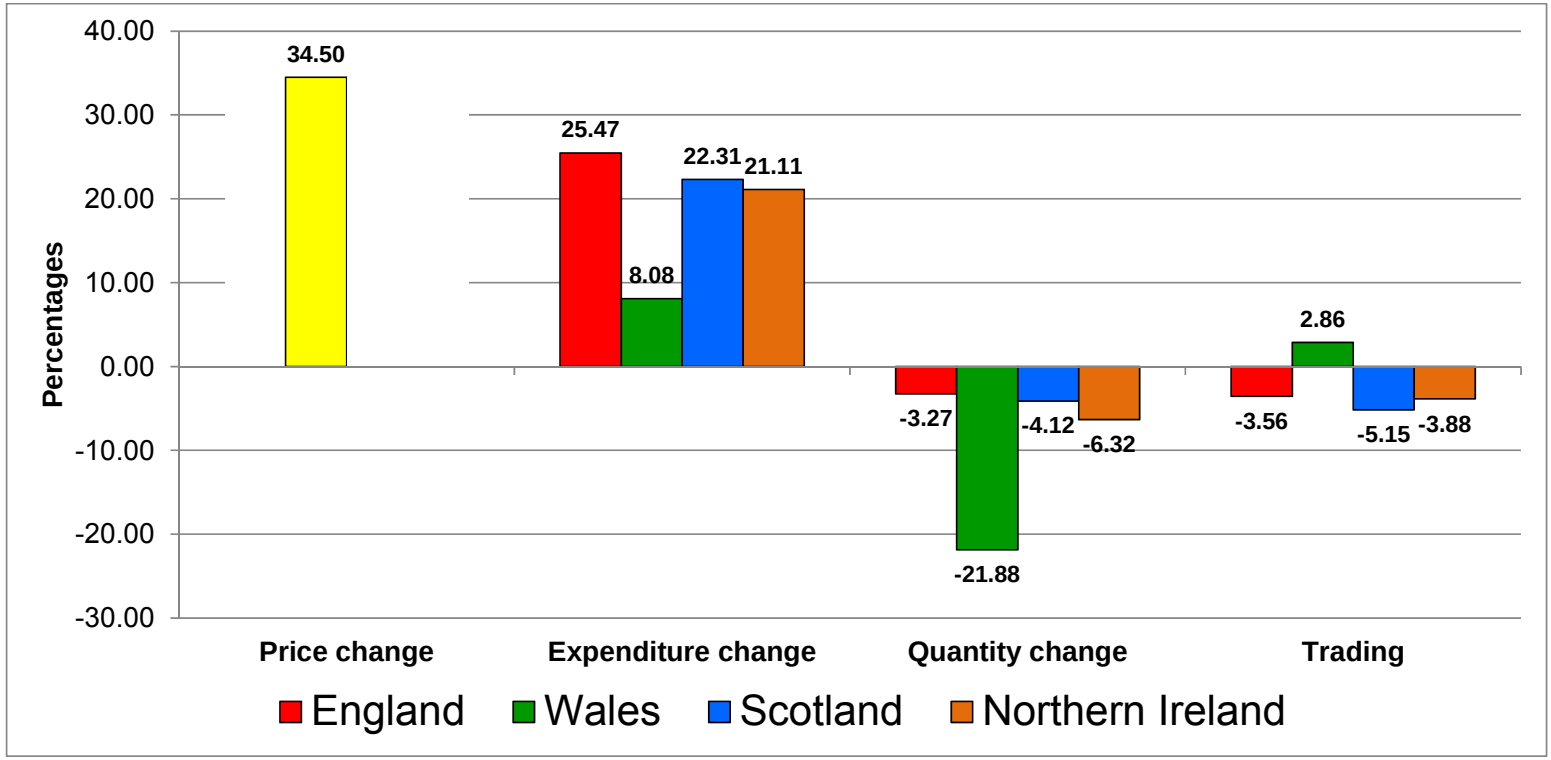
The response to the increase in prices on the category was similar in all the countries, characterised by increase in expenditure, decrease in quantities and by trading down in quality.

Biscuits and cakes 2007/2015



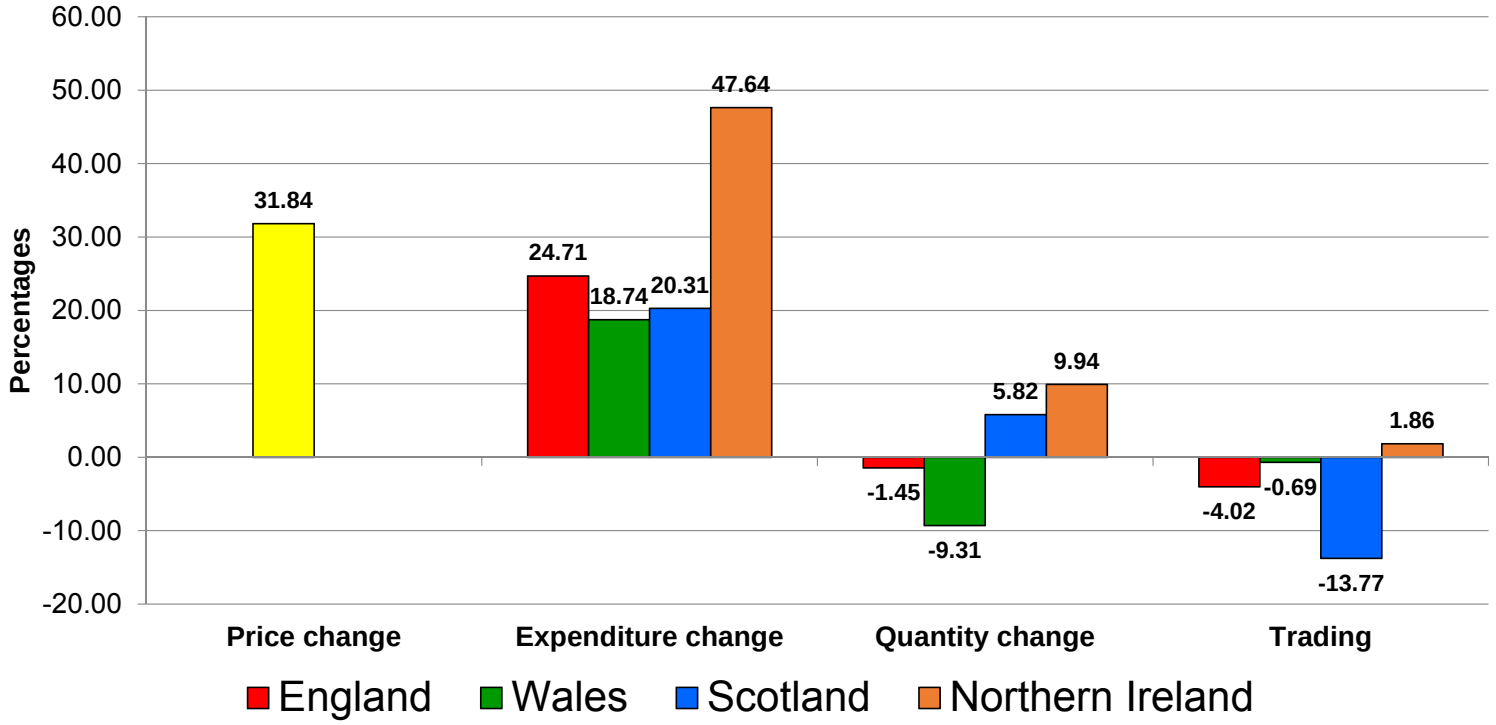
The response to the increase in prices on the category differed across the countries, characterised by increase in expenditure, decrease in quantities in EN & NI but increase for WA & SC and by trading down in quality.

Processed vegetables 2007/14



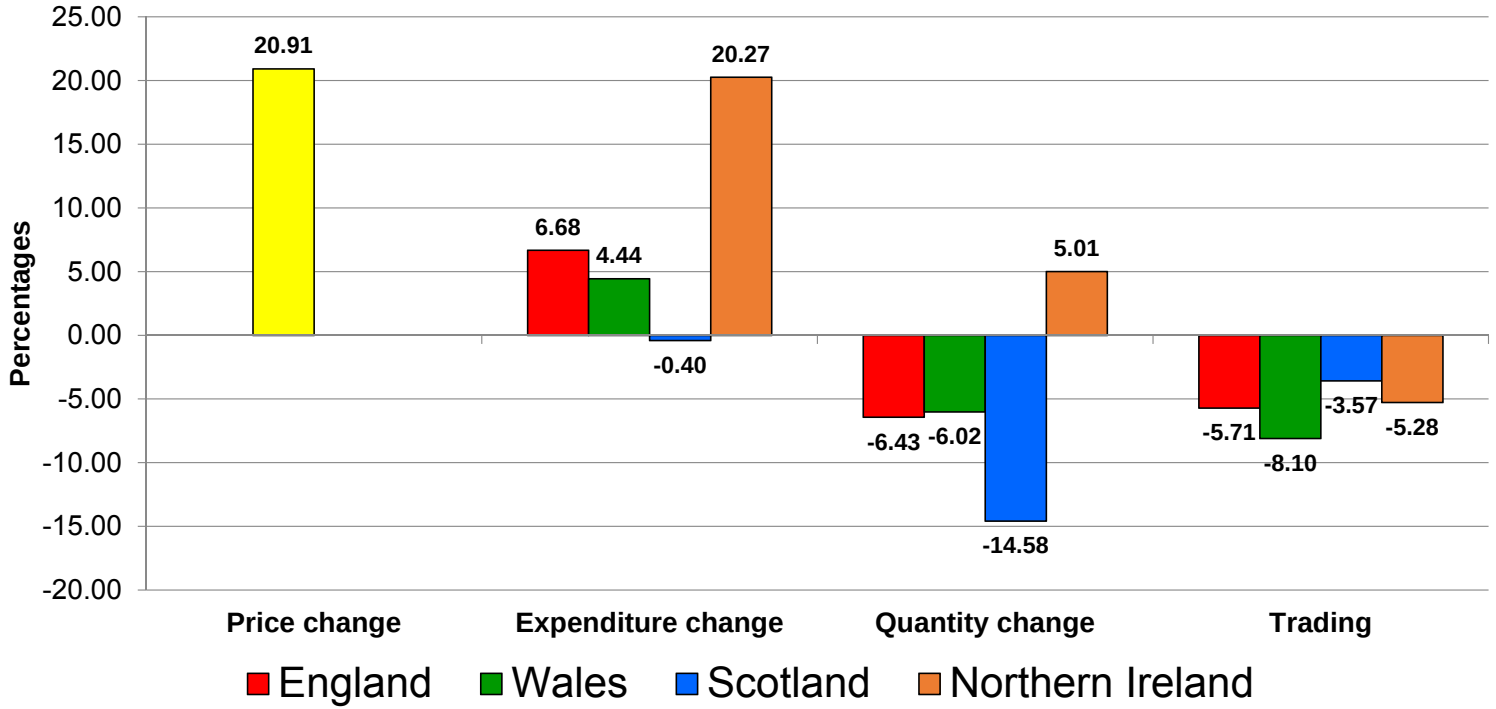
The increase in prices of processed vegetables was followed up by an increase in expenditure, a decrease in quantity (particularly in WA) and trading down in most countries except WA.

Processed vegetables 2007/15



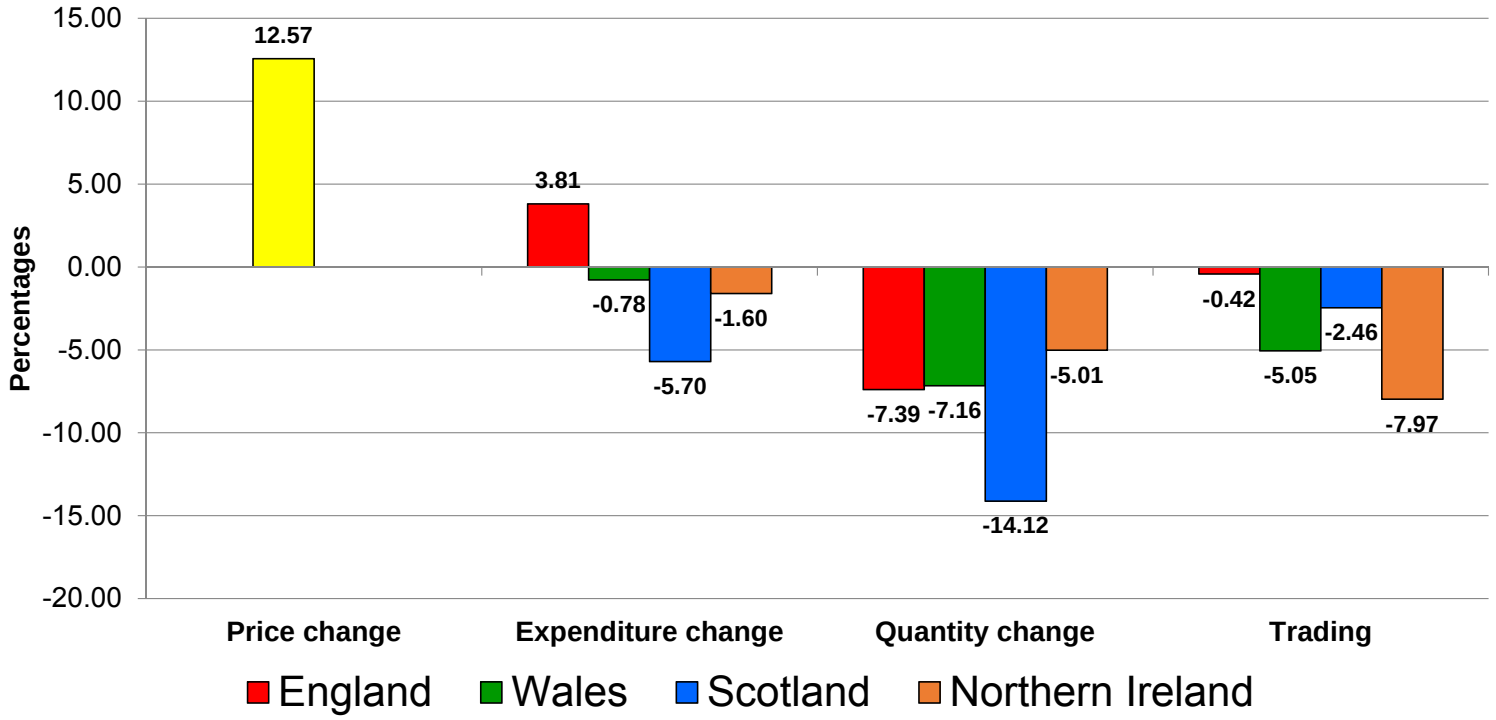
The increase in prices of processed vegetables was followed up by an increase in expenditure, an increase in quantity for SC & NI (decrease for EN & WA) and trading down in all countries except NI.

Milk and milk products (no cheese) 2007/14



The increase in prices of Milk and milk products was followed up by an increase in expenditure (except SC), a decrease in quantity (except NI) and trading down in all countries.

Milk and milk products (no cheese) 2007/15



The increase in prices of Milk and milk products was followed up by a decrease in expenditure (except EN), a decrease in quantity and trading down in all countries.

Conclusions (1)

- Changes in prices affect not only expenditures and the quantities purchased but also the **choice of products, which have implications for the quality of the diet.**
- The results indicate that in general the UK countries responded similarly to increases in prices (though there were differences in some categories).
- Trading down in quality was a common reaction to the increase in prices in all countries.
- Trading down in quality (for food & drink), depending on the category, was found to be associated with increases in Retinol and Calcium (negative elasticities in all cases).
- Trading down in quality for biscuits and cakes and Processed Vegetables increases the quantities of nutrients consumed.

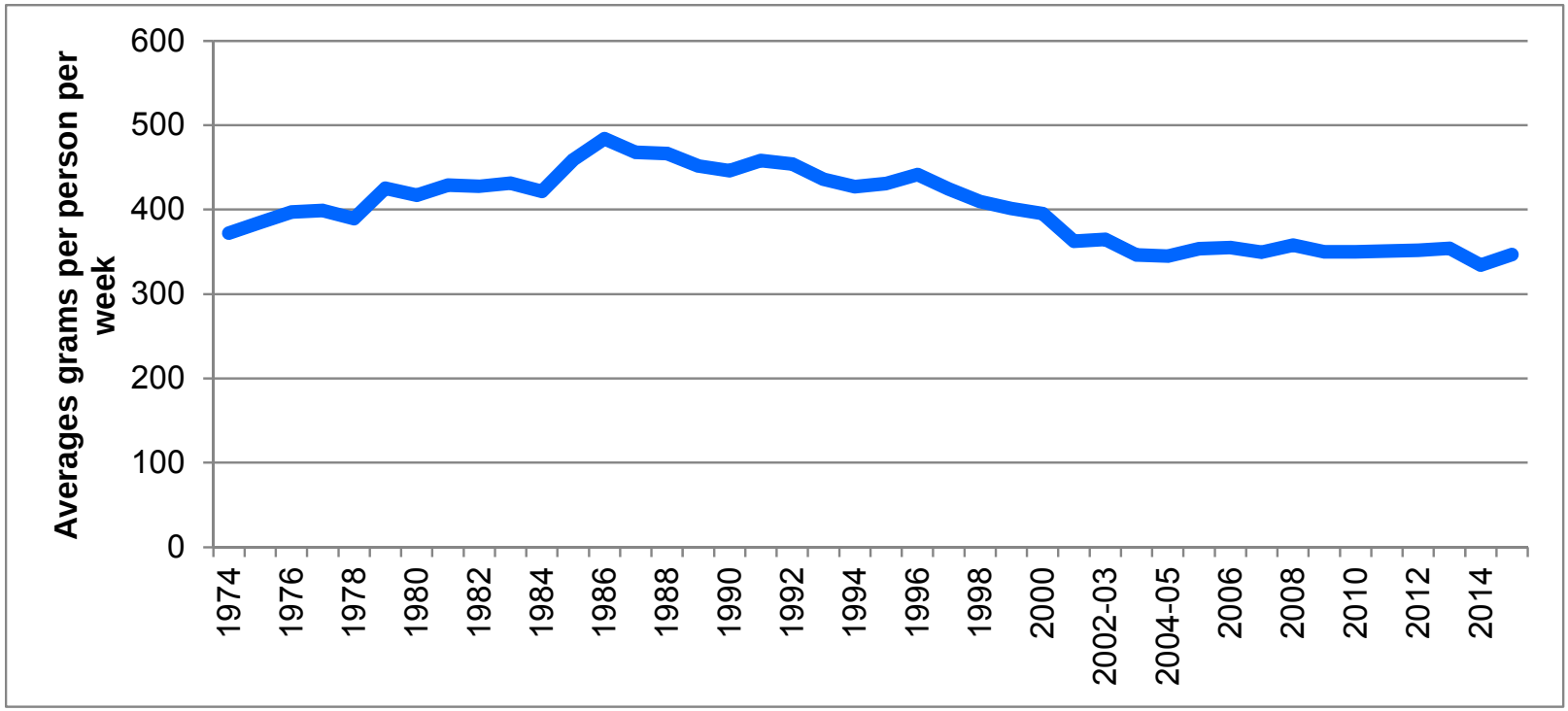
Conclusions (2)

- **Trading down** in quality of **processed vegetable products** has resulted in an increase in the purchase of foods higher in 7 nutrients.
- A caveat of the analysis is its aggregated nature, nevertheless the results are not unreasonable and they are statistically significant.
- Planned research extensions include:

1. Exploring in more detail at household level the trading down/up in quality using Kantar Worldpanel data where it is possible to observe the substitutions at the level of actual products instead of food categories as it is in the case of the family Food data.

Additional material

UK households: Quantity of processed vegetables purchased 1974-2015



Source: Based on Defra's Family Food data