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Final Report

Analysis of Red and Processed Meat Purchases in Scotland using Representative Supermarket Panel Data

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April – 2009

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Analysis of Red and Processed Meat Purchases in Scotland using Representative Supermarket Panel Data

Summary of Main Results

The purpose of the project has been to examine whether the database of representative supermarket shoppers could help address the lack of information on meat consumption in Scotland. Thus, the data were used to identify differences in the purchasing of red meat and preserved meat products in relation to geographical location, socio-economic categories (geo-demographics) and lifestage in Scotland.

Literature review

- Purchases and the consumption of red and processed meat in Scotland have significant implications for both the red meat sector and the health of the population. Recent trends indicate that consumers are reducing expenditure on more expensive meat cuts and meat products and looking for cheaper outlets in order to control household food budgets.

- Economic concerns are causing consumers to be more cautious in their spending in the red meat category. Forecasts for red meat sales in the UK suggest further volume and value growth, which suggests further increases in consumption.

- Encouragement of the demand for good quality, locally supplied meat within the recommended intake amount could support the Scottish meat industry, including local producers and processors, as well as the independent distribution of meat. On the other hand, recognition of the role of multiple retailers and their dominance in the market place, could offer valuable insights into, and opportunities for, the promotion of healthy options and increase the availability of affordable good quality meat to all socio-economic groups in the Scottish consumer market.

Analysis of supermarket data

The analysis of red meat purchases using supermarket data embraced five issues: geographical analysis, where Scottish purchases and composition were compared with the rest of the UK; analysis of Scottish purchases by geo-demographic group (CAMEO); analysis of Scottish purchases by lifestage; analysis of the proportion of total red meat purchases that is of Scottish origin (i.e., 'Scotch' and other Scottish origin); and a case study where the purchases of sausages (a product that represents approximately 11 per cent of the total meat expenditure in Scotland) were studied. The main results are outlined below.

Geographical analysis

- The geographical analysis indicated that the proportion of total customers buying red meat in Scotland with respect to the rest of the UK was not

different when analysed by category (e.g., raw beef). The difference, however, was significant when the aggregated categories (i.e., total red meat and preserved meat) were compared. The Scottish proportion was lower than the rest of the UK in all categories.

- As regards the distribution of Scottish expenditure by red meat category, this was close to the rest of UK, with approximately 53 per cent of the expenditure destined to red meat and 47 per cent to preserved meat.

- With respect to the average number of units purchased per supermarket customer, Scotland's value is much lower than the rest of the UK (0.5 units per customer versus 0.85 in the rest of the UK). In the case of red meat, the Scottish mean was 0.22 and the rest if the UK mean 0.39, whilst for preserved meat the corresponding figures were 0.28 for Scotland and 0.46 for the rest of the UK.

- It is important to note that the previous result does not necessarily mean that those consumers buying red meat in Scotland buy much less on average than consumers in the rest of the UK. Thus, the number of units per purchasing customer in Scotland was only slightly lower than in the rest of the UK (1.20 versus 1.22 units, respectively).

Analysis by CAMEO groups

- The analysis of the proportions of customers that purchase red meat with respect to the total number of customers in a CAMEO group, indicated that almost none of the group results were different from the Scottish average. The only difference found was that related to the purchasing of both red and preserved meats in total by 'Young and Affluent Singles', which showed a significantly lower proportion than the Scottish average.

- Across the ten CAMEO groups, there appears to be considerable similarity in the proportions of meat expenditure on red meat and preserved forms.

- The number of units purchased per customer for each CAMEO group was found to be statistically different from the Scottish average. These differences between groups may be due to the influence of the number of meat customers in the group (i.e., if only a few people in a CAMEO group purchase the product, the ratio per group will be low), but may also be due to clear eating preferences between socio-economic groups, with poorer groups having a preference for a relatively high meat and meat product diet.

- As regards the actual number of units purchased per meat customer (i.e., customers who actually buy meat products) by CAMEO group, the poorer socio-economic groups (i.e., groups 'Poorer Council Tenants – Many Single Parents' and 'Poorer Family and Single Parent Households') purchase less units of red meat and also preserved meat (raw). In contrast, the more affluent groups such as 'Affluent Home Owners', 'Comfortable Mixed Neighbourhoods', 'Wealthy Retired Neighbourhoods'

and 'Young and Affluent Singles' purchase more of them. This indicates a possible income effect (since the share in expenditure was found to be the same in all of the groups).

Analysis by Lifestage groups

- The ratios of customers purchasing red meat with respect to the total number of customers for each Lifestage group are quite similar to that observed for Scotland as a whole. However, 'Young Families' seem to have the highest proportions amongst the groups (23.1 per cent for raw meat and 30.5 per cent for preserved meat).

- There are statistically significant differences in the number of units of meat purchased per customer amongst the Lifestage groups and the Scottish average. The figures indicate that families, both 'Older Families' and 'Young Families', purchase most meat (both red and preserved meat).

- As regards the number of units purchased per customer, the groups with an above average number of units are 'Adult' and 'Young Families' (both with 2.45 units) and the category 'Others' (2.49 units). In contrast, 'Pensioners' exhibit the lowest purchase per customer with 2.28 units. It is important to recall that it is inappropriate to infer household consumption from these figures –even if they are per customer- as the household size may differ substantively amongst groups.

Analysis of purchases of Scottish origin

- Overall, just over 26 per cent of the purchased red meat by value is from Scottish origin (i.e., Scotch and other Scottish). This result, however, differs substantially by groups. Thus, 7.5 per cent of the total red meat purchased is Scotch and 34.6 per cent is other Scottish (i.e., non-Scotch), making a total of 42.1 per cent. The former only consists of raw Scotch Beef and Lamb, whilst the latter comprises a wide range of products carrying a Scottish name or indication that they were produced in Scotland.

- In terms of raw beef, the percentage explained by the 'Scotch' PGI is 12.0 per cent of the total expenditure, whilst the other Scottish raw beef explains 50.2 per cent. Thus, 62.2 per cent of the raw beef purchased is from Scottish origin. In the case of raw lamb, the percentage accounted for by the 'Scotch' label is above the one observed for beef (14.5 per cent), but the percentage of other Scottish is much lower than for beef (23.6 per cent), producing a total from Scottish origin that is substantially lower than for beef (38.1 per cent).

- The Scottish origin in the case of preserved meat is quite small and equal to 7.9 per cent. Bacon and gammon and Sausages have the highest percentage (13.9 per cent and 12.6 per cent, respectively).

Analysis of the purchases of sausages

The purchases of sausages was studied according to a number of variables, namely: energy from saturated fat; saturated fat in total product weight; sodium in total product weight; salt in total product weight; price per unit and price per 100g.; and also by CAMEO and Lifestage groups. The main results found were as follows.

- The distribution of expenditure on sausages, according to energy from saturated fat, was found to be similar to the Scottish average across the CAMEO and Lifestage groups. This was also the case for the distributions of the expenditure according to the saturated fat content of the products.

- The expenditure allocation on sausages of different sodium contents in the total product weight for the CAMEO and Lifestage groups, showed that most of the expenditure is allocated to sausages in the intermediate category and none of the groups was statistically different to the Scottish mean. The distribution according to different salt contents showed similar results to the distribution according to the content of sodium, and no differences were found between the groups and the Scottish average distribution.

- In contrast to the previous results the distributions according to price showed differences amongst groups and reflected the importance of income. Thus, the allocation according to price per unit by CAMEO groups, showed that affluent groups (i.e., 'Affluent Home-Owners', 'Wealthy Retired Neighbourhood' and 'Young and Affluent Singles') are the ones that allocate more expenditure to the most expensive sausages. In contrast, 'Poorer Council Tenants – Many Single Parents' and 'Poorer Family and Single Parent Households', have a relatively high share of their expenditure on the low priced sausages.

- The expenditure allocation on sausages considering prices per 100g also showed that income plays an important role in the selection of sausages. This is quite important because there is a negative correlation between the nutritional characteristics of the different sausages and their prices. In addition, although the relationship between nutritional characteristics and prices is negative for the cheaper products, there is a range in terms of their nutritional characteristics; in other terms, a cheap product not necessarily an unhealthy product. However, groups 'Poor Council Tenants – Many Single Parents' and 'Poorer Family and Single Parent Households' have an above average expenditure proportion on sausages with higher energy from saturated fats, sodium and salt.

- In the case of Lifestage groups, their distribution of expenditure across sausages with different prices per unit was similar to the average for Scotland. As regards differences between groups, 'Pensioners' spend the highest proportion of sausage expenditure on low priced sausages, and the lowest on the highly priced sausages. 'Young Adults' and 'Older adults'

and 'Others' spend the highest share on high priced sausages and the lowest on low priced sausages.

Overall, the supermarket data seem to point out that the differences in the purchasing patterns amongst either CAMEO groups or Lifestage groups in Scotland are not too strong. In this sense, targeting particular consumer groups might be a relatively inefficient policy for improving the nutritional standards of the population. Instead, it might be better to address the quality of specific products (e.g., cheap products with poor nutritional characteristics and which enjoy a high level of sales) through engaging with suppliers on raising the nutritional characteristics of their products.

Analysis of Red and Processed Meat Purchases in Scotland using Representative Supermarket Panel Data

I.   Introduction

The diet in Scotland, together with smoking, has been successively cited as one of the main contributors to high rates of chronic diseases such as coronary heart disease, obesity, type 2 diabetes, high blood pressure, stroke and certain types of cancer (The Scottish Office, 1993; The Scottish Office, 1996; The Scottish Executive, 2003).

Dietary targets for Scotland were published in the 1996 Scottish Diet Action Plan (SDAP), Eating for Health (The Scottish Office, 1996) and reiterated in the latest policy document on Healthy Eating, Active Living (The Scottish Government, 2008). These targets, which include a mixture of nutrient and food based targets, were set for achievement in 2005 (now extended to 2010). The Scottish Dietary Targets (SDTs) were set for fruit and vegetables, bread, breakfast cereals, fats (including saturated fatty acids), salt, sugar, total complex carbohydrates and fish.

A previous report on the Scottish Diet (The Scottish Office, 1993) had also identified targets for reducing processed meat and sausages (to be reduced by half) and bacon and ham (to be reduced by 20 per cent), with the aim of reducing the intake of fat and saturated fatty acids which are thought to be contributing to high rates of heart disease and obesity.

The current UK recommendations from the Committee on Medical Aspects of Food and Nutrition Policy (COMA, 1998) for red and processed meat consumption for adults in relation to cancer risk, suggest that individuals' consumption of red and processed meat should not rise; and that higher consumers should consider a reduction; and as a consequence of this the population average will fall (COMA, 1998).

More recently, the World Cancer Research Fund (WCRF, 2007) highlighted the evidence that consumption of red and processed meat (including bacon and ham) is likely to increase the risk of colorectal cancer and recommended a reduction in both red and processed meat consumption.

Diet has an impact on health, therefore it is important to track changes in the diet of the population and in sub-groups of the population to allow better targeting of appropriate advice and interventions.

Ongoing surveillance of the UK diet data from the National Diet and Nutrition Survey (e.g., NDNS, 2002) provides detailed information on nutrient and food consumption for individuals using a diet diary, but its Scottish coverage is limited. Data from other parts of the UK is not necessarily representative of food consumed in Scotland, due to regional differences in food consumption (Blades, 2004).

Additional information on the diet of sub-groups of the population in Scotland is available from secondary analysis of the UK Expenditure and Food Survey (EFS). A review of Food Consumption in Scotland, carried out in 2006 (Wrieden et al, 2006) and based on EFS 2003/2004 data, showed that the population mean consumption of processed meat (including burgers and meat pies) and sausages was 55g /day and for bacon and ham was 16g /day. The review also showed that higher amounts of processed meat and sausages were consumed in more deprived areas.

More than three-quarters of the meat in the UK is purchased from supermarkets (MLC, 2008). It was therefore worth considering whether supermarket panel purchase data could help address the lack of timely and up to date information on meat purchasing patterns in Scotland. Principally, this is in relation to the patterns of consumption of different types of meat products within sub-groups of the population, with the purpose of informing Scottish Government and Food Standards Agency Scotland (FSAS) policy.

The data used in the project come from a database of representative supermarket shoppers. Scotland represents 7 per cent of shoppers in the database (i.e., 91 thousand shoppers). The main characteristics of the database data are as follows:

• It consists of the most recent 2 years of weekly supermarket panel data.
• It comprises a panel of 1.3 million supermarket shoppers, representative of 40 per cent of UK households.
• The database records information for 265 thousand Stock Keeping Units (SKUs), of which 30 thousand are food products.

It is important to note that the database records transactions not at the level of shoppers but aggregated at the level of stores (e.g., total sales of a product in a store). Thus, it is not equivalent to survey data. However, the data are classified according to different dimensions to help their analysis. Thus, they are classified by lifestage, lifestyle, region, retail format and neighbourhood (geo-demographics).

The project's aim has been to examine whether this database of representative shoppers can help address the lack of information on meat consumption in Scotland. Thus, the data were used to try and measure purchases of red and preserved meats and to identify differences in the purchasing of red meat and preserved meat products in relation to geographical location, socio-economic categories (geo-demographics), and lifestage in Scotland.

The structure of the report is as follows: it starts with literature review of the red meat purchases in the UK and Scotland followed with a brief presentation of the methods used in the report. Next, the results from statistical analysis of supermarket data are presented. This is done by means of figures and the detailed statistical tables are presented in the annex. These are divided into the following sections: first, geographical analysis, where the Scottish results are compared with the rest of the UK; second, analysis by geo-demographic

classification (i.e., UK-CAMEO); third, analysis by lifestage group; fourth, analysis of the purchase of red meat from Scottish origin; and fifth, a case study regarding the purchases of sausages by CAMEO and Lifestage groups. Finally, conclusions and implications for policy and further research are presented.

II. Literature review regarding red meat purchases in UK and Scotland

This literature and market review addresses meat consumption in Scotland from the perspective of the market place. As such, it summarises major market and consumer behaviour factors influencing meat purchase in the UK (and where possible identifying aspects prominent in Scotland). It also examines recent meat and meat product purchase trends in the UK and Scotland. It concludes with present and future prognosis on red meat sales and consumption in the UK and Scottish markets. Separate section of this review is dedicated to methodology and use of economic measures to predict consumption of food.

The Scottish Diet, together with smoking, has been successively cited as one of the main contributors to high rates of chronic diseases such as heart disease, obesity, type 2 diabetes, high blood pressure, stroke and certain types of cancer (Scottish Office, 1993; Scottish Office, 1996; Scottish Executive 2003).

Dietary targets for Scotland were published in the 1996 Scottish Diet Action Plan (SDAP), Eating for Health (Scottish Office, 1996) and reiterated in the latest policy document on Healthy Eating, Active Living (Scottish Government 2008). These targets, which include a mixture of nutrient and food based targets, were set for achievement in 2005 (now extended to 2010). The Scottish Dietary Targets (SDTs) are set for fruit and vegetables, bread, breakfast cereals, fats (including saturated fatty acids), salt, sugar, total complex carbohydrates and fish.

A previous report on the Scottish Diet (1993) also identified targets for reducing other specific food groups in the diet of the nation. These included: cakes, biscuits and pastry; processed meat and sausages; bacon and ham; butter; saturated fat margarines and spreads (to be replaced with low saturated fat equivalents); whole milk (to be replaced by semi-skimmed, except for infants and 1-2 year olds), sugar and preserves; confectionery, soft drinks and savoury snacks.

The current UK recommendations from COMA (1998) for red and processed meat for adults, suggests that individuals' consumption of red and processed meat should not rise; and that higher consumers should consider a reduction, which would lower the population's average.

As a guide to help identify where people's patterns of consumption lie in the distribution of intakes, the current UK average meat consumption was estimated by COMA at around 90 g/day cooked weight (8-10 portions a week). COMA also assessed that 15 per cent of the Scottish population consumes above 140 g/day of meat (cooked weight, 12-14 portions per week) and that this group of consumers should consider a reduction in their meat intake.

More recently the second report of the World Cancer Research Fund (WCRF, 2007) highlighted the patterns of consumption likely to increase the risk of various cancers. In particular, the report highlighted the evidence that the consumption of red and processed meat (including bacon and ham) is likely to increase the risk of colorectal cancer. Their recommendation, to limit the intake of red meat and avoid processed meat, is still being considered by the Scottish and UK Governments.

Research into red meat consumption and cancer interdependence is especially important for decision makers in developed countries that are affected by adverse dietary patterns (Cross et al., 2007). Meat and meat products are one of the major sources of fat and saturated fat in the diet. However, they also provide essential micronutrients, particularly vitamins A and D and the minerals iron and zinc (Hoare and Henderson, 2004). Any targets for consumption will have to be balanced to avoid sub-optimal intakes of micronutrients, which are already known to be low in some groups (e.g. iron and zinc in young women) (Nelson et al., 2004).

A review of Food Consumption in Scotland carried out in 2006 (Wrieden et al., 2006), showed that in 2003/04 the population's mean consumption of processed meat (including burgers and meat pies) and sausage was 55 g. and for bacon and ham 16 g. per week. The review also showed that the Scottish Dietary Targets (STDs) were not being met, and that consumption of foods targeted to be increased was significantly lower in the most deprived groups of the population. For processed meat and sausages the reverse was seen, with higher amounts (the population mean is 64 g. for the most deprived quintile of the Scottish Index of Multiple Deprivation, SIMD) being consumed in more deprived areas.

There are several reasons why people may choose a poor diet. These include the following.

- Perceptions and attitudes - consumers might not fully understand the implications of their food choices for their health (Tiffin et al., 2006).
- Market failure – the prices of food may not reflect the social resource costs of production (Tiffin et al., 2006).
- Poverty and associated problems of low educational attainment, unemployment, low pay and poor areas of residence (Anderson, 2007; Wrigley, 2002).
- Minimal cooking facilities and skills (Wrieden et al., 2007).

Determinants of red meat purchase and consumption

Socio-economic status

Well documented research worldwide (Ball et al., 2009; Darmon and Drewnowski, 2008; De Irala-Estevez et al., 2000), in the UK (Bromley et al., 2005), and in Scotland (Wrieden, 2004), supported by market and

epidemiological data, shows that diet quality follows the Social and Economic Standing (SES - often referred to as Socio Economic Position) of consumers.

Overall, higher-quality diets are associated with higher income, higher social standings and education. Energy-dense diets (nutrient-poor) are associated with lower socio-economic groups with limited disposable income (Inglis et al., 2005). Personal disposable income (PDI) therefore, is a major predictor used to forecast the red meat market as it determines the consumers' ability and willingness to trade up to premium, higher value options and to absorb any price rises.

While socio-economic differences in dietary intake are well documented, relatively little is known about their underlying causes. Amongst the reasons for such variations are the cost differentials between energy-dense and nutrient-dense foods (Maillot et al., 2007), physical access to healthy food options (neighbourhood effect), acquired taste (sensory preferences) and nutritional habits and traditions (Rozin, 2007).

In the UK, marketing research involves the application of "traditional" socio-economic groupings of AB, C1, C2, D and E. However, in more specific groupings such as the 'A Classification of Residential Neighbourhoods' (ACORN) (CACI, 1993) categories of 'Wealthy Achievers', 'Urban Prosperity', 'Comfortably Off', 'Moderate Means', and 'Hard Pressed' are being used in commercial research. ACORN is used in the UK to categorise consumers according to postcodes, by using Census data and other information such as lifestyle surveys. There are also proprietary classifications owned by marketing research agencies and used to answer specific research questions in commercial business research (e.g. competing with the ACORN Mosaic or CAMEO classification used in this report). There have also been attempts to arrive at a comprehensive classification orientated towards food products alone (Grunert et al., 1997) and also meat as a food product category (Verbeke and Vackier, 2004).

The post code classification has significant impact where availability of food as determined by store location is concerned (Cummins and Macintyre 2002).

Consumer preferences, attitudes and behavioural perspective

In food marketing and consumer studies most research is based on investigation of "traditional" attitudes and behavioural intent. These are recorded during direct questioning. Consumers express their opinions at a given point of time in a situation that often is remote from the Point-of-Purchase (POP) conditions encountered in the course of everyday shopping. Declared attitudes and food preferences therefore may not be a true reflection of consumer purchase and consumption behaviour (Shepherd and Towler, 1992). However, consumers when making choices are likely to use a "starting point" defined by strong and well established attitudes. Thus, in order to define the purchase orientation that consumers have towards meat and meat products one may use the psychographic characteristics of consumers (i.e., information about social class, lifestyle, behaviour, opinions, believes and

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values). There is an array of factors (Resurreccion, 2004) that differ in their importance in influencing meat choice decisions of different groups of consumers. Consumer segmentation has to be applied to identify sectors of the population of consumers with different preference criteria. In meat and meat product choices, consumer preferences depend on both intrinsic and extrinsic sets of product attributes (Bello and Calvo, 2000), with sensory values prevailing in the first set and product provenance leading in the second set (Verbeke and Vackier, 2004; Verbeke and Ward, 2006).

For example, in the UK 25 per cent (Mintel, 2008a) of red meat consumers consider red meat consumption as driven by taste and cannot see any alternative to this product category. Men tend to be more loyal to specific meat product categories and have their preferences rooted firmly in nutritional habits acquired in childhood and adolescence (Mintel, 2008a). There are also specific differences between Scotland and the rest of the UK with regards to specific meat products, such as canned meat (see Canned Meat sub-section below) or Scottish preference for locally produced lamb and beef.

Figure 1 illustrates changes in purchases of individual meat categories in the space of one year (2007) and indirectly depicts differences in preferences between British and Scottish consumer markets. Scottish consumers tend to eat more beef, bacon and cooked sliced meat, and less lamb, chicken and sausages in comparison with the British average. What is even more visible is the difference in trends (percentage change over the period of one year) where, for example, an increase of 5 per cent in pork volume sales in Britain in total was accompanied by a decrease of 1 per cent in the same measure in Scotland. Similar percentage differences could be observed in volume sales of lamb, 6 per cent of more growth in Scotland, and turkey, 7 per cent less of a decrease in sales of turkey.

Figure 1: Comparison of volume share change of different meat and fish product in Great Britain and Scotland in total meat and fish retail sales (%)
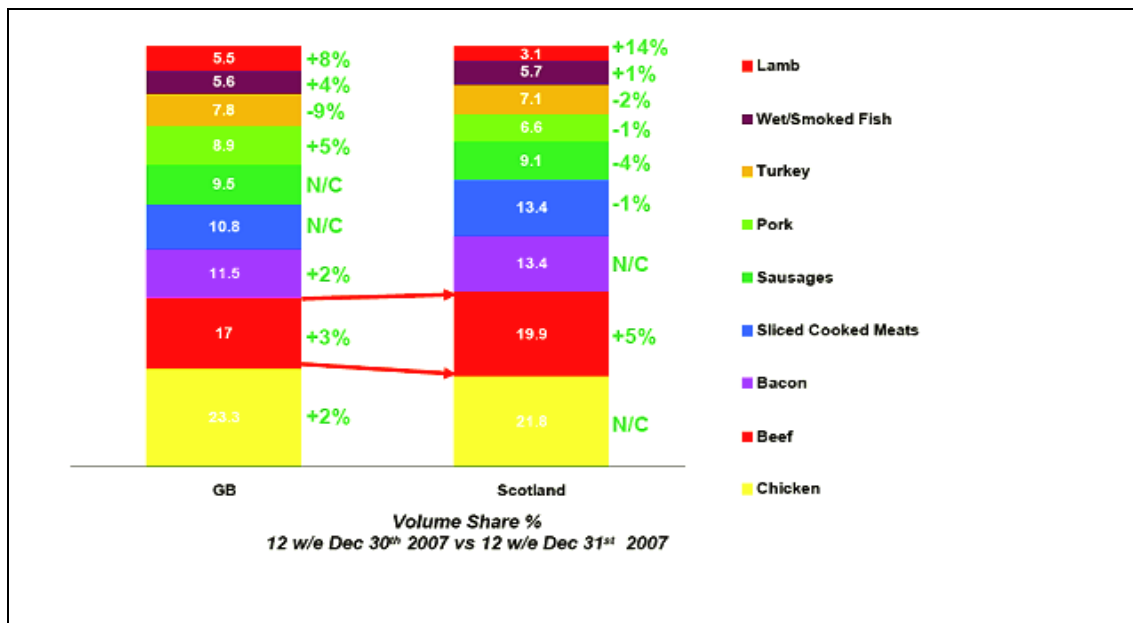
Source: TNS Worldpanel, 2008[2].

Red meat supply chain and the market

Meat supply chain

Values of sales for the whole UK retail market according to type of retail outlet are presented in Table 1 below. Supermarket chains dominated meat sales in the UK, however, there was also an increase in the value of sales through independent outlets. However, butchers enjoyed only a slight turnover increase in comparison with the double digit growth observed for both multiples and other independent outlets.

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[2] TNS Worldpanel data is collated using bar code scanners, Internet, till receipt scanning as well as paper diaries and interviewing.

Table 1: UK retail sales of red meat, by type of outlet and value, 2003-07

	2003		2005		2007		% change 2003-07
	£m	%	£m	%	£m	%	
Multiple grocers and freezer centres	1,943	76	2,130	76	2,331	76	20.0
Butchers	399	16	399	14	413	14	3.5
Co-ops	77	3	95	3	107	4	38.6
Others*	154	6	179	6	206	7	33.7
Total	2,573	100	2,803	100	3,057	100	+18.8

Notes:
* includes market stalls, farm shops and the Internet
Source: Mintel Red Meat, 2008a.

An important change in the sales distribution of retail outlets was observed in 2008 due to an increase in the sales of meat through the discounters: Lidl, Aldi and Netto. Despite the fact that they all have a very limited assortment of fresh meats in comparison to the Big 4 supermarkets[3], and stock cheaper cuts such as stewing beef, mince and pork chops, their price offering corresponds with the expenditure capabilities and expectations of many consumers.

Generally, butchers play a bigger role in red meat sales in Scotland compared with the rest of the UK, and the Big 4 supermarket chains have a significantly lower share in sales of lamb (Table 2).

Table 2: Comparison of retail outlets share in value of meat sales in Scotland and the UK, 2007

	Scotland			United Kingdom		
	Beef	Lamb	Pork	Beef	Lamb	Pork
Big 4	63	41	65	68	60	69
Butchers	16	16	12	12	16	11
Others	21	33	23	20	24	20

Source: QMS Consumer Insights, 2008.

More detailed differences between Scotland and the British average sales of meat and meat product categories are presented in Figure 2 below. Amongst all the outlets, Tesco meat sales show the least variance between Scottish and British markets. What is even more important in the context of the approach used in this analysis is that on average 25 per cent of meat and meat products in Scotland are sold by Tesco.

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[3] Tesco, Asda, Sainsbury and Morrisons currently account for 75 per cent of the grocery market, with the largest retailer - Tesco, having almost twice the market share of its next competitor (31.3 per cent versus 16.7 per cent of ASDA – according to data for last 12 weeks ending 04/11/08) (TNS Worldpanel, 2008).

Figure 2: Comparison of meat sales in the whole of Great Britain versus Scotland
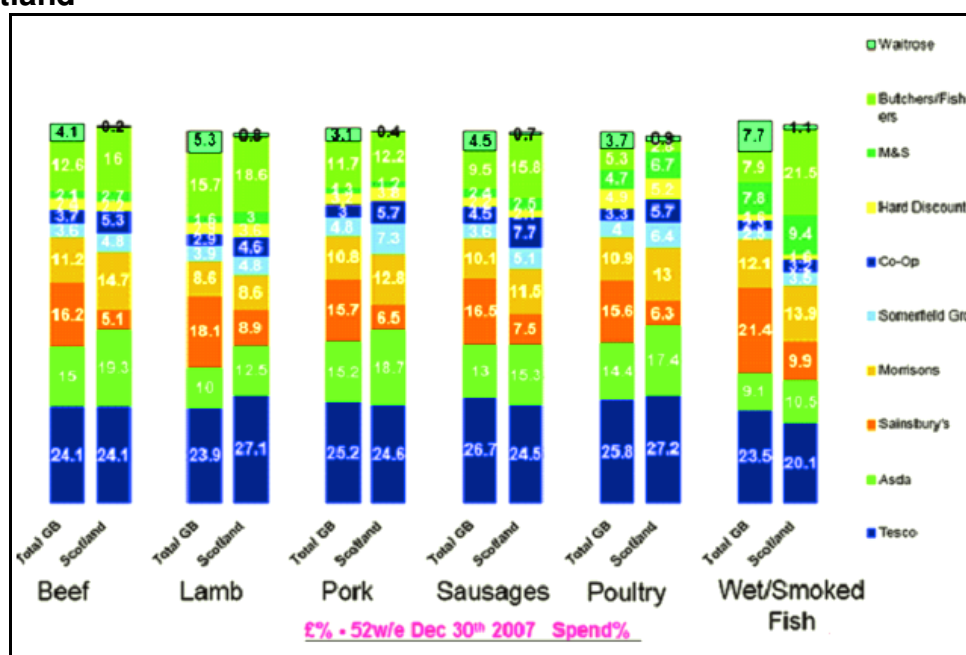
Source: TNS Worldpanel, 2008.

Meat purchases

The trends in purchases of red meat and meat products in the UK are depicted in the table below. Over the last year, there has been a significant decrease in the quantity of all fresh and frozen meat categories purchased. The most prominent changes were seen in the beef and lamb categories. As price rises affected household budgets there was a shift towards cheaper cuts, which has limited further price increases on the more valuable cuts of meat. On the other hand, sales of premium red meats might have benefitted as consumers have tended to reduce their frequency of eating out occasions and replaced them with a higher quality meat consumed at home. Amongst different demographic groups of consumers, men reacted with the highest reported decrease in consumption due to the higher prices of meat in 2008, and were seeing quality red meat as a special meal rather than everyday food (Mintel, 2008a). Despite these influences, marketing research has identified that men, young consumers and consumers aged 55-64 years old, have the potential to increase consumption of red meat in the future (Mintel, 2008a). Depending on current intakes of red meat in these consumers, an increase in red meat consumption might not be considered appropriate based on COMA recommendations and the evidence provided by the WCRF in 2007 (WCRF, 2007) on the potential risks of high consumption. Thus, increases in red meat intake could, therefore, contradict dietary recommendations issued by non-profit/government bodies.

According to TNS (QMS, 2008) the volume of sales of locally produced lamb has risen by almost 9 per cent in Scotland during the period August-November 2008 in comparison with the same period in 2007. However, the

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total volume of lamb sold (of all origins) in Scotland decreased by 4.5 per cent in the same period. Similar data for Scottish origin beef show only a slight drop of 1 per cent during these months, with a significant 8 per cent drop for purchases of all beef in Scotland during this period.

Table 3: Percent changes in quantity purchased, expenditure and price of meat categories 2008/2009

Product category	Quantity Purchased	Expenditure	Price
Fresh and Frozen Meat	↓2	↑8	↑10
Pork	↓2	↑8	↑10
Beef	↓3	↑9	↑12
Lamb	↓4	↑4	↑9
Bacon	↑1	↑12	↑11
Sausages	↑2	↑11	↑8
Burgers	↑7	↑11	↑4
Ham	0	↑7	↑8
Total Sausage Rolls	↑1	↑5	↑4
Pork/Cold Eating Pies	↓3	↓1	↑1
Total Hot Pies	↑2	↑7	↑5
Total Processed Products	↑0	↑5	↑5
Pig meat	↑1	↑6	↑6
Beef	↓2	↑6	↑7

Source: Agriculture and Horticulture Development Board (AHDB), Meat Services. UK Pig Market Update March 2009.

More recent comparative data for Scotland and Great Britain are available from Quality Meat Scotland (QMS, 2008) for each of the red meat categories and it is presented in Table 4.

Table 4: Household consumption of fresh meat: Scotland versus the whole of the UK

	Scotland			United Kingdom		
	2004	2005	2006	2004	2005	2006
Grams per person per week						
Beef and veal	134	130	137	123	120	128
Lamb	18	22	25	50	53	54
Pork	39	36	30	56	52	55

Source: QMS Annual report 2007/2008

Table 4 shows that beef is the most popular meat in Scotland, accounting for more than half of consumption both in volume and value terms, although it has come under greater pressure from the other meats. Consumption of pork showed slight decrease although long term it has followed a growth trend. Since 2005, lamb has taken a greater share of the overall red meat market. This increase has been driven by strong promotional support (led by QMS in Scotland), and increased allocations of shelf space in supermarkets.

Cooked Meat and Bacon

In recent years the vast majority of cooked meats and bacon have been sold by supermarkets, with independent outlets selling around 25 per cent of these product categories (see Tables 5 and 6). Cooked meats constituted over 13 per cent of sales of total meat and fish products in Scotland. Hence the quality and availability of "healthy" cooked meat could be a challenge, as very often the range of meats offered by independent retailers is limited, especially in deprived areas.

Table 5: UK retail sales of delicatessen meats, by value, by type of outlet, 2003-07

Retail outlet	2003		2005		2007 (est)		% change
	£m	%	£m	%	£m	%	2003-07
Grocery multiples/co-ops	1,171	72	1,391	75	1,606	76.4	37.0
Independent delicatessens and butchers	455	28	464	25	504	24.6	11.0
Total	**1,626**	**100**	**1,854**	**100**	**2,102**	**100**	**29.0**

Source: Mintel, 2008a

Table 6: UK retail sales of bacon, by type of outlet and value, 2002-06

	2002		2004		2006		% change
	£m	%	£m	%	£m	%	2002-06
Grocery multiples and freezer centres	796	77.5	838	78.2	822	79.8	3.3
Co-ops	34	3.3	38	3.5	37	3.6	8.9
Butchers	55	5.4	57	5.3	54	5.2	-1.8
Other outlets	142	13.8	145	13.5	117	11.4	-17.6
Total	**1,027**	**100**	**1,072**	**100**	**1,030**	**100**	**0.3**

Source: Mintel, 2007

According to a 2007 report by Mintel, fresh pre-packed bacon rashers, bacon/gammon joints and fresh loose bacon rashers are the top three bacon products in the UK (bought by 71 per cent, 38 per cent and 28 per cent respectively of respondents participating in a survey of 902 main shoppers aged 16 and above). Gammon joints and cubed bacon appealed to consumers of higher socio economic status, whereas pre-packed, value rashers were preferred by lower socio-economic categories of consumers. Loose bacon rashers were preferred by older consumers.

Canned Meat

Recent consumer trends have indicated an increase in purchases of canned meals in the last two years (Mintel 2008b). Amongst the complete range of canned meals, canned meats are more popular in Scotland than in the rest of the UK. The most popular canned meat in the UK is corned beef (53 per cent of households purchased this product in Scotland as opposed to 41 per cent in the UK). There are no such differences in relation to other canned, non-meat meals. The comparison of purchasing of all major canned meat categories included in the Mintel report on canned meals (2008b, op. cit.) is given in Table 7 below.

Table 7: Types of canned meals and meats purchased in the last 12 months, UK versus Scotland

	Corned beef	Baked beans with sausages	Ravioli	Fray Bentos Pie	Meatballs	Spaghetti or hoops with sausages	All Canned Meats	Canned meats are a poor substitute for fresh meat*
UK	41	24	19	14	14	11	58	23
Scotland	53	28	30	25	18	14	71	20

Source: Mintel, 2008b.
*Percentage of respondents agreeing with the statement.

Meat prices

Price changes from January 2006 to early 2008 are depicted in Figure 1 below.

In the case of all meats, but especially lamb and beef, retail prices increased significantly towards the end of 2007 and continued to increase. This was particularly the case for premium cuts, where price rise increases were reaching 50 per cent over a period of one year.

Figure 3: Retail meat prices changes in the UK during last 3 years
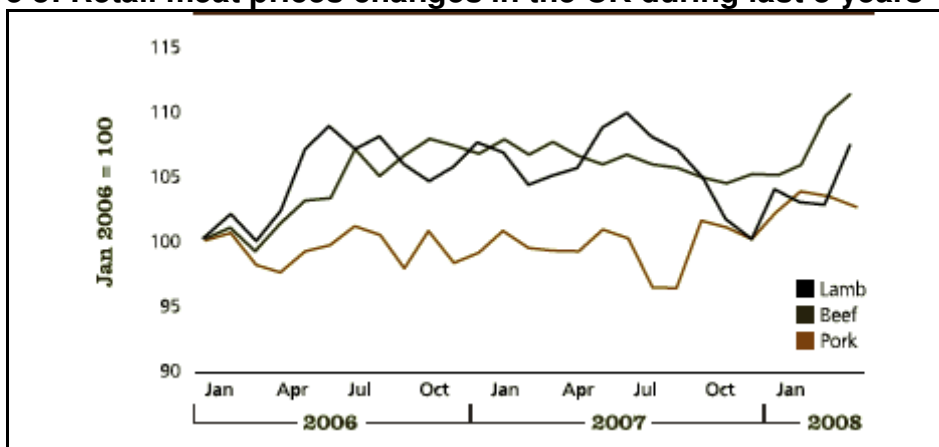
Source: QMS Annual Report, 2009.

The UK food and grocery market grew by 4.9 per cent over 2008, with growth driven by rapid food price inflation. In response to this, consumers started controlling their spending more and modified their purchase behaviour. The main consequences of these changes in relation to red meat and meat products are presented below.

UK consumers spend more on meat than on any other category of food - £14.bn, with the exception of fruit and vegetables (which accounted for £15.5bn of consumer expenditure in 2006). Consumer Trends revealed that, in 2006, the next-largest category of expenditure on food, after meat, was bread (£10.13bn), followed by milk, cheese and eggs (£8.45bn) (Key Note, 2008).

According to an AHDB Meat Services report, cash-strapped shoppers are increasingly turning to the discounters to buy fresh meat. In the 12-week period to 10 August 2008, purchases of fresh meat from discounters were up 17 per cent by volume year-on-year. Consumer spending on fresh meat in discount stores increased 25 per cent to £14.5 million (AHDB, 2008).

Cheapest on display food (COD[4]) is occupying more shelf space, especially in the ambient product category, as most consumers want to buy their staple food cheaply (Mintel, 2008c). This group is represented by processed meat products including sausages, tinned meat and pies. On the other hand, some consumers react badly to increased prices of food considered as being of better quality. For example, increased prices of fresh cuts of red meat have caused changes in its perceptions, so that now some consumers see it as not being an item for everyday consumption (Mintel, 2008a).

Limitations

Data and research results reported in this section of the report originated from different sources. These data were gathered for different purposes and answered different research questions. Nevertheless, this commercially-based information can be used to support primary research carried out with the scanner data on purchases of red meat and meat products.

Varied methodological approaches, and lack of direct access to the published data, make verification of both reliability and validity of the results difficult. On the other hand, as the main trends reported by different sources did not show significant disparities, the major trends identified in the review are likely to reflect the true situation in the market place.

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[4] Cheapest on display foods are defined as those which, "at recommended retail price, are the cheapest of their category available in a given store or group of stores. Other descriptors include budget and economy, but the products are generally recognisable by basic pack design, consistent across a wide variety of product types, and uncomplicated product information – baked beans; cheese; or cola, for example"

In order to have a more complete reflection of sales and consumption of meat in Scotland, a more specific and tailored research design is required to overcome the aforementioned shortcomings of secondary data and results. The application of mixed research designs, linking sales data to the motivational factors of consumers, could provide a better understanding of factors underlying purchase decisions. The use of quantitative and qualitative data collection methods could provide both a quantitative assessment and reasons underpinning specific consumer trends which would be important for policy making and its successful implementation.

Conclusions

Purchases and consumption of red and processed meat in Scotland has significant implications for both the red meat sector and the health of the population. Recent trends indicate that consumers are reducing expenditure on more expensive meat cuts and meat products, and looking for cheaper outlets in order to control household food budgets.

Economic concerns are causing consumers to be more cautious in their spending in the red meat category. This is likely to be the dominant theme of 2009. In Table 8, below, a Mintel (2008a) forecast for red meat sales in the UK market suggests further volume and value growth beyond 2009, which would suggest further increases in consumption. The implications of such a forecast cannot be assessed fully without an overall assessment of trends within individual product categories.

Table 8: Forecast of UK retail sales of red meat, by value and volume, 2003-13

	000 tonnes	% annual change	Index	£m	% annual change	Index	£m at 2008 prices	% annual change	Index
2003	561	-	92	2,573	-	80	2,923	-	91
2004	570	1.6	93	2,733	6.2	85	3,087	5.6	96
2005	576	1.1	94	2,803	2.6	87	3,128	1.3	97
2006	581	0.9	95	2,848	1.6	89	3,113	-0.5	97
2007	614	5.7	100	3,057	7.3	95	3,195	2.6	99
2008	613	-0.2	100	3,212	5.1	100	3,212	0.5	100
2009	607	-1.0	99	3,262	1.6	102	3,137	-2.3	98
2010	616	1.5	101	3,386	3.8	105	3,145	0.3	98
2011	625	1.4	102	3,545	4.7	110	3,213	2.1	100
2012	643	2.9	105	3,744	5.6	117	3,333	3.7	104
2013	654	1.6	107	3,936	5.1	123	3,429	2.9	107
% change 2003-08	9			25			10		
% change 2008-13	7			23			7		

Source: Mintel, 2008a

As it is difficult to assess the actual consumption of meat and meat products in different consumer groupings, and especially in the context of a developing socio-economic and poverty context, a purchase related proxy indicator could provide valuable insights into both the nutrition and health of consumers and demand implications for the industry.

Understanding the benefits that are being sought by consumers in their purchase decisions, as well as the impact of marketing communications promoting red meat and meat products, is necessary for developing and conveying messages that aim to support a balance between the benefits and risks related to meat consumption. Also, in the light of reported trends, such integrated communication should take into account other co-variants impacting upon the effect of red meat consumption on the Scottish population's health (e.g., the levels of physical activity and lifestyle).

Stimulation of the demand for good quality, locally supplied meat within the recommended meat intake could support the Scottish meat industry, including local producers and processors as well as the independent distribution of meat in Scotland. As most purchase decisions are made in store, recognition of the role of supermarkets and their dominance in the market place, could offer valuable insights into the promotion of healthy options in and out of the retail environment.

III.   Methods

The purpose of this section is to describe the methods used in the analysis, comprising: a brief description of the data; the different classifications of the data, namely geographical distribution, the CAMEO and the Lifestage classifications; the process of assembling of the database; the construction of meat categories; and the computed statistics and tests used.

The data

The data consisted of two-years of weekly supermarket information (corresponding approximately to the years 2007 and 2008[5]). This comprised four variables for each one the red meat products sold in the supermarket (2,675 products for the UK and 1,693 for Scotland), namely: total expenditure; number of purchased units; number of customers and prices.

Two variables require further explanation: units purchased and customers. As regards units purchased, this is the number of packs purchased (e.g., pack of 1 kg. of beef or number of meat pies). This has the inconvenience that if one wants to measure the actual quantity of meat purchased by a customer, it is necessary to multiply the number of units purchased by the weight of the unit. However, this is only possible in those cases where the name of the product includes the weight.

It is important to note that the recorded transactions correspond to clubcard owners and therefore, 'customers' are only those using clubcards. These customers can be separated into two groups, those who buy the product and the total number of customers in a specific group (i.e., those who buy together with those who do not buy). This is an important distinction, because both figures are later used in the construction of statistics.

The data are available in Ms Excel bespoken reports written in Visual Basic. The raw data behind these reports are not directly accessible except through a menu.

Data classifications

As mentioned in the introduction, the data are available by different classifications: lifestage, lifestyle, region, retail format and neighbourhood (geo-demographics). However, a key component of the study was to extract the information at the level of a product, and not all the reports by

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[5] The database has a maximum number of two years of weekly observations (104 time series data points). As the supermarket information is uploaded on a weekly basis, as new data become available, the information available to be downloaded moves one week forward. However, in order to maintain the same dataset size (104 observations), the first week of the dataset corresponding to the previous week needs to be dropped. This is an inconvenience in terms of data extraction.

classification allow this feature. Therefore, only three dimensions were considered: regional distribution, lifestage and geo-demographic.

The regional distribution is based on TV advertising areas (Incorporated Society of British Advertisers, ISBA). These areas are presented in Table 9. As regards Scotland, this is further broken into: Borders, Central Scotland, and Northern Scotland. It should be pointed out that Borders includes a bit more than the Scottish border area (e.g., the Isle of Man and a part of Cumbria). The available information did not allow elimination of the non-Scottish part of the data.

The areas used in the report were the Scottish regions, Scotland, Rest of UK (obtained as a residual) and the UK.

Table 9: Regional distribution with percentage with respect of shoppers

Region	% shoppers	Region	% shoppers
London	20%	Scotland	7%
Midlands	12%	Yorkshire	6%
Southern England	11%	South West	4%
Wales & the West	9%	Northern Ireland	3%
East of England	9%	North East	2%
Lancashire	8%		

Source: Provided by the Centre for Value Chain Research (VCR[2]).

Table 10 presents the Lifestage classification with a brief explanation of the categories and their percentages of customers.

Table 10: Lifestage classification and percentage of customers

Lifestage segment	% of Customers	Age & family
Young Adults	14.5%	Adults aged 20-39 with no children
Older Adults	14.0%	Adults aged 40-59 with no children
Young families	16.8%	Adults with all children under 10
Older families	15.7%	Adults with one or more child over 10
Pensioners	10.7%	Adults over 60 with no children
Mixed	28.4%	Multigenerational households

Source: Provided by the Centre for Value Chain Research (VCR[2]).

The geo-demographic classification (i.e., CAMEO) is presented in Table 11 with a description of the categories.

It should be noted that although there is a description for all categories in the groups, a shortcoming of the dataset for its use in the analysis of nutrition issues is that there is not a quantitative description of the categories. For instance, there is no information on the number of members in the households, number of children, etc.

Table 11: The UK-CAMEO classification

CAMEO CODE	CAMEO *UK* TYPE	% OF UK HHOLDS	CHILD AGE	ADULT AGE	FAMILY COMPOSITION	HOUSING TYPE	GEOGRAPHICAL AREA	SOCIAL GROUP	QUALIFICATIONS	EMPLOYMENT TYPE	NEWSPAPER READERSHIP	INTERNET USAGE	MAIL ORDER RESPONSIVE
1	AFFLUENT SINGLES & COUPLES IN EXCLUSIVE URBAN NEIGHBOURHOODS	3.44	Few Children	20-59 yrs	Singles & Couples	Terraced / Flats	Inner City / Suburbs	ABC1	Very High	Professional / White Collar	Quality	Very High	Low
2	WEALTHY NEIGHBOURHOODS NEARING & ENJOYING RETIREMENT	3.64	5-15 yrs	40+ yrs	Older Singles, Couples & Families	Detached / Semi-Detached	Suburbs / Rural	ABC1	High	Professional / White Collar	Quality	Above Average	Average
3	AFFLUENT HOME OWNING COUPLES & FAMILIES IN LARGE HOUSES	10.14	5-19 yrs	30-64 yrs	Couples & Families	Detached / Semi-Detached	Rural	ABC1	Above Average	Professional / White & Blue Collar	Regional / Quality	High	High
4	SUBURBAN HOMEOWNERS IN SMALLER PRIVATE FAMILY HOMES	13.27	0-15 yrs	30-74 yrs	Singles, Couples & Families	Detached / Semi-Detached	Small Towns / Suburbs / Rural	ABC1	Above Average	Professional / White & Blue Collar	Regional / Mid Market / Quality	High	High
5	COMFORTABLE MIXED TENURE NEIGHBOURHOODS	8.42	5-15 yrs	30-74 yrs	Singles & Couples, Some Retired	Detached / Semi-Detached / Flats	Small Towns / Suburbs / Rural	ABC1C2	Average	Professional / White & Blue Collar	Regional / Quality	Average	Low
6	LESS AFFLUENT FAMILY NEIGHBOURHOODS	16.48	5-19 yrs	30-64 yrs	Singles, Couples & Families	Semi-Detached / Terraced	Small Towns / Suburbs	C1C2D	Below Average	Professional / White & Blue Collar	Mixed	High	High
7	LESS AFFLUENT SINGLES & STUDENTS IN URBAN AREAS	5.70	0-19 yrs	20-44 yrs	Singles, Couples & Students	Terraced / Flats	Inner City / Suburbs	BC1D	Above Average	Professional / White & Blue Collar	Mixed	Above Average	Low
8	POORER WHITE & BLUE COLLAR WORKERS	16.69	0-15 yrs	35-59 yrs	Singles, Couples & Families, Some Retired	Semi-Detached / Terraced	Small Towns / Suburbs	C1C2D	Below Average	Professional / White & Blue Collar	Regional / Mid Market / Popular	Above Average	High
9	POORER FAMILY & SINGLE PARENT HOUSEHOLDS	10.69	0-19 yrs	20-59 yrs	Singles, Couples & Families, Some Single Parents	Semi-Detached / Terraced / Flats	Small Towns / Suburbs	C1C2D	Low	White & Blue Collar / Unskilled	Popular	Low	Average
10	POORER COUNCIL TENANTS INCLUDING MANY SINGLE PARENTS	11.53	0-19 yrs	20-59 yrs	Singles & Single Parents, Some Retired	Terraced / Flats	Small Towns / Suburbs	C2DE	Very Low	White & Blue Collar / Semi & Unskilled	Popular	Low	Average

Source: Provided by the Centre for Value Chain Research (VCR[2]).

Assembling of the databases

As mentioned, the data are extracted in bespoke reports that have the aim of providing the user with a quick analysis of the data. However, for the purpose of this project, the interest was in obtaining the underlying data, i.e., by individual product and not the summaries provided by the reports. The only way to extract the data is variable by variable and to export it to MS Excel.

A total of 96 reports were extracted from the database, which were a combination of regions and CAMEO or Lifestage groups (e.g., 'Poorer Families and Single Parents in Households' from Borders or 'Young adults' from the UK). It should be noted that due to the constraint to extract categories of more than 2,000 products at one time, the UK dataset had to be broken into two groups.

The four variables of interest for each meat product, namely, total expenditure, number of purchased units, number of customers and prices, were extracted from each one of the 96 reports and 12 datasets were constructed in MS Excel, i.e., a CAMEO and Lifestage dataset per region (Borders, Central, Northern, Scotland, Rest of UK, and UK).

The construction of the meat categories (described in the next section) and the statistical analysis of the data were performed using routines written in Visual Basic for Applications.

Construction of red meat categories

The data by products was further aggregated into red meat categories. For this, each one of the products had to be classified. The categories used were based on a preliminary version of the classification of red meats by the Food Standard Agency (FSA) based on information provided by the Scientific Advisory Committee on Nutrition (SACN). The classification is presented in Table 12.

It should be pointed out that all of the red meat and preserved meat categories were used in the analysis, but only those that explain at least 2.5 per cent of the total expenditure of red meat and preserved meat are presented in the tables.

Table 12: Composition of the red and preserved meat category

Categories	No. of products	What is included
Red meat		
beef (raw)	228	Raw beef and venison
beef (sliced)	8	Beef cooked and raw
beef (chilled, processed, frozen)	152	As description
blood pudding, faggots & haggis	28	As description
burgers & meatballs	94	Mainly beef based but also some lamb, pork and products with red meat and cheese. Includes meatballs with spaghetti and burgers in buns.
meatballs (raw)	1	As description
lamb (raw)	106	All raw lamb
lamb (chilled, processed, frozen)	27	As description
liver (chilled, processed, frozen)	7	As description
liver (raw)	7	Raw lamb, ox and pigs liver
meat pies	184	Includes pastry and potato topped pies (e.g shepherds pie), pork pies, steak pies and two considered processed (e.g. gala)
sausage rolls	32	All sausage rolls includes bacon and could be a sausage wrapped in bacon (therefore processed)
pork (raw)	117	As description
pork (chilled, processed, frozen)	53	As description
scotch eggs	8	As description
Preserved meat		
bacon & gammon (dishes)	32	Pasta, pies, quiches, sandwiches and pizza with bacon as ingredient.
bacon & gammon (raw)	136	Bacon and gammon joints and rashers, smoked and unsmoked.
cured meats	36	Corned beef, chopped pork and ham, spam, cured pork, cured sausage.
ham (raw)	122	Mainly cooked, packaged and tinned ready to eat ham as well as joints. Includes on entry for pork, ham and leek stuffing which should be moved to ham dishes.
ham (dishes)	58	Includes sandwiches, pasta, pizza, quiches, sandwiches, soup and chicken dishes all with ham.
offals (spreads/pates)	2	Liver pate and liver and bacon pate from liver (chilled, processed) as this is preserved.
sausages	258	Includes sausages (beef and pork), frankfurters, lorne, sausage, salami and dishes with sausage and salami, e.g pizza, Yorkshire pudding and sausage.

Source: Own elaboration based on FSA information.

In addition to the categories described in Table 12, the products were also classified according to whether they carried the label 'Scotch', or they were Scottish or from other origin. In the particular case of sausages, for which a more detailed analysis was developed, the different products were classified according to different nutritional characteristics: energy from saturated fat, saturated fat in total product weight, sodium in total product weight, salt in total product weight. Also, sausages were categorised according to price per unit and price per 100g.

Computed statistics and the tests used

The data per category were analysed by levels (e.g., total expenditure, total number of units), or transformed into shares of the total (e.g., the expenditure on each category as a percentage of the total expenditure), or proportions/ratios with respect to the number of customers (e.g., expenditure per customer).

The information was summarised in tables of weekly summary statistics. The summary statistics employed were the mean, standard deviation, minimum and maximum. Not all of the produced tables are presented in this report, but all are in an electronic form in the CD accompanying the report.

The formulae below have the purpose of helping to understand the meaning of some of the data transformations used.

- Proportion of customers purchasing category i with respect to the total number of customers in a group (either CAMEO or Lifestage) (ρ_i).

$$\rho_i = \frac{\sum_{j=1}^{J} C_{ij}}{C}$$

where:

C_{ij} = is the number of customers buying product j that belongs to the category i in the group.

Note that the previous expression can be rewritten in the following way to highlight a problem with the measure.

$$\rho_i = \frac{\overline{c} \cdot C_i}{C} = \overline{c} \cdot \rho^*_i$$

where:

$$\rho^*_i = C_i / C$$

$\bar{c}$ =average number of different meat products belonging to a category bought by a customer.

C_i =total number of customers in the group buying meat products of category i.

C = total number of customers in the group (i.e., those buying and not buying).

ρ_i is an imperfect measure of the proportion of customers buying meat, i.e., $\rho^*_i = C_i\big/C$, because it is affected by the number of different meat products that a customer buys (i.e., it does not exclude the repeated cases).

How important is this problem?. It should be noted that the less aggregated the category (i.e., the lower the number of products within the category), the better is ρ_i as an indicator of ρ^*_i. For instance, if one considers an individual product (say, Scotch beef fillet), ρ_i is accurate (as $\bar{c}$ is equal to 1). However, as the products are aggregated into categories, $\bar{c}$ tends to increase as the same customer may be buying more than one product within the category (obviously, ρ_i is equal to ρ^*_i only in the case that each customer buys only one product within the category). [6]

The fact that the values of ρ_i come to below 1 is a good indicator that the problem is not serious and $\bar{c}$ takes a value that is not far from 1.

- Shares of total expenditure of category i (s_i)

$$s_i = \frac{\text{Expenditure}_i}{\text{Total expenditure in meat}}$$

- Units purchased of category i bought per total customers in the group (u_i)

$$u_i = \frac{\text{Units}_i}{C}$$

- Units purchased per customer (ub_i)

$$ub_i = \frac{\text{Units}_i}{\bar{c}C_i}$$

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[6] In order to obtain an accurate estimate of the proportion $C_i\big/C$ it would have been necessary to generate one report per aggregated category (i.e., a total of 25 different categories). This would mean extracting a total of 2,000 reports (i.e., 1,250 for the CAMEO classification and 750 for the Lifestage classification). Given that the extraction has to be done in one week -for the reasons already explained- it was not possible to compute the exact proportions.

In addition, p-values corresponding to tests of differences in means and proportions were used (e.g., z-tests, Chi square tests). The tests used in the tables are as follows:

Test of means

The purpose of this test is to compare the mean of a sample with respect to a value. The null hypothesis is that the sample mean is equal to the value against which the comparison is done. The statistic is given by the following formula.

$$z = \frac{\overline{x} - \beta}{\dfrac{S}{\sqrt{n}}}$$

where:

z =statistic.
$\overline{x}$ =mean sample.
β =value for the comparison.
S **=**sample standard deviation.
n =sample size.

Finally, below we present the statistical tests used to compare the different statistics used.

Test of proportions

The purpose of this test is to compare two proportions from different samples, i.e., proportion of the total number of customers that purchase red meat. If the samples are large, the test statistic is of a standard normal distribution. The null hypothesis is that the proportions of both samples are equal. The statistic is given by the following formula.

$$z = \frac{p_1 - p_2}{\sqrt{\dfrac{p_1(1 - p_1)}{n_2} + \dfrac{p_2(1 - p_2)}{n_2}}}$$

Where:

p_1 =proportion of successes in sample 1.
p_2 =proportion of successes in sample 2.
n_1 =sample size 1.
n_2 **=** sample size 2.

Chi-square test

This is a test of goodness of fit, which establishes whether or not an observed frequency distribution differs from a theoretical distribution. Thus the null hypothesis of the test is that both distributions (observed and theoretical) are the same. The test is implemented by calculating the X^2 statistic, which is given by the following expression:

$$X^2 = \sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i}$$

Where:

X^2 =the test statistic that asymptotically approaches a χ^2 distribution with n-1 degrees of freedom.
O_i **=** an observed frequency.
E_i = an expected (theoretical) frequency, asserted by the null hypothesis.
n = the number of possible outcomes of each event.

IV. Geographical analysis of red meat and preserved meat purchases

The purpose of this section is to analyse the differences between Scotland and its regions with the rest of the UK in terms of their purchases of red and preserve meats. The detailed information is presented in Tables A.1 to A.4 in the annex.

Figure 4 shows that the proportion of total customers buying red and preserved meat is different in Scotland than in the rest of UK. As regards red meat, in Scotland 18.4 per cent of the customers buy red meat versus 31.8 per cent in the rest of UK, and 22.9 per cent in Scotland buy preserved meat versus 37.3 per cent in the rest of UK. This significant difference can be the result of a high proportion of consumers in Scotland buying red meat products in other outlets. It should be noted that the other outlets can be different supermarkets or retailers different from supermarkets (e.g., butchers, farmers' markets).

Figure 4: Proportion of customers that buy red and preserved meat
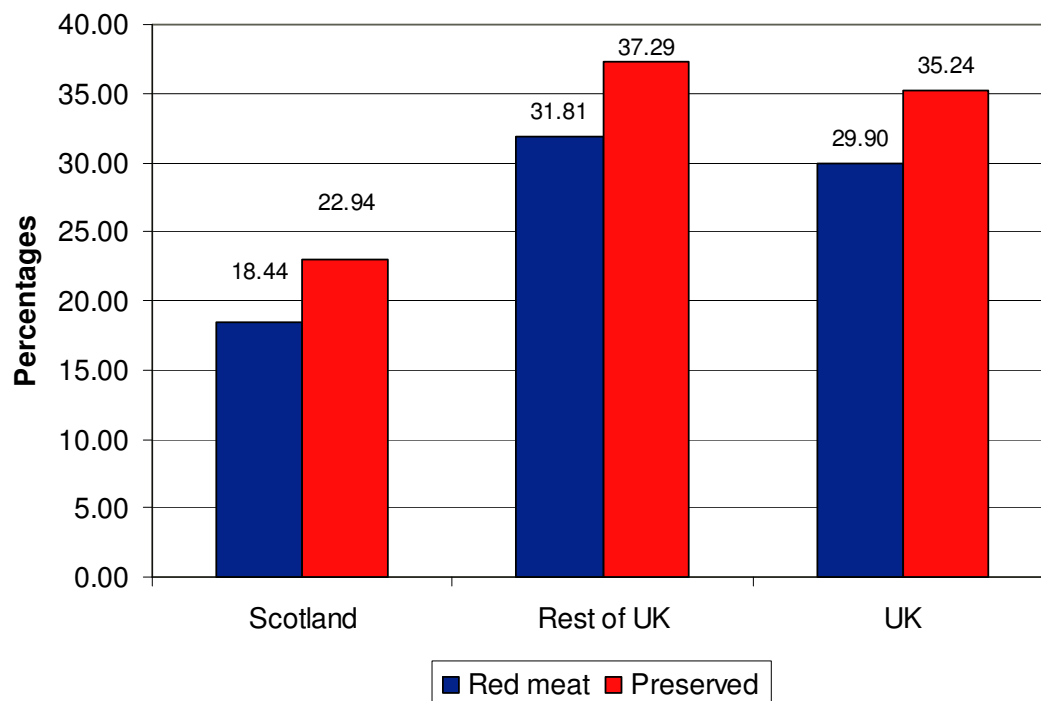
Source: Table A.1 in the annex.

As shown in Figure 5, the distribution of Scottish expenditure by red meat category was close to the rest of UK, with approximately 53 per cent of the expenditure destined to red meat and 47 per cent to preserve meat.

Figure 5: Distribution of the expenditure by red and preserved meat in the UK
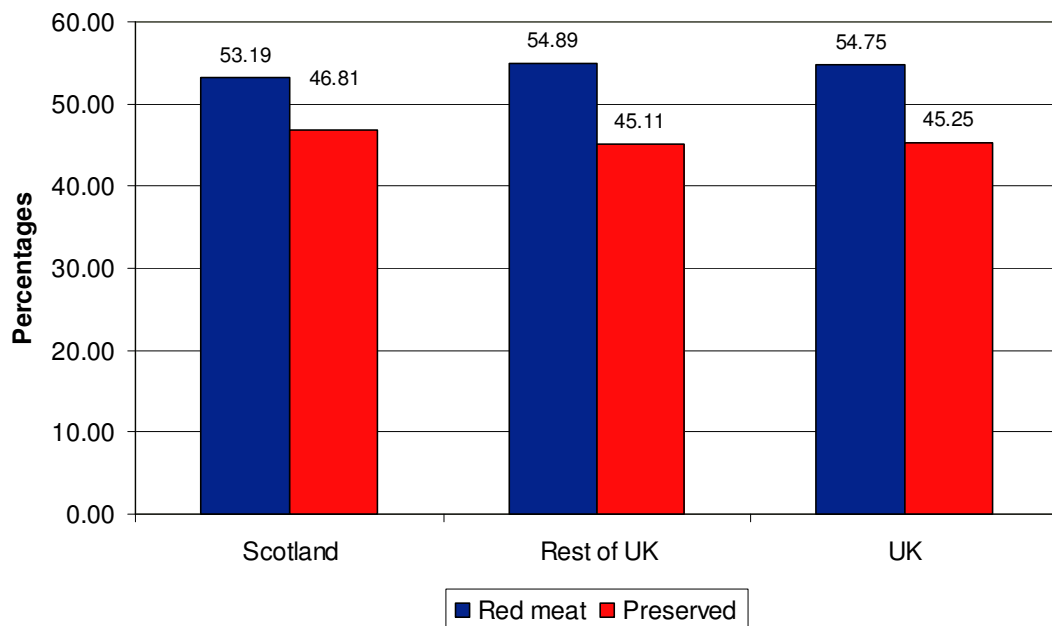
Source: Table A.2 in the annex.

Figure 6 shows that across Scotland raw meat accounts for 52 to 54 per cent of meat expenditure. As regards the raw meat categories, Figure 7 shows the dominance of raw beef within the purchase expenditure, with similar percentages to those observed in the rest of the UK.

As for the preserved meats, Figure 6 indicates that consumers in the Northern region appear on average to spend a slightly higher proportion (48.0 per cent) of expenditure on this category than their other Scottish counterparts, whilst those in the Central Region spend the lowest proportion (46.0 per cent).

Figure 6: Distribution of the expenditure by red and preserved meat by Scottish region
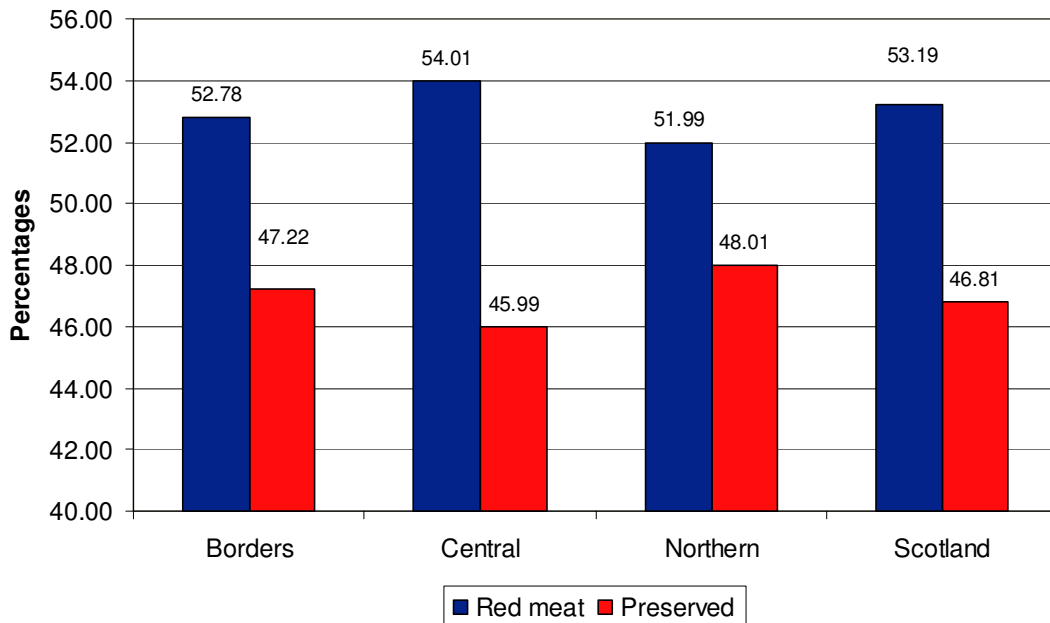
Source: Table A.2 in the annex.

Scottish consumers (see Figure 7), relative to those in the rest of the UK, spend on average a higher proportion on raw beef (26.8 per cent versus 23.7 per cent) and less on raw lamb (5.2 per cent versus 8.4 per cent). Scottish consumers are similarly spending a smaller proportion of expenditure on pork (6.4 per cent versus 9.2 per cent). Again, this finding may be influenced by the types of outlets that Scottish consumers use for particular types of products.

Figure 7: Distribution of the expenditure by major red meat products in the UK

Source: Table A.2 in the annex.

34
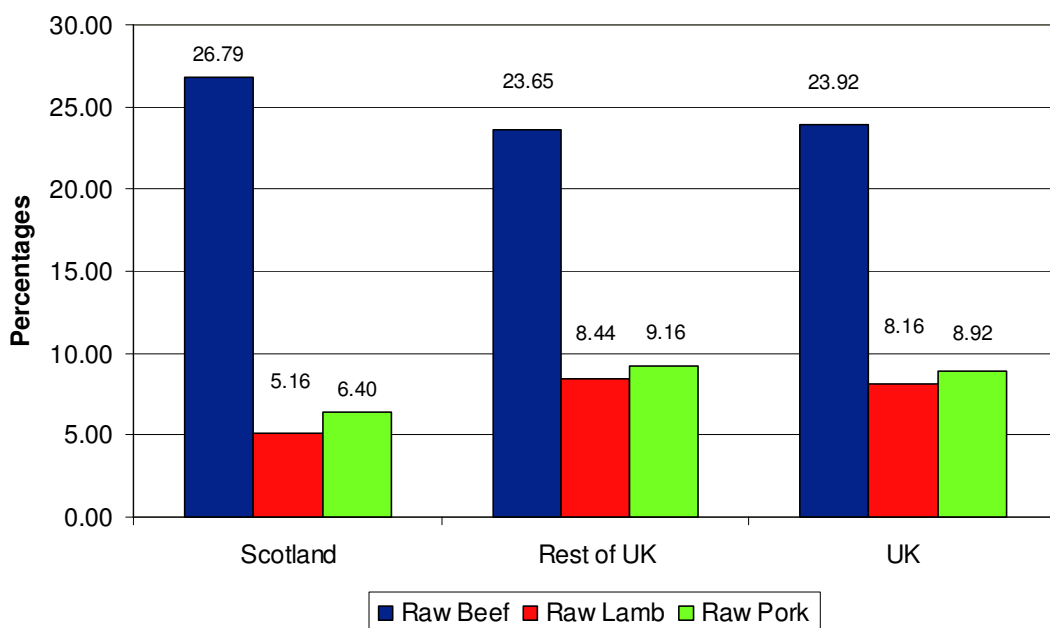
In terms of preserved products, as shown in Figure 8, Scottish consumers spend proportionately more on bacon and ham and slightly less on sausages than consumers in other parts of the UK.

Figure 8: Distribution of the expenditure on major preserved meat products in the UK
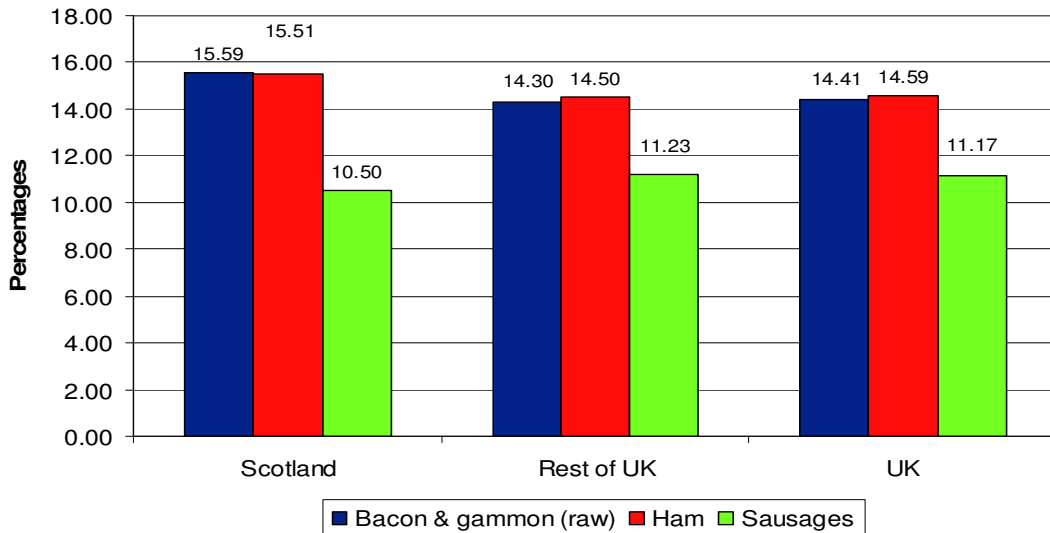
Source: Table A.2 in the annex.

Figure 9 complements the results presented in Figure 4, in the sense that the number of units purchased per customer (i.e., all customers and not only those buying meat) in Scotland is much lower than in the rest of the UK. Thus, the total number of units per customer in Scotland is 0.5 whilst in the rest of the UK it is equal to 0.85. In the case of red meat the Scottish mean is 0.22 and the rest of the UK mean 0.39 and for preserved meat the corresponding figures are 0.28 for Scotland and 0.46 for the rest of the UK.

Figure 9: Number of units purchased of red and preserved meat by customer
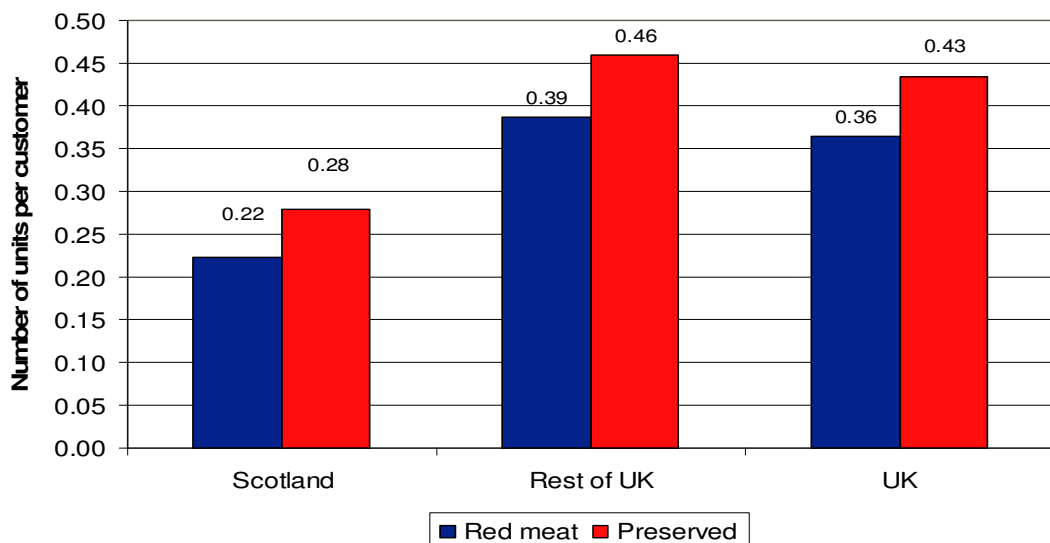
Source: Table A.3 in the annex.

Figure 10 indicates that although the actual number of units per customer buying meat (i.e., not all the customers) in Scotland are slightly lower than those in the rest of the UK, the differences are very close and negligible.

Figure 10: Number of units purchased of red and preserved meat by customer buying meat
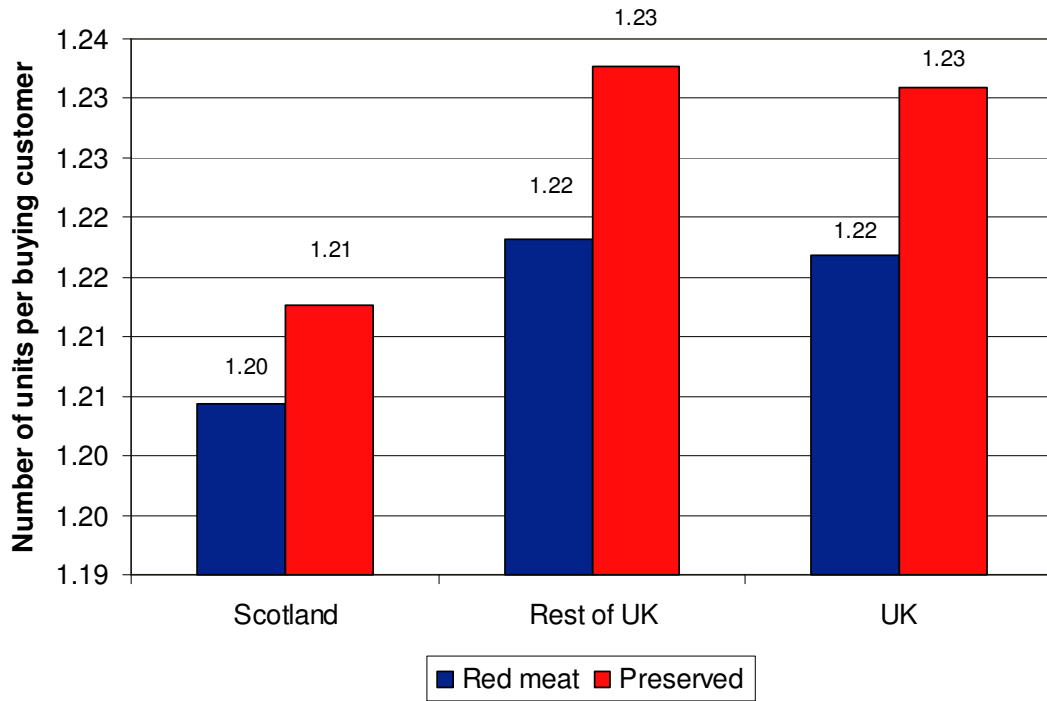
Source: Table A.4 in the annex.

V. Analysis of red meat and preserved meat purchases by CAMEO groups

The purpose of this section is to analyse the differences in the purchase patterns of red and preserved meat by geo-demographic group (i.e., CAMEO group) in Scotland. The detailed information is presented in Tables A.5 to A.8 in the annex.

Figure 11 shows the percentage of customers actually purchasing red meat to the total number of customers by CAMEO group. The results for most of the groups were not found to be statistically significant different than the overall Scottish result. However, the group 'young and affluent singles' shows a statistically significant lower proportion than the overall Scottish figures for both red and preserved meat.

Figure 11: Proportion of customers that buy red and preserved meat by CAMEO group in Scotland
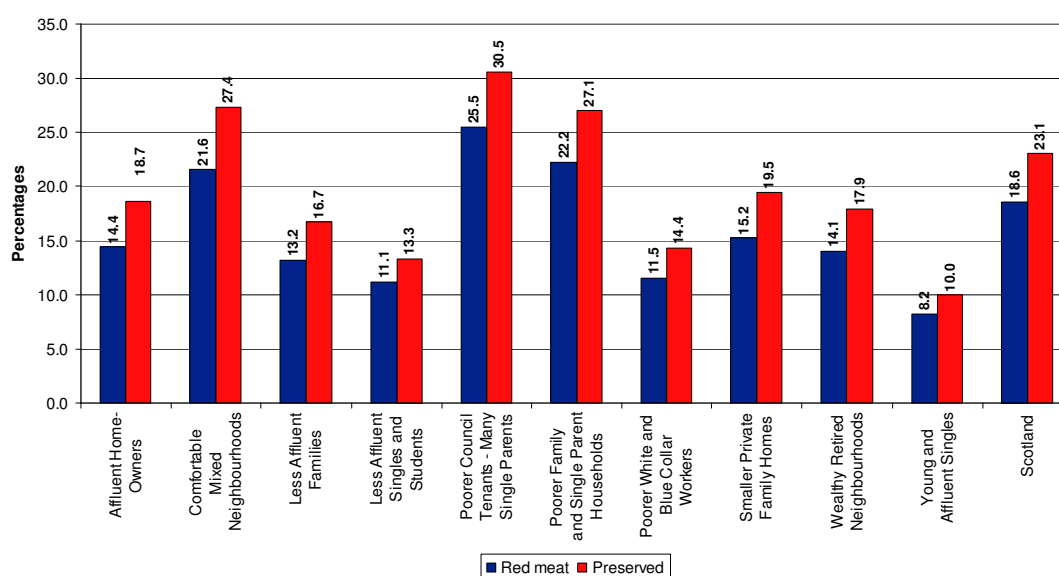
Source: Table A.5 in the annex.

It should be noted that when the proportion of customers buying red meat and preserved meat products is aggregated, the sum for some of the groups is found to be statistically significant in relation to the Scotland figure. Thus, the group 'poor white and blue collar workers' shows a proportion lower than the Scottish average (25.9 per cent versus 41.7 per cent), and this is also the case for the 'young and affluent group' (18.1 per cent versus 41.7). In contrast, the group 'poorer council tenants' shows a proportion higher than the Scottish average (56.1 per cent versus 41.7 per cent).

Figure 12 shows that across the ten Cameo groups, there appears to be considerable similarity in the proportions of meat expenditure on raw meat and preserved forms. Although not statistically significantly different from the Scottish average proportion, the most affluent CAMEO groups 'Affluent Home-Owners', 'Wealthy Retired Neighbourhoods' and 'Young and Affluent Singles' spend the highest proportion on the preserved meat category.

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Figure 12: Distribution of the expenditure by red and preserved meat in Scotland by CAMEO group.
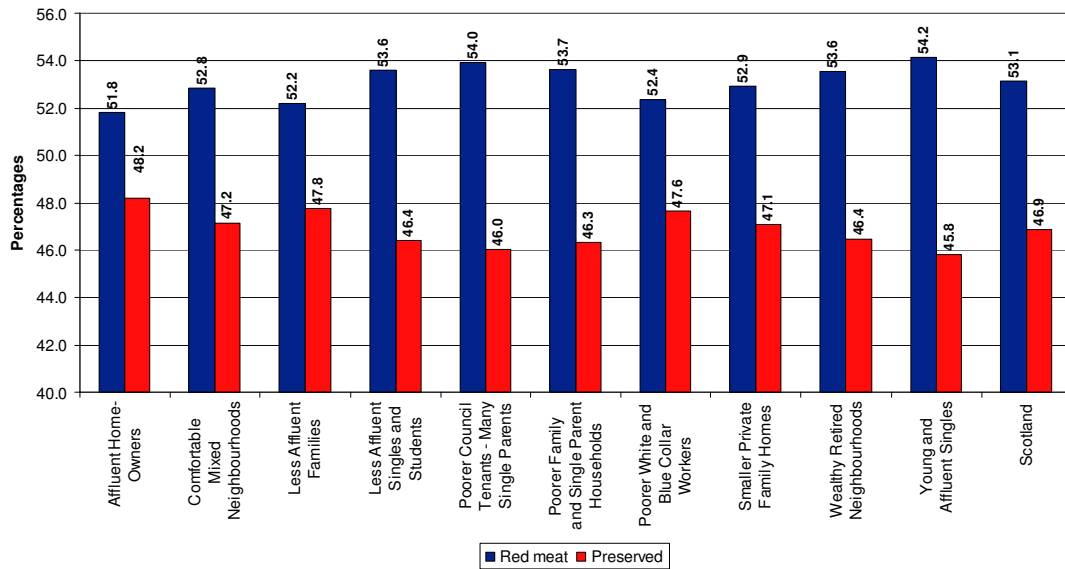
Source: Table A.6 in the annex.

As shown in Figure 13, the two poorer groups 'Poorer Council Tenants – Many Single Parents' and 'Poorer Family and Single Parent Households' have a similar share of their expenditure on beef relative to other groups, but rather less on lamb (a comparatively expensive form of red meat) and rather more on meat pies and burgers. In contrast, the group 'Wealthy Retired Neighbourhoods' spends a relatively high share of their meat expenditure on lamb.

Figure 13: Distribution of the expenditure by major red meat products in Scotland by CAMEO group.
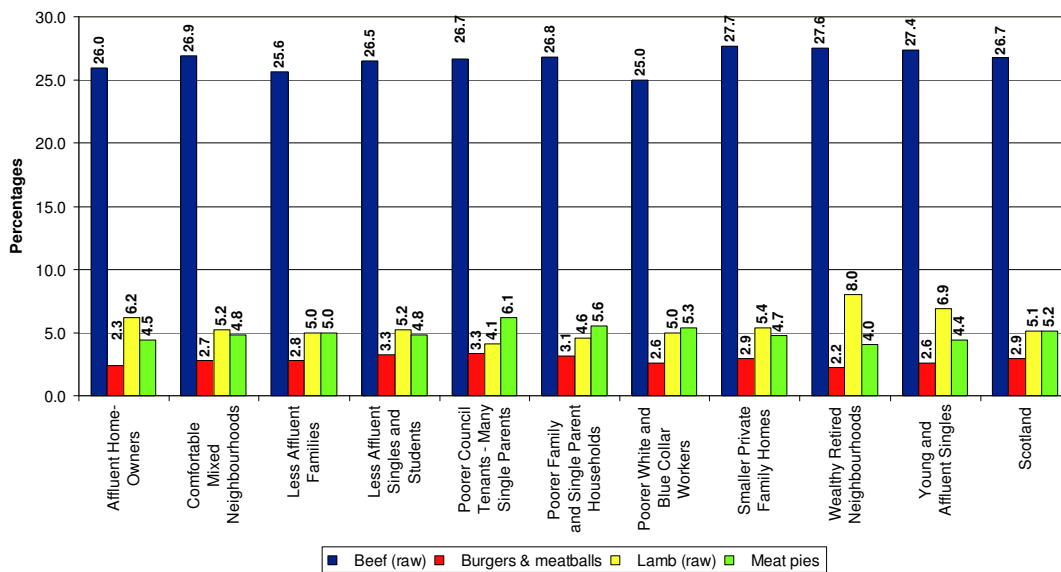
Source: Table A.6 in the annex.

Figure 14 presents the distribution of the expenditure on preserved meat products. The shares of expenditure across the groups look quite similar, with

the possible exception of the share devoted to sausages by the 'Less Affluent Singles and Students' which is equal to 11.9 per cent.

Figure 14: Distribution of the expenditure by major preserved meat products in Scotland by CAMEO group.
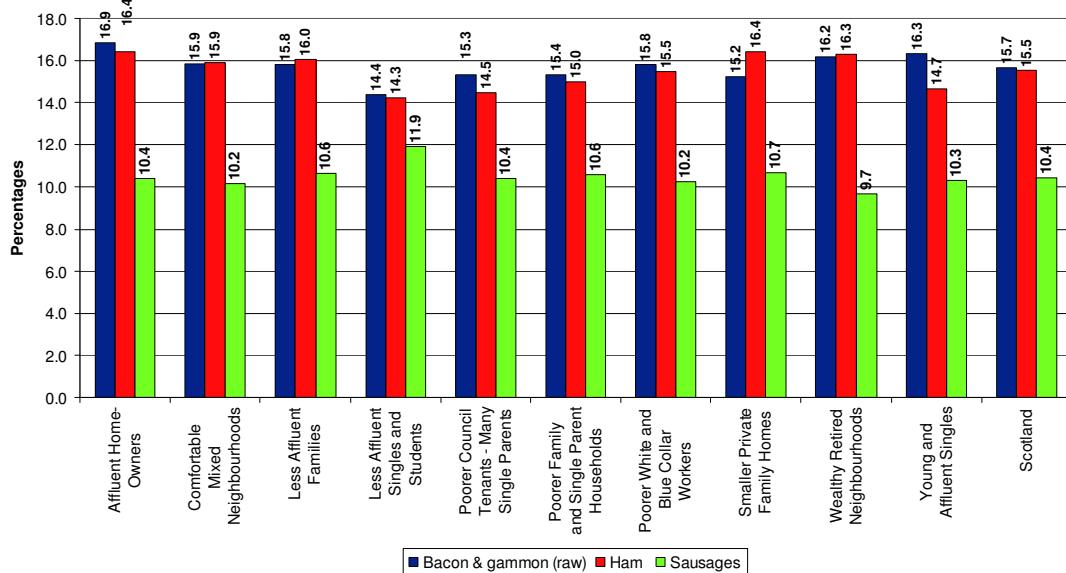
Source: Table A.6 in the annex.

Figure 15 presents the information regarding the number of units purchased across the CAMEO groups in Scotland. It indicates a higher average number of units for the groups of 'Poorer Council Tenants – Many Single Parents' and 'Poorer Family and Single Parent Households' for both raw red meat and for preserved meat products. The differences of these two groups in the red meat category are quite marked for raw beef and meat pies, whilst in the preserved meat products category their purchasing is relatively high for bacon, ham and sausages.

Figure 15: Number of units purchased of red and preserved meat per CAMEO group customer in Scotland
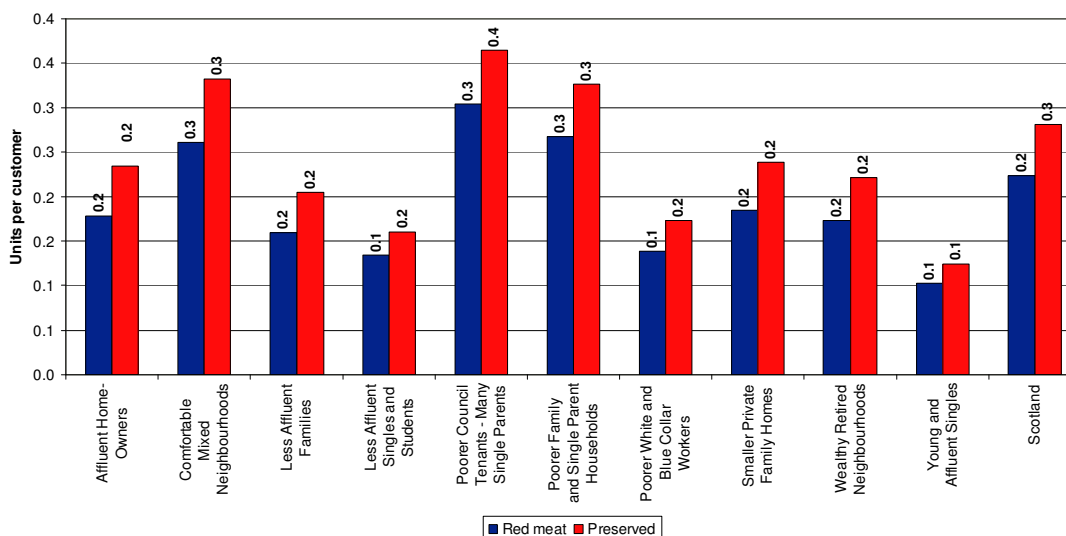
Source: Table A.7 in the annex.

In contrast to the results obtained in terms of expenditure shares, the number of units purchased per customer for each CAMEO group was found to be statistically different from the Scottish average. These differences between groups may be due to the influence of the number of customers in the group (i.e., if only a few people in a CAMEO group purchases the product, the ratio per group will be low), but may also be due to clear eating preferences between socio-economic groups, with poorer groups having a preference for a relatively high meat and meat product diet.

Figure 16 presents the actual number of units purchased per customer (i.e., customers who actually buy meat products) by CAMEO group. The poorer socio-economic groups (i.e., groups 'Poorer Council Tenants – Many Single Parents' and 'Poorer Family and Single Parent Households') purchase less units of red meat and also preserved meat (raw), whilst the more affluent groups such as 'Affluent Home Owners', 'Comfortable Mixed Neighbourhoods', 'Wealthy Retired Neighbourhoods' and 'Young and Affluent Singles' purchase more of them. This indicates a possible income effect (since the share in expenditure was found to be the same in all of the groups). Note that the number of units purchased of burgers and meatballs amongst the poorer groups were similar to the average.

Figure 16: Number of units purchased of red and preserved meat per customer in Scotland
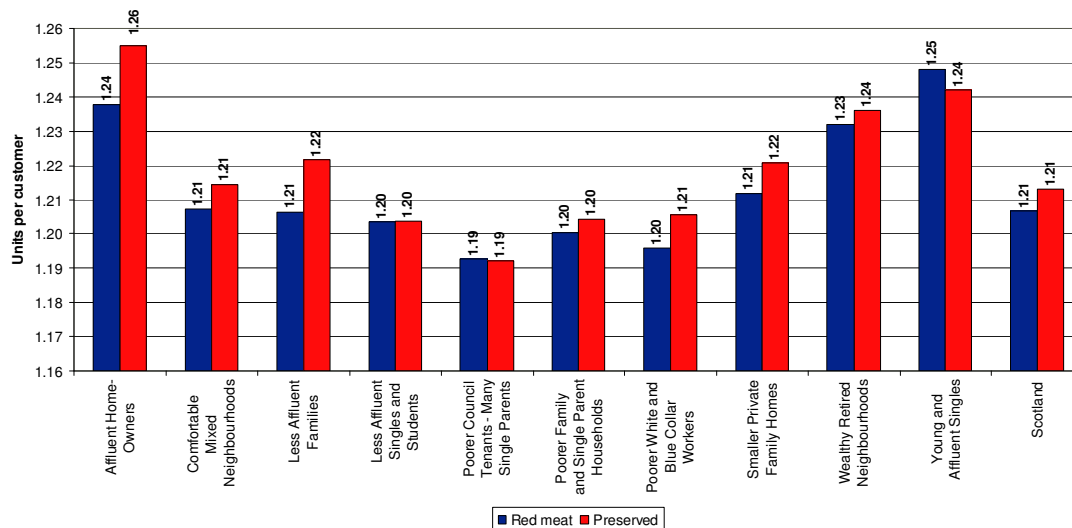
Source: Table A.8 in the annex.

VI. Analysis of red meat and preserved meat purchases by Lifestage groups

The purpose of this section is to analyse the differences in the purchases of red and preserved meat by Lifestage groups. Annex tables A.9 to A.12 present the detailed information.

The results presented in Figure 17 indicate that the ratios of customers purchasing red meat with respect to the total number of customers for each Lifestage group are quite similar to that observed for Scotland. However, 'Young Families' seem to have the highest proportions amongst the groups (23.1 per cent for raw meat and 30.5 percent for preserved meat).

Figure 17: Proportion of customers that buy red and preserved meat by Lifestage group in Scotland
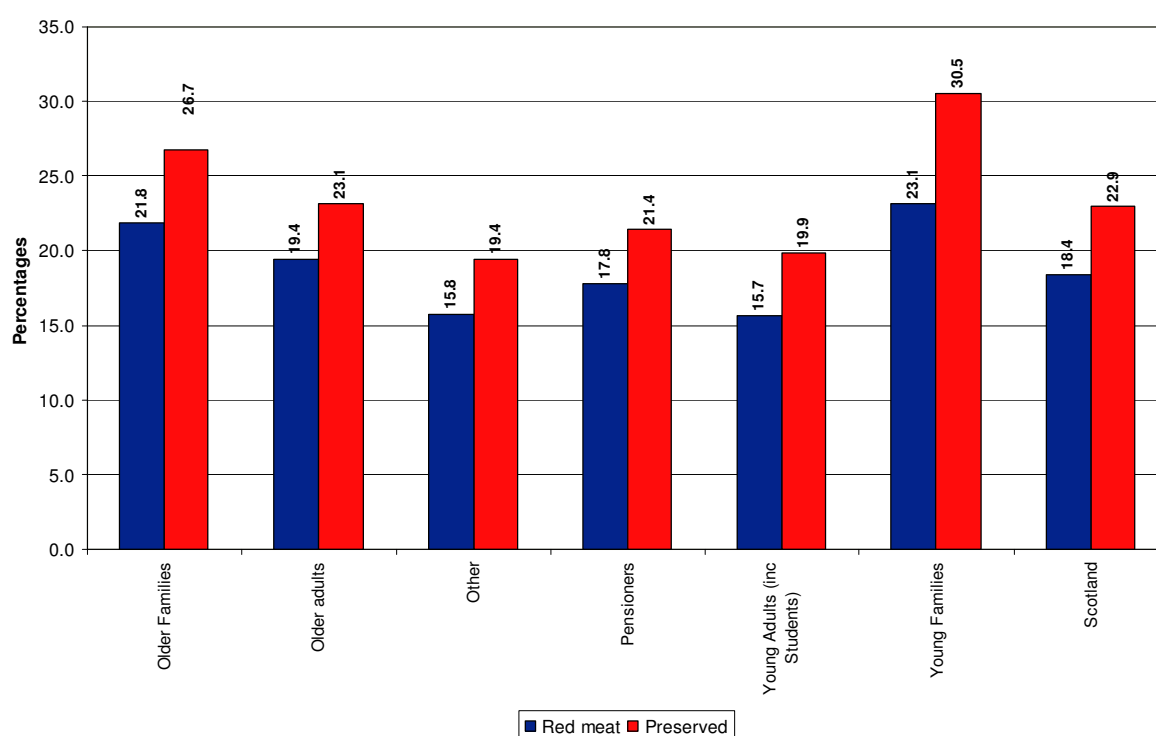
Source: Table A.9 in the annex.

Figure 18 shows that on average just over 53 per cent of total meat expenditure is on red meat, whilst preserved meat (principally bacon, ham and sausages) accounts for 47 per cent. Moreover, as in the case of the CAMEO groups, there is considerable similarity across the Lifestage groups. When comparing amongst groups, it appears that 'Young Families' spend a slightly smaller proportion at 51.6 per cent on red meat, and a slightly higher proportion on preserved forms (48.4 per cent).

Figure 18: Distribution of the expenditure by red and preserved meat in Scotland by Lifestage group
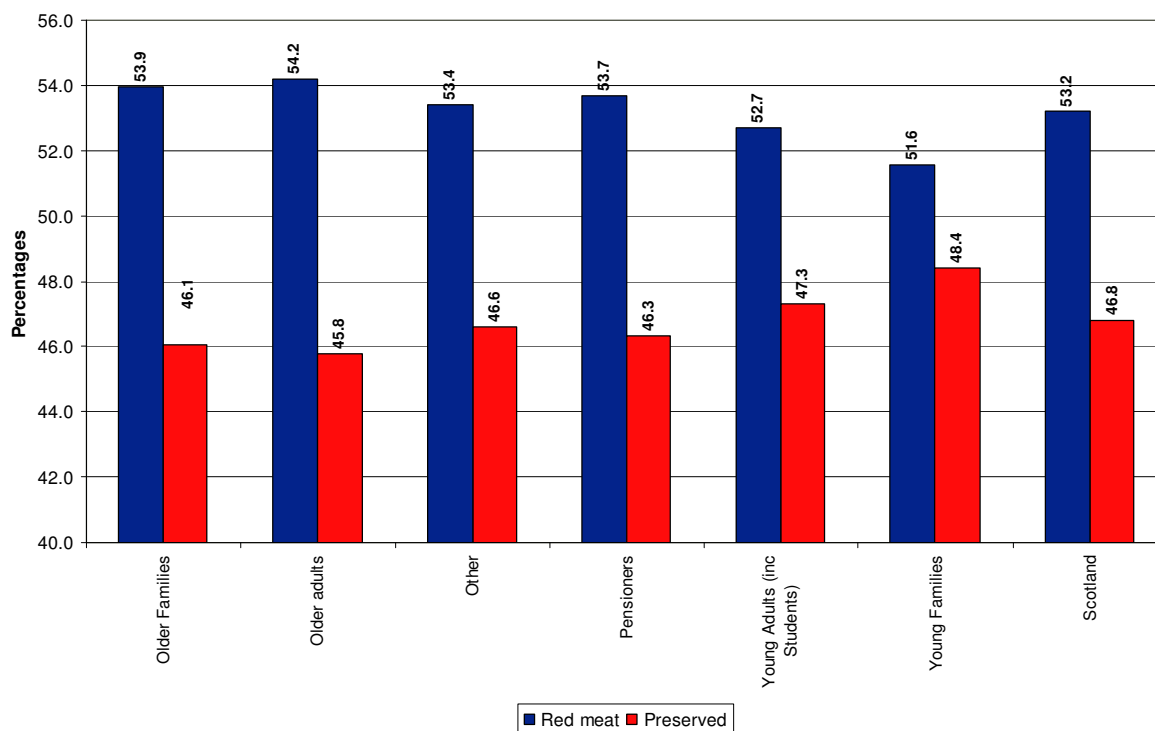
Source: Table A.10 in the annex.

Figure 19 presents the composition of the expenditure on red meat. Clearly most of the expenditure is allocated to beef, leaving a relatively small proportion to the other meats.

It would appear that 'Young consumers' (i.e., 'Young Families', along with 'Young Adults'), spend a smaller proportion on lamb and meat pies. The former is widely recognised as having its consumption skewed slightly towards older consumers, whilst the latter may be regarded as a more traditional product than many of the more recently developed meat dishes. In contrast to this feature of 'Young consumers' purchasing, 'Pensioners' spend a rather smaller proportion on Burgers and Meatballs (of which Burgers are likely to be the principal component) and a rather higher proportion on lamb.

Figure 19: Distribution of the expenditure by major red meat categories in Scotland by Lifestage group
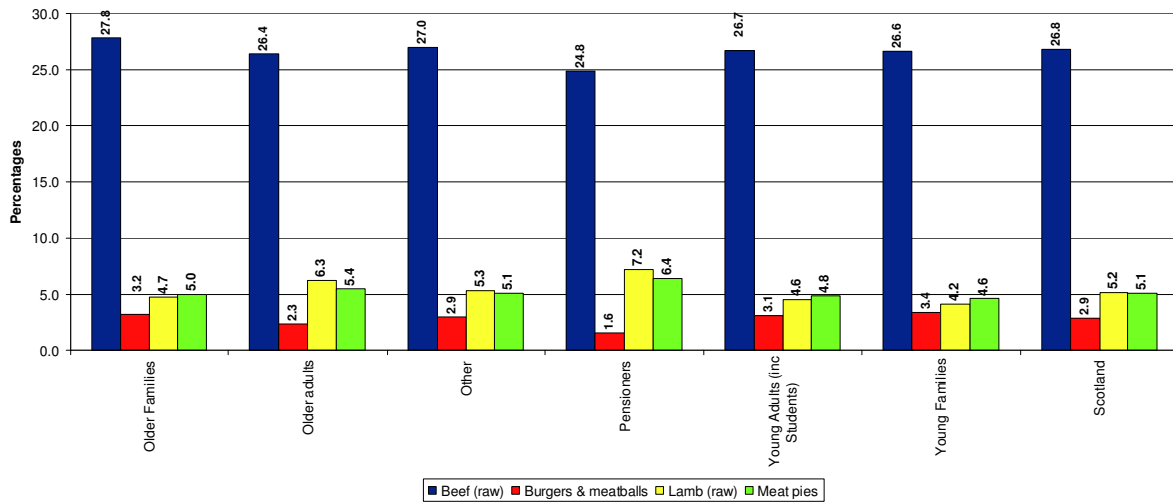
Source: Table A.10 in the annex.

Figure 20 shows the allocation of expenditure amongst the preserved meat categories. The proportions of expenditure on bacon and gammon and ham are quite similar over the groups. However, the allocation to sausages seems to show more variability. Thus, 'Young consumers' appear with the highest proportion (12 per cent) whilst 'Pensioners and Older Adults' seem to spend a rather lower proportion of their meat expenditure on sausages (8.7 per cent and 7.8 per cent, respectively).

Figure 20: Distribution of the expenditure on preserved meat in Scotland by Lifestage group
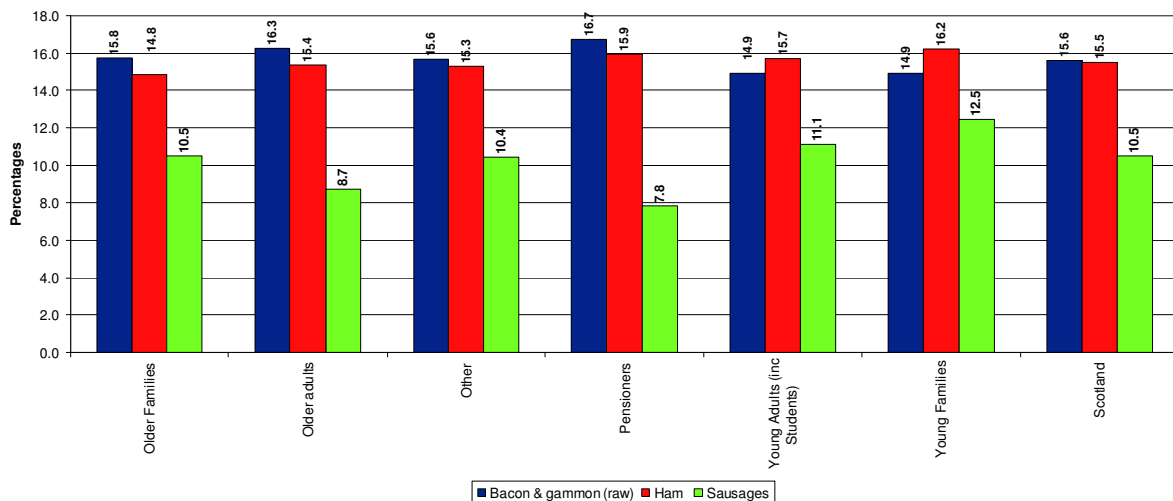
Source: Table A.10 in the annex.

The number of units of meat purchased per customer of each Lifestage group is presented in Figure 21. The differences between the groups and the average for Scotland are statistically significant. The figure indicates that families, both 'Older Families' and 'Young Families' purchase most meat (both red and preserved meat).

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Figure 21: Number of units purchased of red and preserved meat per Lifestage group customer in Scotland
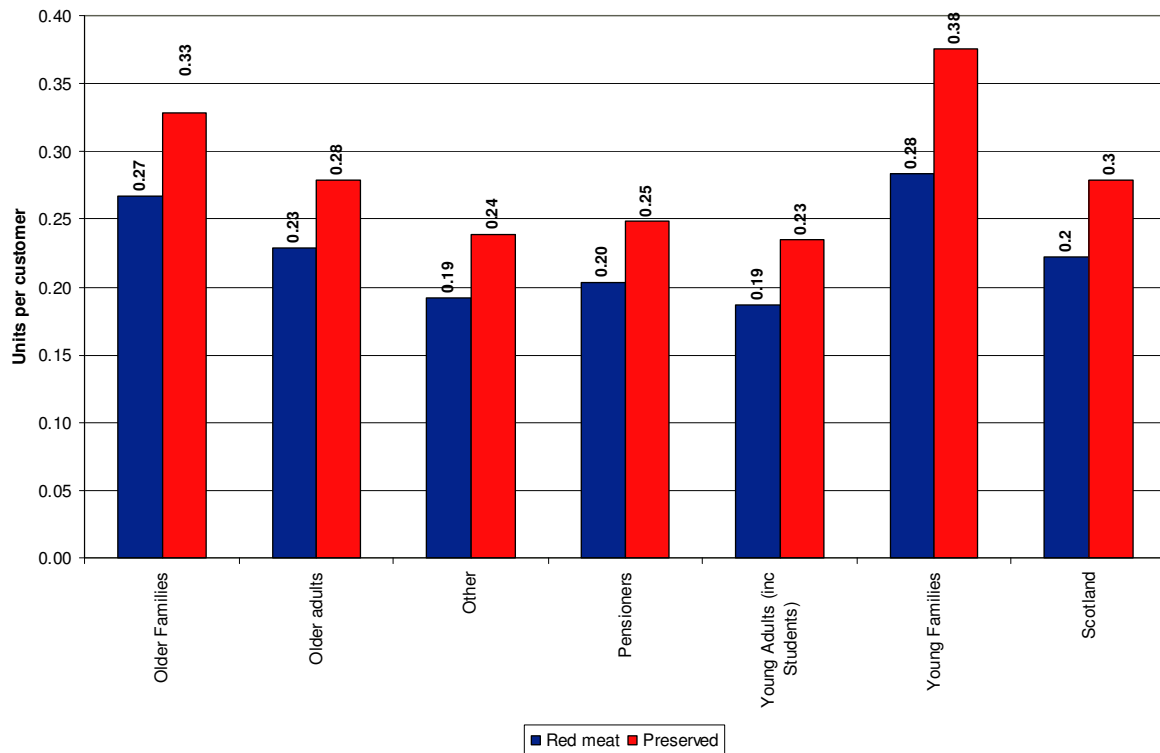
Source: Table A.11 in the annex.

Figure 22 presents the number of units purchased per customer actually purchasing meat. The groups with above average number of units are adult and young families (both with 2.45 units) and the category 'Others' (2.49 units). In contrast, the group 'Pensioners' shows the lowest purchase per customer with 2.28 units. It is important to recall that it is inappropriate to infer household consumption from these figures – even if they are per customer- as the household size may differ substantively amongst groups.

Figure 22: Number of units purchased of red and preserved meat per customer in Scotland
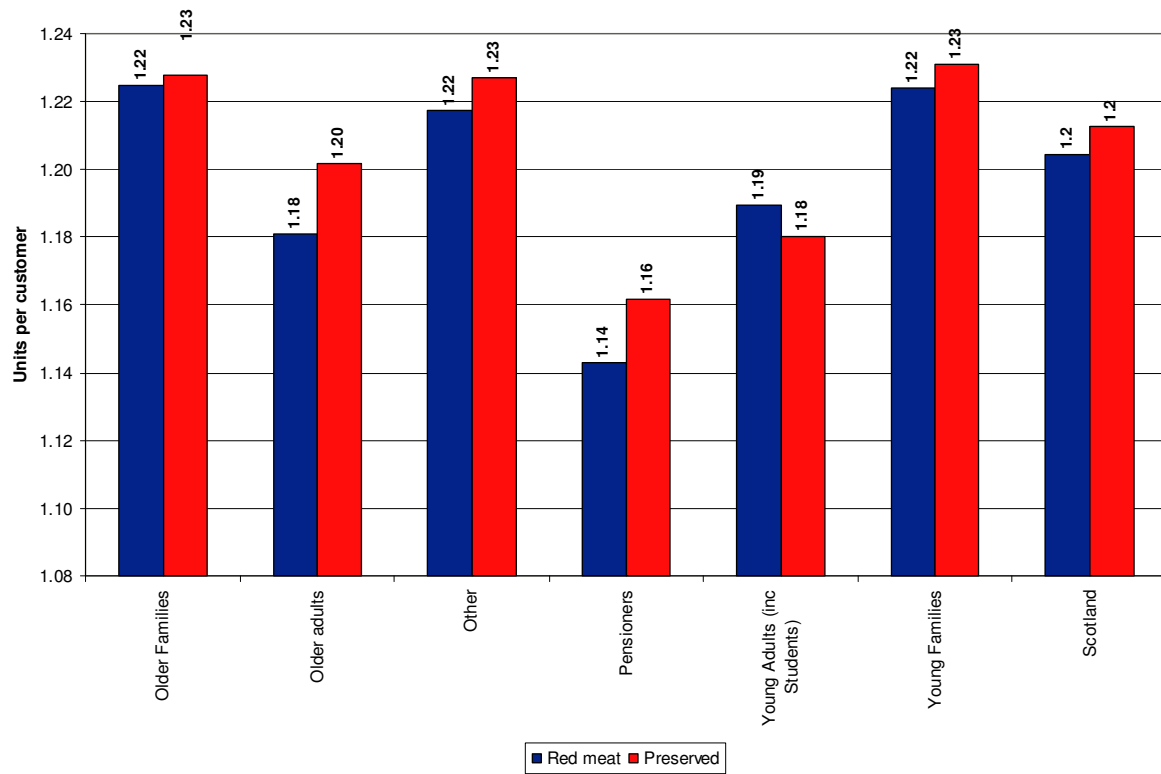
Source: Table A.12 in the annex.

VII.   Analysis of purchases of red and preserved meat of Scottish origin

This section estimates the proportion of total red and preserved meat that corresponds to products of Scottish origin. Figure 23 shows the proportion of meat purchased by value by consumers in Scotland, which is either labelled Scotch (conforms to the requirements of the Scotch beef and Scotch lamb PGIs) or Scottish, with respect to the total value of red meat purchases.[7]

Figure 23: Proportion of the total expenditure on meat products that are discernible as being of Scottish origin
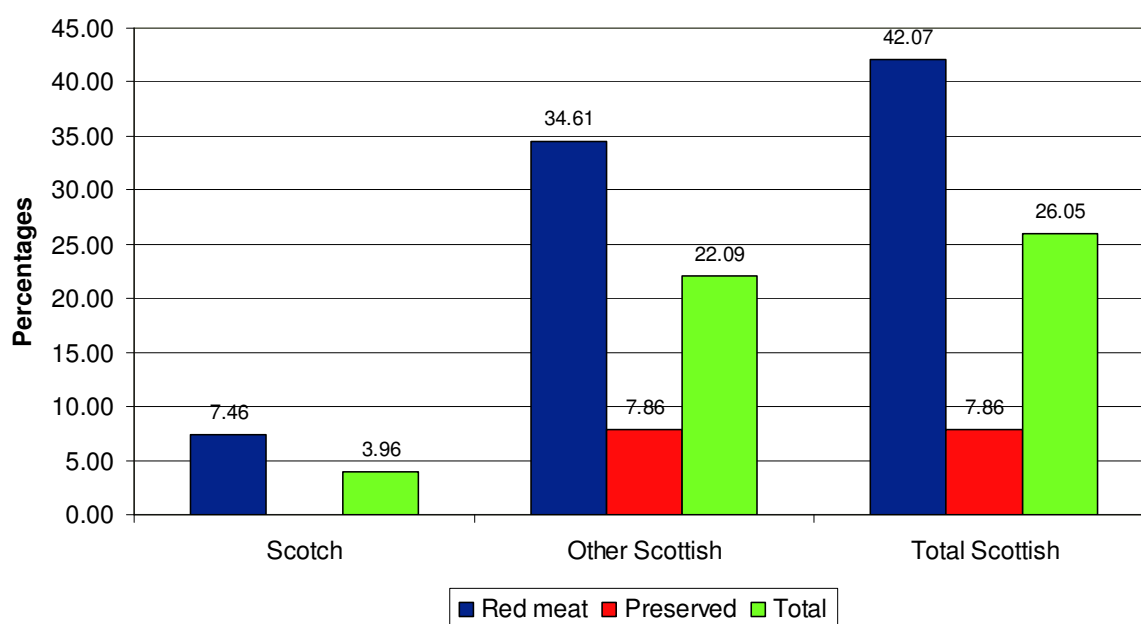
Source: Table A.13 in the annex.

Overall, approximately 26 per cent of the purchased red meat by value is from Scottish origin (i.e., Scotch and other Scottish). This result, however, differs substantially by groups. Thus, in terms of red meat 7.5 per cent of the total red meat purchased is Scotch and 34.6 per cent is other Scottish (i.e., non-Scotch), making a total of just over 42 per cent. The former only consists of raw Scotch Beef and Lamb,

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[7] Scotch Beef and Scotch Lamb are 'Protected Geographical Indication' (PGI) labels. PGI labels are an EU certification to protect and promote traditional and regional food products of high quality, which are unique to a geographic area. The PGI status includes: quality guarantee, which guarantees a specific production method and controls which are stricter than those required by legislation; a superior character, which also guarantees the meat to have specific characteristics or quality that is superior to usual commercial standards; 100% traceable, which ensures complete traceability of all these products; and clear labelling, which allows identification of quality products, their origin and their characteristics. All the livestock come from cattle and sheep farms across Scotland and every farmer who is a member of Quality Meat Scotland Farm Assurance scheme is independently inspected each year to ensure that the scheme's rigorous standards are met.

whilst the latter comprises a wide range of products carrying a Scottish name or indication that they were produced in Scotland.

In terms of raw beef, the percentage explained by the 'Scotch' PGI is 12.0 per cent of the total expenditure, whilst the other Scottish raw beef explains 50.2 per cent. Thus, 62.2 per cent of the raw beef purchased by value is of Scottish origin.

In the case of raw lamb, the percentage explained by 'Scotch' is above the one observed for beef (14.5 per cent), but the percentage of other Scottish is much lower than for beef (23.6 per cent), producing a total that is substantively lower than for beef (38.1 per cent).

The Scottish origin in the case of preserved meat is quite small and equal to 7.9 per cent. Bacon and gammon and sausages have the highest percentages (13.9 per cent and 12.6 per cent, respectively)

VIII.   Case study: analysis of the purchases of sausages

The purpose of this section is to provide a more detailed analysis of the purchases of sausages by CAMEO and Lifestage groups in Scotland.

The selection of sausages as the product to study was due not only to the fact that they represent an important component of the Scottish meat purchases (10.4 per cent by value) but also because they are quite variable in terms of their fat and salt composition. Therefore, even if the proportion of the expenditure allocated to sausages is similar amongst the different groups, differences in the composition of the purchases might be important from a health perspective.

The methodology used consisted of describing most of the sausages available in the database (the specific criterion consisted of selecting those sausages with more than 5 per cent of the total expenditure on sausages) according to six variables: energy from saturated fat, saturated fat in total product weight, sodium in total product weight, salt in total product weight, price per unit and price per 100g.

For each variable the cut-off points for each tertile were computed and used to classify the expenditure of the CAMEO and Lifestage groups. The detailed results are presented in tables A.14 and A.15 in the annex.

Analysis by CAMEO group

As presented in Figure 14, the expenditure on sausages as a proportion of the total weekly meat purchases is of considerable consistency across the CAMEO groups. It fluctuates between 10 to 11 per cent of the meat expenditure for all but two groups: the 'Less Affluent Singles and Students', which has a relatively high share of expenditure on sausage at 11.9 per cent and 'Wealthy Retired Neighbourhoods' with a relatively low share at 9.7 per cent.

Figure 24 provides the distribution of expenditure on sausages according to energy from saturated fat. The results indicate that there are no statistically significant differences in the composition of the expenditure amongst the groups.

Figure 24: Distribution of expenditure on sausages according to energy from saturated fat and CAMEO group
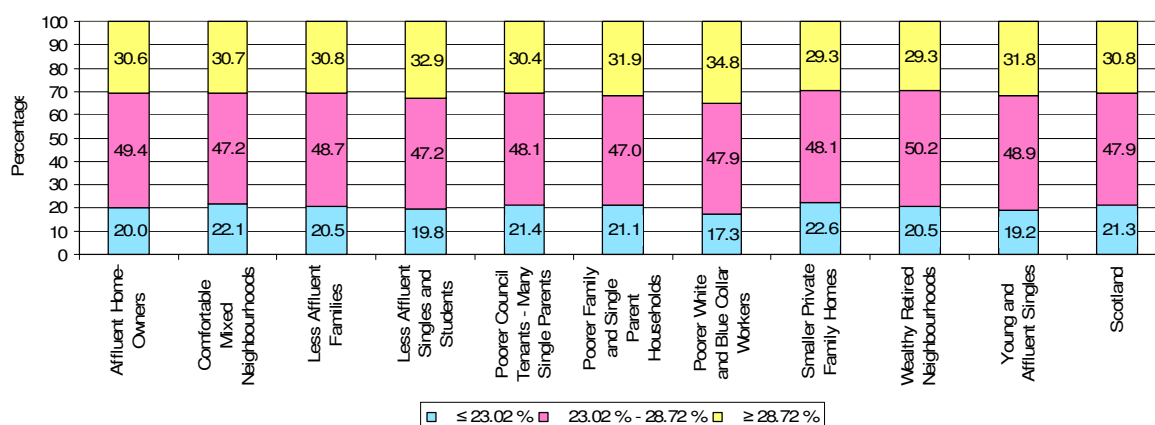
Source: Table A.14 in the annex.

Figure 25 shows the distribution of the expenditure according to the saturated fat content of the products. The observed proportions are similar amongst the groups and they are not statistically different from the Scottish average. The groups of 'Affluent Home Owners' and 'Wealthy Retired Neighbourhoods' have the highest percentages of expenditure on the sausages with the highest saturated fat (35.7 and 34.7 per cent). It is interesting to note that most of the expenditure is allocated to those sausages in the middle category.

Figure 25: Distribution of expenditure on sausages according to saturated fat in total product weight and CAMEO group
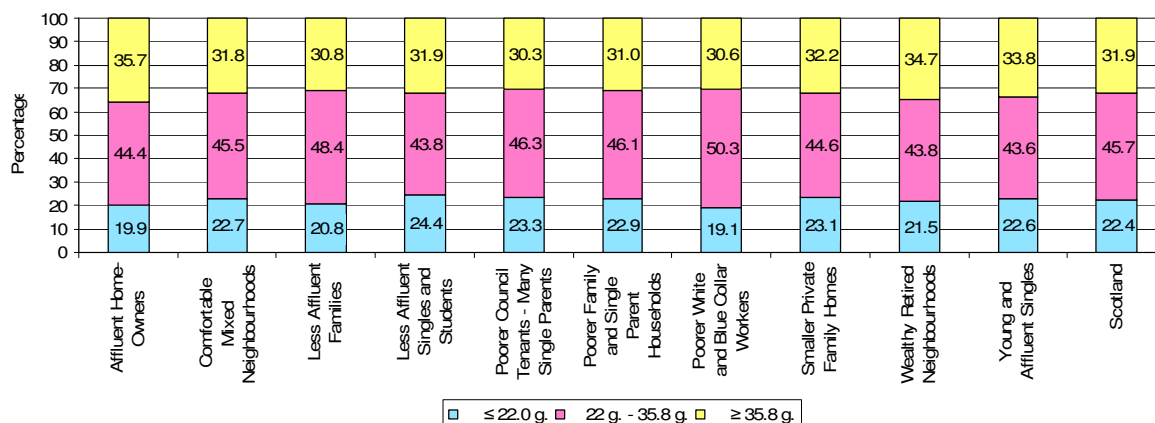
Source: Table A.14 in the annex.

Figure 26 shows the expenditure allocation amongst sausages of different content of sodium in the total product weight. Most of the expenditure is allocated to sausages in the intermediate category. None of the groups was statistically different to the Scottish mean.

Figure 26: Distribution of expenditure on sausages according to sodium in total product weight and CAMEO group
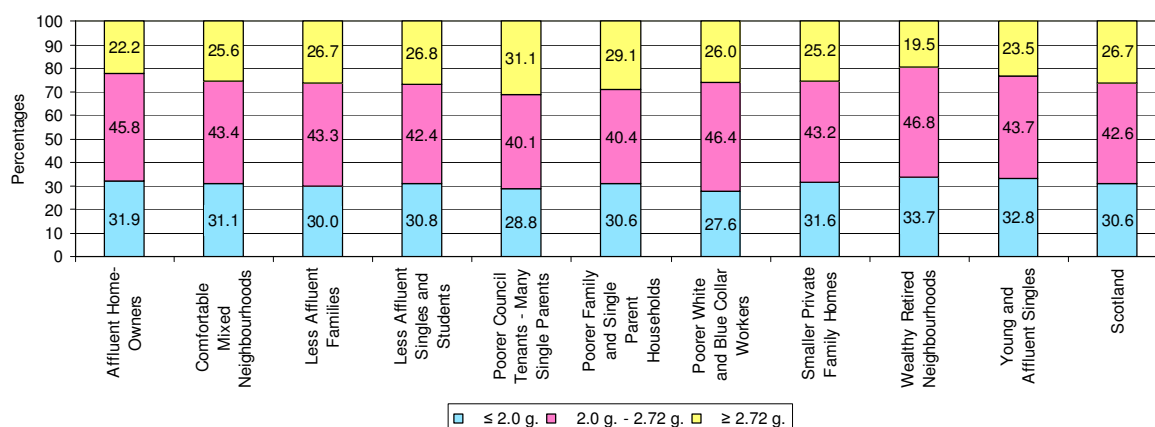
Source: Table A.14 in the annex.

Figure 27 presents the expenditure allocation according to the content of salt. No statistically significant differences between the groups and the Scottish average were found in the data. However, it is interesting to note that the groups 'Poor Council Tenants – Many Single Parents' and 'Poorer Family and Single Parent Households'

are the ones who allocate the highest proportion of their expenditure to sausages high in salt.

Figure 27: Distribution of expenditure on sausages according to salt in total product weight and CAMEO group
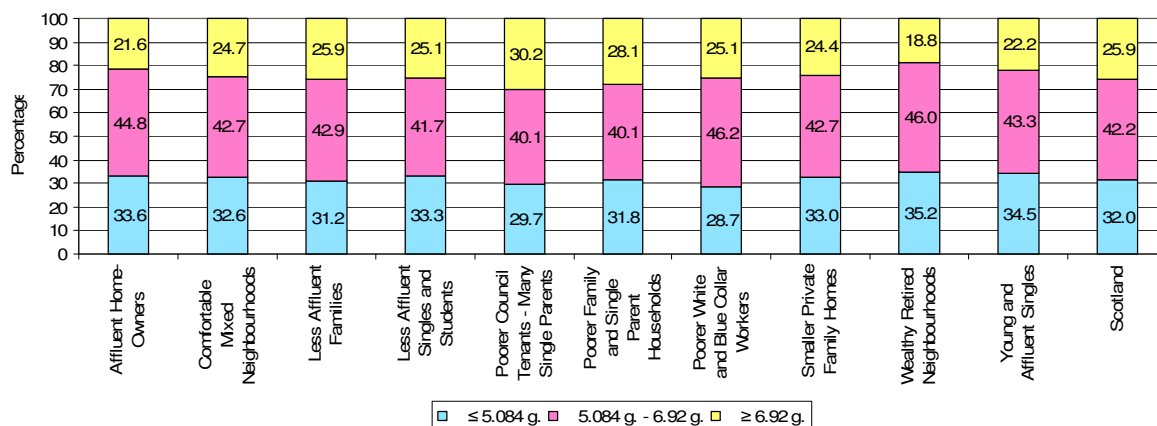
Source: Table A.14 in the annex.

Figure 28 shows the allocation according to price per unit. The message behind the figure is clear, affluent groups (i.e., 'Affluent Home-Owners', 'Wealthy Retired Neighbourhood' and 'Young and Affluent Singles') are the ones that allocate more expenditure to the most expensive sausages. In contrast, 'Poorer Council Tenant – Many Single Parents' and 'Poorer Family and Single Parent Households', have a relatively high share of their expenditure on the low priced sausages.

Figure 28: Distribution of expenditure on sausages according to price per unit and CAMEO group
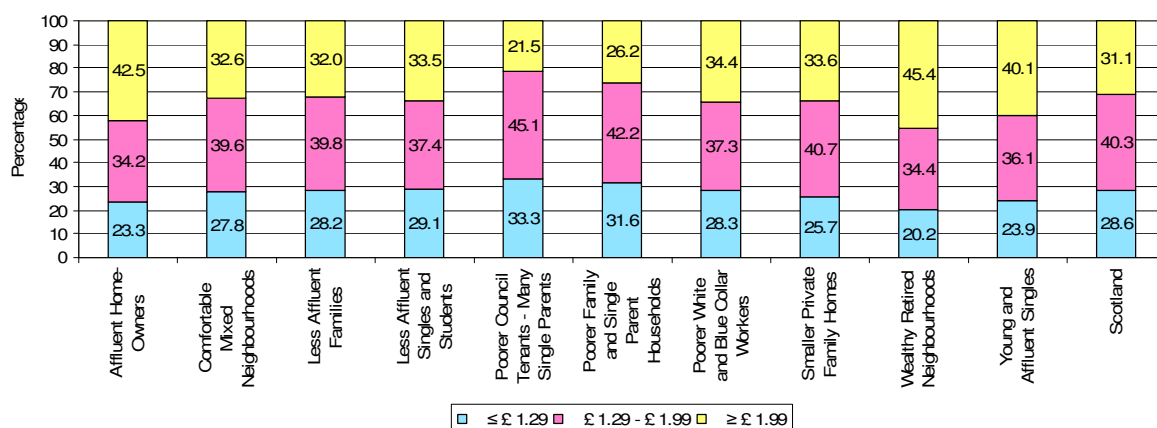
Source: Table A.14 in the annex.

Figure 29 presents the expenditure allocation on sausages considering prices per 100g. The results are similar to the ones considering prices per unit, i.e., income plays an important role in the selection of sausages.

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Figure 29: Distribution of expenditure on sausages according to price per 100g and CAMEO group
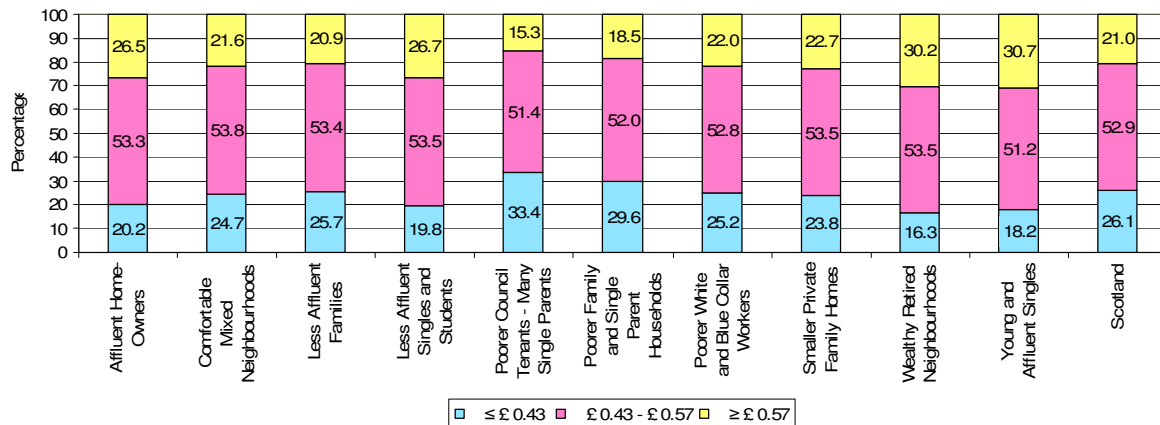
Source: Table A.14 in the annex.

The fact that the income plays an important role in the determination of the type of sausages purchased seems to be quite important because as shown by figures 30, 31, and 32 there seems to be an inverse relationship between prices and the nutritional composition of the sausage. Thus, according to the figures, the more expensive the sausage types the less saturated fat, sodium and salt can be found in the product.

Figure 30: Relationship between saturated fat content and price per 100 g.

$$y = 24.15x^2 - 71.83x + 61.83$$
$$R^2 = 0.349$$
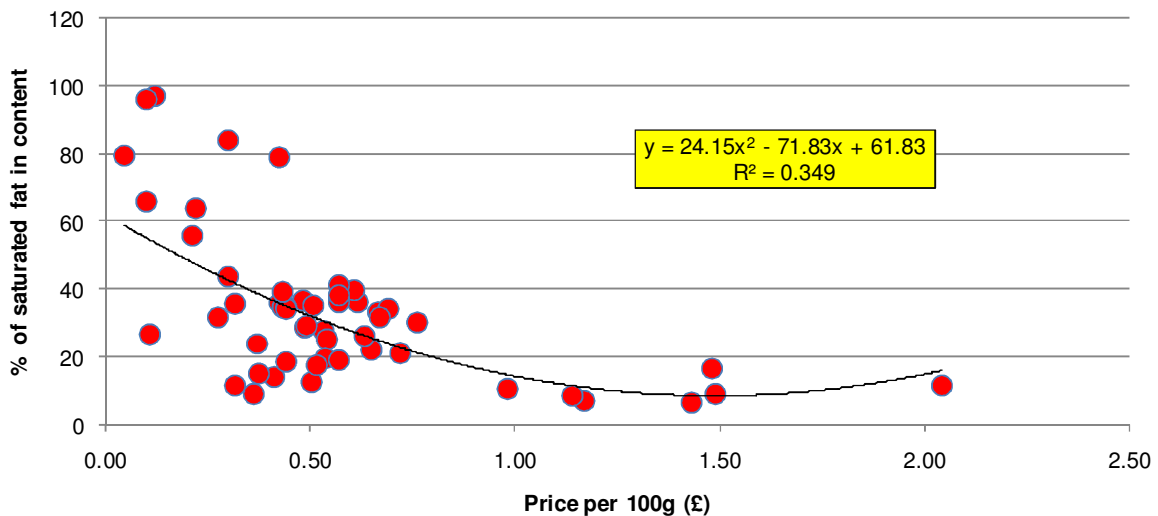
Source: own elaboration based on supermarket data.

Figure 31: Relationship between sodium content and price per 100 g.

$y = 2.258x^2 - 5.772x + 4.857$
$R^2 = 0.470$
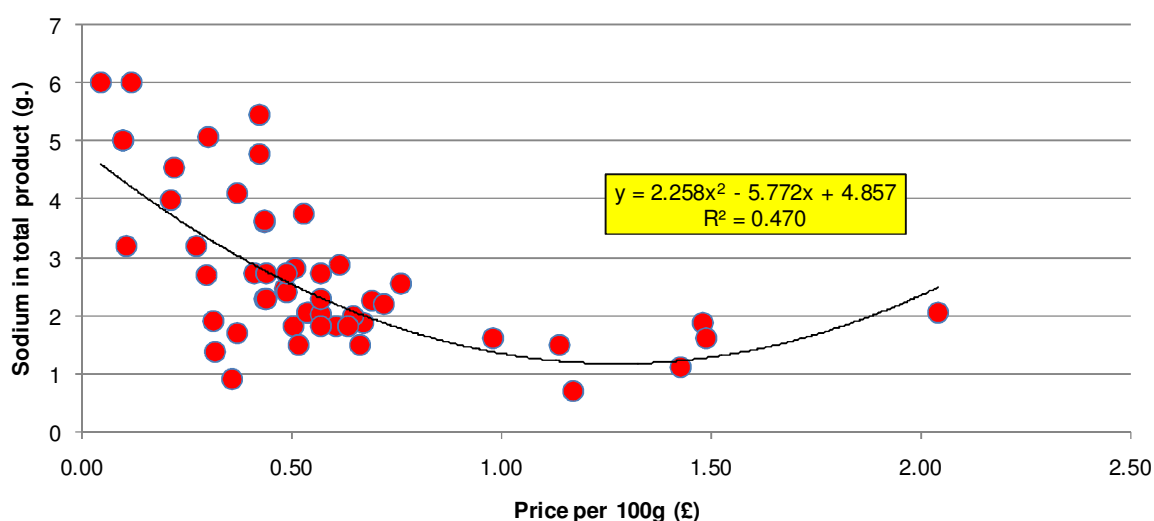
Source: own elaboration based on supermarket data.

Figure 32: Relationship between salt content and price per 100 g.

$y = 5.730x^2 - 14.65x + 12.33$
$R^2 = 0.469$
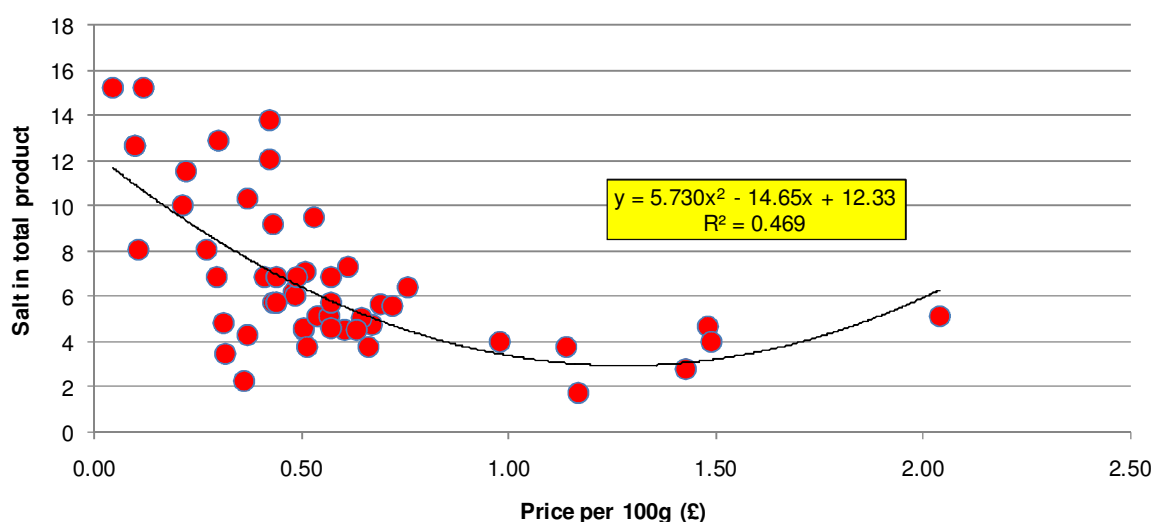
Source: own elaboration based on supermarket data.

In addition, as it is shown in Figures 30 to 32, although the slope of the regression curve is negative for the cheaper products, there is a range in terms of their nutritional characteristics; in other terms, a cheap product not necessarily an unhealthy product. However, as shown in the figures the groups 'Poor Council Tenants – Many Single Parents' and 'Poorer Family and Single Parent Households' have an above average expenditure proportion on sausages with higher energy from saturated fats, sodium and salt.

Analysis by Lifestage group

As shown in Figure 20, 'Young Families' spend the highest share of their meat expenditure on sausages (12.5 per cent) relative to other Lifestage groups, whilst 'Pensioners' spend the lowest share (7.8 per cent). It may be that the popularity of sausages is influenced by both age and the presence of young children in a family.

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Figure 33: Distribution of expenditure on sausages according to energy from saturated fat and by Lifestage group
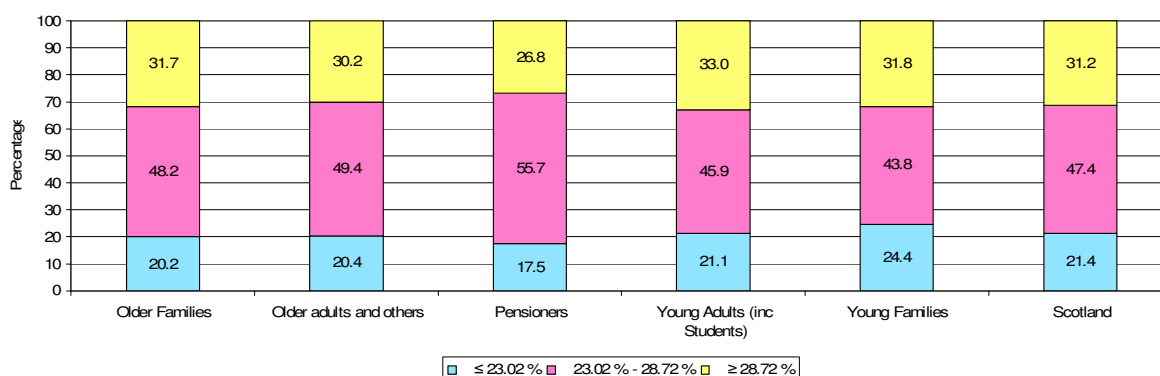
Source: Table A.15 in the annex.

As regards the distribution of the expenditure on sausages with different energy levels from saturated fat, Figure 33 shows that the allocation from each group is quite close to the average distribution for Scotland. The most marked differences exist between 'Pensioners' and 'Young Families', with the former spending the lowest share on low fat sausages and the latter the highest. Figure 34 that presents the expenditure distribution according to saturated fat in total product weight also shows that the groups distribution is not different to the Scottish one.

Figure 34: Distribution of expenditure on sausages according to saturated fat in total product weight and Lifestage group
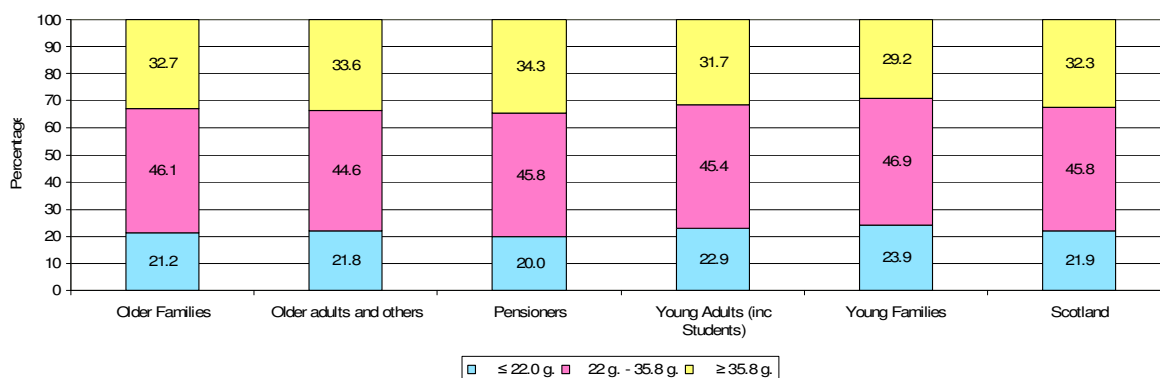
Source: Table A.15 in the annex.

Figure 35 shows the distribution of expenditure on sausages according to sodium in total product weight. None of the group distributions was found to be statistically different.

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Figure 35: Distribution of expenditure on sausages according to sodium in total product weight and Lifestage group
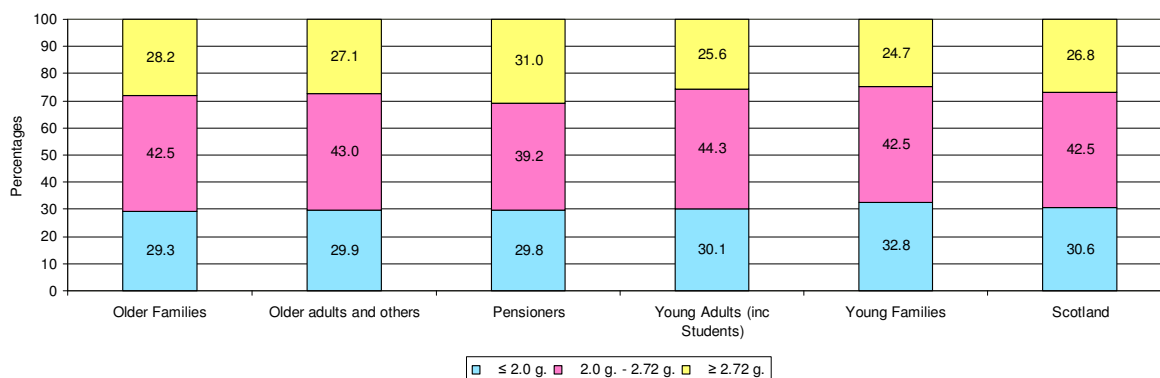
Source: Table A.15 in the annex.

The distribution of expenditure on sausages with different salt content levels is shown in Figure 36. The distributions of the groups are quite close to the ones according to the content of sodium, and again no differences were found between the groups and the Scottish average distribution.

Figure 36: Distribution of expenditure on sausages according to salt in total product weight and Lifestage group
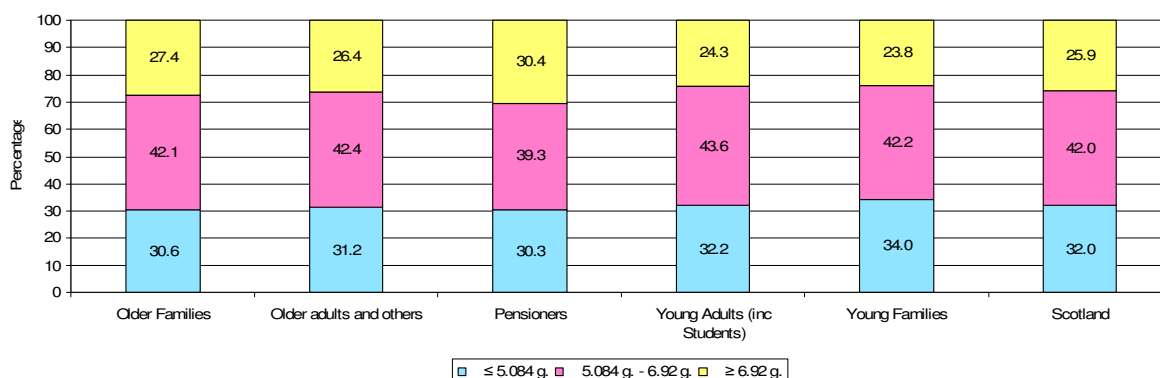
Source: Table A.15 in the annex.

Figure 37 presents the distribution of expenditure over sausages with different prices per unit. The distributions observed by group are similar to the average for Scotland. As regards differences between groups 'Pensioners' spend the highest proportion of sausage expenditure on low priced sausages and the lowest on the highly priced sausages. 'Young Adults' and 'Older adults and other' spend the highest share on high priced sausages, and the lowest share on low priced sausages. The difference between these two groups was statistically significant at 5 per cent.

Figure 37: Distribution of expenditure on sausages according to price per unit and Lifestage group
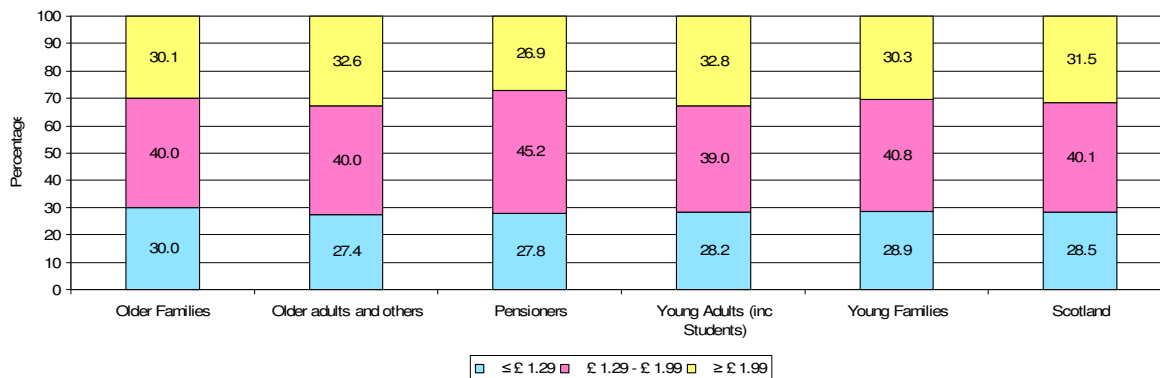
Source: Table A.15 in the annex.

Figure 38 gives the distribution of expenditure on sausages by price per 100 grams. The results are similar to those from the distributions using prices per unit. However, there are some differences such as 'Pensioners' appear with the highest proportion of cheap sausages and it is 'Young Adults' and 'Young families' which are the ones with the highest proportion of expensive sausages.

Figure 38: Distribution of expenditure on sausages according to price per 100g and Lifestage group

Source: Table A.15 in the annex.

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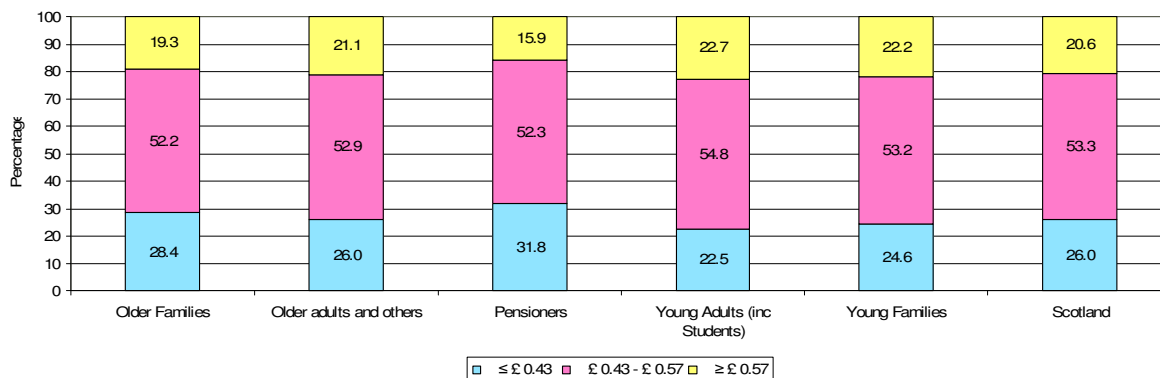
IX.   Conclusions

The purpose of the project has been to examine whether the database of representative supermarket shoppers could help address the lack of information on meat consumption in Scotland. Thus, the data were used to identify differences in the purchasing of red meat and preserved meat products in relation to geographical location, socio-economic categories (geo-demographics) and lifestage in Scotland.

The report started with a literature review on red meat purchases, which concluded that purchases and consumption of red and processed meat in Scotland has significant implications for both the red meat sector and the impact on health of the population. Recent trends indicate that consumers are reducing expenditure on more expensive meat cuts and meat products and looking for cheaper outlets in order to control household food budgets.

Economic concerns are causing consumers to be more cautious in their spending in the red meat category. Forecasts for red meat sales in the UK suggest further volume and value growth which suggests further increases in consumption. The implications of such forecasts cannot be assessed fully without an overall assessment of trends within individual product categories. As it is difficult to assess the actual consumption of meat and meat products in different consumer groupings, and especially in the context of socio-economic conditions, purchase-related proxy variables could provide valuable insights into both the nutrition and health of consumers and the demand implications for the industry.

Encouragement of the demand for good quality, locally supplied meat within the recommended intake amount could support the Scottish meat industry, including local producers and processors, as well as the independent distribution of meat. On the other hand, recognition of the role of multiple retailers and their dominance in the market place, could offer valuable insights into, and opportunities for, the promotion of healthy options and increase the availability of affordable good quality meat to all socio-economic groups in the Scottish consumer market.

The analysis of red meat purchases using supermarket data embraced five issues: geographical analysis, where Scottish purchases and composition were compared with the rest of the UK; analysis of Scottish purchases by geo-demographic group (CAMEO); analysis of Scottish purchases by lifestage; analysis of the proportion of total red meat purchases that is of Scottish origin (i.e., 'Scotch' and other Scottish origin); and a case study where the purchases of sausages (a product that represents approximately 11 per cent of the total meat expenditure in Scotland) were studied. The main results are outlined below.

Geographical analysis

The geographical analysis indicated that the proportion of total customers buying red meat in Scotland with respect to the rest of the UK was not different when analysed by category (e.g., beef raw). The difference, however, was significant when the aggregated categories (i.e., total red meat and preserved meat) were compared. Nevertheless, the Scottish proportion was lower than the rest of UK in all categories.

Scotland's proportion of customers buying red meat was approximately 41.4 per cent whilst in the rest of the UK was 69.1 per cent. This is broken down into 18.4 per cent (Scotland) versus 31.8 per cent (rest of UK) for red meat and 22.9 per cent (Scotland) versus 37.3 per cent (rest of UK) for preserved meat.

This difference may arise from the fact that in Scotland a higher proportion of consumers buys red meat products in outlets other than supermarkets (or at least different from the supermarket chain that the data was extracted from) (see the literature review section). In addition, as explained in the methods section, it may also be due to the case that in the rest of the UK, customers buy a higher number of meat products in the supermarket.

As regards the distribution of Scottish expenditure by red meat category, this was close to the rest of UK, with approximately 53 per cent of the expenditure destined to red meat and 47 per cent to preserved meat.

With respect to the average number of units purchased per supermarket customer, Scotland's value is much lower than the rest of the UK (0.5 units per customer versus 0.85 in the rest of the UK). In the case of red meat the Scottish mean was 0.22 and the UK mean 0.39, whilst for preserved meat the corresponding figures were 0.28 for Scotland and 0.46 for the rest of the UK.

It is important to note that the previous result does not necessarily mean that those consumers buying red meat in Scotland buy much less on average than consumers in the rest of the UK. Thus, the number of units per purchasing customer in Scotland was only slightly lower than in the rest of the UK (1.20 versus 1.22 units, respectively).

Analysis by CAMEO groups

The analysis of the proportions of customers that purchase red meat with respect to the total number customers in the CAMEO group, indicated that almost none of the group results were different from the Scottish average. The only difference found was that related to the purchasing of both red and preserved meats in total by 'Young and Affluent Singles', which showed a significantly lower proportion than the Scottish average. When the proportion of customers buying red meat and preserved meat products is aggregated, the sum for some of the groups is found to be statistically significant in relation to the Scotland figure. Thus, the group 'Poor White and Blue Collar Workers' shows a proportion lower than the Scottish average (25.9 per cent versus 41.7 per cent), and this is also the case for the 'Young and Affluent group' (18.1 per cent versus 41.7). In contrast, the group 'Poorer Council Tenants' shows a proportion higher than the Scottish average (56.1 per cent versus 41.7 per cent).

Across the ten CAMEO groups, there appears to be considerable similarity in the proportions of meat expenditure on red meat and preserved forms. Although not statistically significantly different from the Scottish average proportion, the most affluent CAMEO groups 'Affluent Home-Owners', 'Wealthy Retired Neighbourhoods' and 'Young and Affluent Singles' spend the highest proportion on the preserved meat category.

The number of units purchased per customer for each CAMEO group was found to be statistically different from the Scottish average. These differences between groups may be due to the influence of the number of customers in the group (i.e., if only a few people in a CAMEO group purchase the product, the ratio per group will be low), but may also be due to clear eating preferences between socio-economic groups, with poorer groups having a preference for a relatively high meat and meat product diet.

As regards the actual number of units purchased per customer (i.e., customers who actually buy meat products) by CAMEO group, the poorer socio-economic groups (i.e., groups 'Poorer Council Tenants – Many Single Parents' and 'Poorer Family and Single Parent Households') purchase less units of red meat and also preserved meat (raw). In contrast, the more affluent groups such as 'Affluent Home Owners', 'Comfortable Mixed Neighbourhoods', 'Wealthy Retired Neighbourhoods' and 'Young and Affluent Singles' purchase more of them. This indicates a possible income effect (since the share in expenditure was found to be the same in all of the groups).

Analysis by Lifestage groups

The ratios of customers purchasing red meat with respect to the total number of customers for each Lifestage group are quite similar to that observed for Scotland. However, 'Young Families' seem to have the highest proportions amongst the groups (23.1 per cent for raw meat and 30.5 percent for preserved meat).

On average just over 53 per cent of total meat expenditure is on red meat, whilst preserved meat (principally bacon, ham and sausages) accounts for 47 per cent. Moreover, as in the case of the CAMEO groups, there is considerable similarity across the Lifestage groups. As regards the composition of the expenditure on red meat, most of the expenditure is allocated to beef, leaving a relatively small proportion on the other meats.

It would appear that 'Young consumers' (i.e., 'Young Families', along with 'Young Adults'), spend a smaller proportion on lamb and meat pies. The former is widely recognised as having its consumption skewed slightly towards older consumers, whilst the latter may be regarded as a more traditional product than many of the more recently developed meat dishes. In contrast to this feature of 'Young consumers' purchasing, 'Pensioners' spend a rather smaller proportion on Burgers and Meatballs (of which Burgers are likely to be the principal component) and a rather higher proportion on lamb.

In terms of the preserved meat categories, the proportions of the expenditure on bacon and gammon and ham are quite similar across the groups. However, the allocation to sausages seems to show more variability. Thus, 'Young consumers' appear with the highest proportion (12 per cent), whilst 'Pensioners and Older Adults' seem to spend a rather lower proportion of their meat expenditure on sausages (8.7 per cent and 7.8 per cent, respectively).

There are statistically significant differences in number of units of meat purchased per customer amongst the Lifestage groups and the Scottish average. The figures

indicate that families, both 'Older Families' and 'Young Families', purchase most meat (both red and preserved meat).

As regards the number of units purchased per customer, the groups with above average number of units are 'Adult' and 'Young Families' (both with 2.45 units) and the category 'Others' (2.49 units). In contrast, 'Pensioners' exhibit the lowest purchase per customer with 2.28 units. It is important to recall that it is inappropriate to infer household consumption from these figures –even if they are per customer– as the household size may differ substantively amongst groups.

Analysis of purchases of Scottish origin

Overall, just over 26 per cent of the purchased red meat by value is from Scottish origin (i.e., Scotch and other Scottish). This result, however, differs substantially by groups. Thus, 7.5 per cent of the total red meat purchased is Scotch and 34.6 per cent is other Scottish (i.e., non-Scotch), making a total of 42.1 per cent. The former only consists of raw Scotch Beef and Lamb, whilst the latter comprises a wide range of products carrying a Scottish name or indication that they were produced in Scotland.

In terms of raw beef, the percentage explained by the 'Scotch' PGI is 12.0 per cent of the total expenditure, whilst the other Scottish raw beef explains 50.2 per cent. Thus, 62.2 per cent of the raw beef purchased is from Scottish origin. In the case of raw lamb, the percentage accounted for by the 'Scotch' label is above the one observed for beef (14.5 per cent), but the percentage of other Scottish is much lower than for beef (23.6 per cent), producing a total from Scottish origin that is substantially lower than for beef (38.1 per cent).

The Scottish origin in the case of preserved meat is quite small and equal to 7.9 per cent. Bacon and gammon and Sausages have the highest percentage (13.9 per cent and 12.6 per cent, respectively).

Analysis of the purchases of sausages

The purchases of sausages was studied according to a number of variables, namely energy from saturated fat, saturated fat in total product weight, sodium in total product weight, salt in total product weight, price per unit and price per 100g., and also by CAMEO and Lifestage groups

The distribution of expenditure on sausages according to energy from saturated fat was found to be similar to the Scottish average across the CAMEO and Lifestage groups. This was also the case for the distributions of the expenditure according to the saturated fat content of the products.

The expenditure allocation on sausages of different sodium contents in the total product weight for the CAMEO and Lifestage groups, showed that most of the expenditure is allocated to sausages in the intermediate category and none of the groups was statistically different to the Scottish mean. The distribution according to different salt contents showed similar results to the distribution according to the

content of sodium, and no differences were found between the groups and the Scottish average distribution.

In contrast to the previous results the distributions according to price showed differences amongst groups and reflected the importance of income. Thus, the allocation according to price per unit by CAMEO groups, showed that affluent groups (i.e., 'Affluent Home-Owners', 'Wealthy Retired Neighbourhood' and 'Young and Affluent Singles') are the ones that allocate more expenditure to the most expensive sausages. In contrast, 'Poorer Council Tenants – Many Single Parents' and 'Poorer Family and Single Parent Households', have a relatively high share of their expenditure on the low priced sausages. The expenditure allocation on sausages considering prices per 100g also showed that income plays an important role in the selection of sausages. This is quite important because there is a negative correlation between the nutritional characteristics of the different sausages and their prices.

In the case of Lifestage groups, their distribution of expenditure across sausages with different prices per unit was similar to the average for Scotland. As regards differences between groups, 'Pensioners' spend the highest proportion of sausage expenditure on low priced sausages, and the lowest on the highly priced sausages. 'Young Adults' and 'Older adults' and 'Others' spend the highest share on high priced sausage and the lowest on low priced sausages. The difference between these two groups was statistically significant at 5 per cent. The distribution of expenditure on sausages by price per 100 grams was similar to those from the distributions using prices per unit. However, there were some differences such as 'Pensioners' appeared with the highest proportion of cheap sausages, and it is 'Young Adults' and 'Young families' that are the ones with the highest proportion of expensive sausages.

Overall, the supermarket data seem to point out that the differences in the purchasing pattern amongst either CAMEO groups or Lifestage groups in Scotland are not too strong. In this sense, targeting particular consumer groups might be an efficient policy to improve the nutritional standards of the population. Instead, it might be better to address the quality of specific products (e.g., cheap products with poor nutritional characteristics and which enjoy of high selling level).

X. Limitations and strengths of the data and possibilities for further research

The purpose of this section is to outline the main limitations and strengths of the supermarket data for their use on consumption/nutrition analysis. In addition, based on the experience acquired during the study, to propose some possibilities for further research.

Limitations

- The data extraction system is a constraint for its use on projects requiring large datasets and many categories. The recommendation is to contact the primary database provider and ask for the preparation of a bespoke dataset. This would incur a related expense.
- The use of units instead of weights is a limitation for nutrition projects. This is a limitation that can be solved by compiling information about the products' weights, but it will be a lengthy process.
- The absence of nutritional information associated to the products. Similar to the previous point, this can be overcome through the collection of information about the nutritional characteristics of the products, many of which are available in the internet.
- The absence of demographic information makes it difficult to associate CAMEO or Lifestage groups with households. This issue can be solved by directly contacting the providers of these classifications.

Strengths

- The data reflect the supermarket transactions of a large number of customers, and in this it can provide information on at least part of the consumption habits of the Scottish population.
- The distribution of consumers, across the socio-economic groups, using the supermarket chain in question, is similar to that of the average for all grocery shoppers.
- Supermarkets represent an important proportion of the consumers' food purchases.
- The data allow identication and analysis of the most important products (in terms of purchasing) within a category, and in this respect it makes it much easier to provide specific policy recommendations.
- Although not explored in this report, the data have the potential to provide information about the response of consumers to price changes.
- The data have the potential to provide information about the time series properties of food purchases such as trends, seasonality, etc., which can provide a better understanding of market dynamics in periods of change such as periods of price inflation or health policy initiatives.

Possibilities for further research

- Before pointing out potential areas of analysis, it is necessary to invest in complementing the supermarket data with demographic information regarding the

households and also with information on the nutritional characteristics of the products.

- It would also be possible to identify the differences in the purchasing of specific product types by the ISBA areas in Scotland, or indeed at individual stores. Thus the purchases at stores within relatively deprived areas could be identified as could those in relatively affluent areas.

As regards potential further research, some of the possibilities are as follows.

- **Analysis of trends and consumers' responses to changes in prices**. The database has the potential of providing information about the aggregate response of a group of consumers to changes in the prices of important nutritional items (e.g., wholemeal bread or key fruit and vegetable products), or any other factors such as discounts or health promotion campaigns.
- **Specific case studies**. Under the current limitations imposed by the data extraction procedure, the development of specific case studies associated to products is the best way to operate. This has been shown by the analysis of sausages.

XI.   References

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XII. Annexes

Table A.1: UK - Mean and standard deviation of the proportion of total customers by geographical area that purchase red meat (%) 1/
Period: 1-01-07 to 22-12-08

Categories	Scotland				Sig. 2/	Rest of UK	UK
	Borders	Central	Northern	All			
Red meat	14.80	20.02	17.75	18.44	*	31.81	29.90
sd	1.01	1.27	1.32	1.17		1.73	1.58
Of which:							
Beef (raw)	5.52	8.00	6.85	7.23		10.95	10.42
sd	0.37	0.50	0.46	0.44		0.94	0.85
Burgers & meatballs	0.97	1.47	1.16	1.29		1.96	1.86
sd	0.35	0.40	0.36	0.38		0.64	0.60
Lamb (raw)	0.97	1.19	1.03	1.10		3.01	2.74
sd	0.12	0.16	0.14	0.15		0.35	0.31
Meat pies	2.41	3.26	2.71	2.94		4.98	4.68
sd	0.26	0.33	0.29	0.30		0.49	0.45
Pork (raw)	1.61	1.73	1.94	1.78		4.29	3.93
sd	0.24	0.18	0.23	0.19		0.33	0.29
Preserved	18.10	24.47	22.91	22.94	*	37.29	35.24
sd	1.51	1.84	2.17	1.83		2.54	2.38
Of which:							
Bacon & gammon (raw)	4.69	6.19	5.88	5.85		9.28	8.79
sd	0.60	0.71	0.84	0.72		1.03	0.97
Ham	5.67	7.82	7.33	7.31		11.33	10.75
sd	0.62	0.79	0.72	0.72		1.04	0.98
Sausages	4.98	6.76	6.19	6.29		11.03	10.35
sd	0.69	0.84	0.94	0.83		1.07	1.02
Total	32.90	44.49	40.65	41.38	*	69.11	65.13
sd	2.24	2.75	3.24	2.69		3.85	3.54

Source: Own elaboration based on information from the dunnhumby database, © dunnhumby 2009
Notes:
1/ For each category, the first figure corresponds to the mean and the second, denoted with sd, is the standard deviation.
2/ '*' indicates that the Scottish mean is statistically different to the Rest of UK mean at 5 per cent of significance

Table A.2: UK - Mean and standard deviation of expenditure share of weekly purchases by meat categories (%) 1/
Period: 1-01-07 to 22-12-08

Categories	Scotland				Sig.	Rest of	UK
	Borders	Central	Northern	All	2/	UK	
Red meat	52.78	54.01	51.99	53.19		54.89	54.75
sd	2.08	1.64	1.75	1.70		1.76	1.74
Of which:							
Beef (raw)	25.13	27.79	25.81	26.79		23.65	23.92
sd	1.52	1.27	1.39	1.30		1.65	1.60
Burgers & meatballs	2.63	3.13	2.69	2.92		2.59	2.62
sd	0.95	0.85	0.84	0.85		0.93	0.92
Lamb (raw)	5.64	5.16	4.97	5.16		8.44	8.16
sd	0.60	0.60	0.60	0.57		1.02	0.97
Meat pies	5.11	5.37	4.62	5.09		4.97	4.98
sd	0.65	0.73	0.63	0.67		0.52	0.53
Pork (raw)	7.46	5.73	7.08	6.40		9.16	8.92
sd	1.22	0.67	0.87	0.78		0.73	0.71
Preserved	47.22	45.99	48.01	46.81		45.11	45.25
sd	2.08	1.64	1.75	1.70		1.76	1.74
Of which:							
Bacon & gammon (raw)	15.83	15.19	16.14	15.59		14.30	14.41
sd	2.04	1.58	1.80	1.70		1.75	1.74
Ham	15.65	15.21	15.95	15.51		14.50	14.59
sd	1.49	1.42	1.45	1.42		1.13	1.15
Sausages	10.53	10.47	10.53	10.50		11.23	11.17
sd	0.94	0.81	0.81	0.81		0.83	0.81
Total	100.00	100.00	100.00	100.00		100.00	100.00

Source: Own elaboration based on information from the dunnhumby database, © dunnhumby 2009

Notes:
1/ For each category, the first figure corresponds to the mean and the second, denoted with sd, is the standard deviation.
2/ '*' indicates that the Scottish proportion is statistically different than the Rest of UK proportion at 5 per cent of significance.

Table A.3: UK - Mean and standard deviation of weekly number of units purchased of red and preserved meat categories 1/
Figures per total group customers, Period: 1-01-07 to 22-12-08

Categories	Scotland				Sig.	Rest of	UK
	Borders	Central	Northern	All	2/	UK	
Red meat	0.18	0.24	0.22	0.22	*	0.39	0.36
sd	0.01	0.02	0.02	0.01		0.02	0.02
Of which:							
Beef (raw)	0.07	0.10	0.08	0.09	*	0.13	0.13
sd	0.00	0.01	0.01	0.01		0.01	0.01
Burgers & meatballs	0.01	0.02	0.02	0.02	*	0.03	0.03
sd	0.00	0.01	0.00	0.01		0.01	0.01
Lamb (raw)	0.01	0.01	0.01	0.01	*	0.03	0.03
sd	0.00	0.00	0.00	0.00		0.00	0.00
Meat pies	0.03	0.04	0.03	0.04	*	0.06	0.06
sd	0.00	0.00	0.00	0.00		0.01	0.01
Pork (raw)	0.02	0.02	0.02	0.02	*	0.05	0.04
sd	0.00	0.00	0.00	0.00		0.00	0.00
Preserved	0.22	0.29	0.28	0.28	*	0.46	0.43
sd	0.02	0.02	0.03	0.03		0.03	0.03
Of which:							
Bacon & gammon (raw)	0.06	0.08	0.08	0.07	*	0.12	0.11
sd	0.01	0.01	0.01	0.01		0.02	0.02
Ham	0.07	0.09	0.09	0.09	*	0.14	0.13
sd	0.01	0.01	0.01	0.01		0.01	0.01
Sausages	0.06	0.08	0.08	0.08	*	0.14	0.13
sd	0.01	0.01	0.01	0.01		0.01	0.01
Total	0.40	0.53	0.50	0.50	*	0.85	0.80
sd	0.03	0.04	0.04	0.04		0.05	0.05

Source: Own elaboration based on information from the dunnhumby database, © dunnhumby 2009
1/ For each category, the first figure corresponds to the mean and the second, denoted with sd, is the standard deviation.

2/ '*' indicates that the Scottish mean is statistically different to the Rest of UK mean at 5 per cent of significance

Table A.4: UK - Mean and standard deviation of the number of units purchased by meat categories 1/
Figures per purchasing customers, Period: 1-01-07 to 22-12-08

Categories	Scotland				Sig.	Rest of	UK
	Borders	Central	Northern	All	2/	UK	
Red meat	1.21	1.20	1.21	1.20	*	1.22	1.22
sd	0.01	0.01	0.01	0.01		0.01	0.01
Of which:							
Beef (raw)	1.21	1.21	1.23	1.22	*	1.23	1.23
sd	0.02	0.02	0.02	0.02		0.02	0.02
Burgers & meatballs	1.35	1.31	1.34	1.33	*	1.36	1.36
sd	0.06	0.04	0.05	0.04		0.05	0.05
Lamb (raw)	1.15	1.15	1.16	1.15	*	1.15	1.15
sd	0.03	0.04	0.04	0.03		0.03	0.03
Meat pies	1.22	1.20	1.22	1.21	*	1.24	1.23
sd	0.04	0.03	0.04	0.03		0.04	0.04
Pork (raw)	1.11	1.11	1.12	1.12	*	1.13	1.13
sd	0.03	0.02	0.02	0.02		0.02	0.02
Preserved	1.24	1.20	1.22	1.21	*	1.23	1.23
sd	0.02	0.02	0.02	0.02		0.02	0.02
Of which:							
Bacon & gammon (raw)	1.30	1.25	1.29	1.27	*	1.29	1.29
sd	0.06	0.05	0.05	0.05		0.05	0.05
Ham	1.21	1.18	1.19	1.19	*	1.20	1.20
sd	0.03	0.03	0.03	0.03		0.03	0.03
Sausages	1.23	1.19	1.22	1.20	*	1.23	1.22
sd	0.03	0.02	0.03	0.02		0.03	0.02
Total	2.45	2.40	2.44	2.42	*	2.45	2.45
sd	0.03	0.02	0.03	0.03		0.03	0.02

Source: Own elaboration based on information from the dunnhumby database, © dunnhumby 2009

Notes:
1/ For each category, the first figure corresponds to the mean and the second, denoted with sd, is the standard deviation.

2/ '*' indicates that the Scottish mean is statistically different to the Rest of UK mean at 5 per cent of significance

Table A.5: Scotland - Mean and standard deviation of the proportion of total customers by that purchase red meat by CAMEO group (%) 1/2/3/

Period: 4-12-06 to 24-11-08

Categories	CAMEO groups																				Scotland
	Group 1	Sig.	Group 2	Sig.	Group 3	Sig.	Group 4	Sig.	Group 5	Sig.	Group 6	Sig.	Group 7	Sig.	Group 8	Sig.	Group 9	Sig.	Group 10	Sig.	
Red meat	14.40		21.58		13.22		11.13		25.50		22.25		11.53		15.24		14.06		8.17	*	18.56
sd	0.93		1.62		0.94		0.86		1.56		1.36		0.71		1.01		0.94		0.75		1.17
Of which:																					
Beef (raw)	5.64		8.58		5.07		4.47		9.67		8.59		4.25		6.30		5.82		3.31		7.27
sd	0.33		0.56		0.35		0.35		0.58		0.53		0.30		0.44		0.44		0.41		0.43
Burgers & meatballs	0.85		1.44		0.89		0.84		1.89		1.62		0.73		1.07		0.77		0.50		1.28
sd	0.30		0.46		0.30		0.23		0.59		0.51		0.23		0.34		0.25		0.19		0.40
Lamb (raw)	1.09		1.34		0.79		0.67		1.17		1.15		0.67		1.00		1.37		0.63		1.10
sd	0.16		0.20		0.13		0.11		0.19		0.17		0.12		0.16		0.20		0.16		0.16
Meat pies	2.18		3.36		2.09		1.63		4.52		3.72		1.90		2.27		1.89		1.16		2.98
sd	0.21		0.38		0.25		0.19		0.45		0.38		0.23		0.27		0.22		0.21		0.30
Pork (raw)	1.60		2.15		1.34		1.27		2.16		2.03		1.13		1.38		1.47		0.94		1.78
sd	0.20		0.30		0.20		0.19		0.24		0.24		0.15		0.16		0.21		0.18		0.21
Preserved	18.69		27.37		16.73		13.34		30.55		27.05		14.36		19.49		17.90		10.00	*	23.09
sd	1.75		2.53		1.55		1.06		2.53		2.31		1.16		1.62		1.61		0.93		1.95
Of which:																					
Bacon & gammon (raw)	5.07		7.05		4.26		3.31		7.61		6.78		3.60		4.90		4.93		2.81		5.89
sd	0.70		0.94		0.57		0.35		0.87		0.82		0.47		0.68		0.69		0.40		0.73
Ham	6.19		8.92		5.35		3.87		9.31		8.45		4.51		6.57		6.16		3.08		7.37
sd	0.65		0.90		0.54		0.43		1.01		0.87		0.49		0.64		0.62		0.36		0.73
Sausages	5.03		7.29		4.60		4.11		8.35		7.51		3.75		5.42		4.62		2.81		6.30
sd	0.71		1.06		0.70		0.47		1.15		1.05		0.51		0.73		0.66		0.45		0.85
Total	33.10		48.95		29.95		24.47	*	56.05	*	49.30		25.89	*	34.73		31.96		18.18	*	41.65
sd	2.42		3.80		2.22		1.71		3.65		3.32		1.60		2.30		2.25		1.42		2.81

Source: Own elaboration based on information from the dunnhumby database.

Notes:

1/ The CAMEO groups are: 1='Affluent Home-Owners', 2='Comfortable Mixed Neighbourhoods', 3='Less Affluent Families', 4='Less Affluent Singles and Students',
   5='Poorer Council Tenants - Many Single Parents', 6='Poorer Family and Single Parent Households', 7='Poorer White and Blue Collar Workers', 8='Smaller Private
   Family Homes', 9='Wealthy Retired Neighbourhoods', 10='Young and Affluent Singles'.

2/ For each category, the first figure corresponds to the mean and the second, denoted with sd, is the standard deviation.

3/ '*' indicates that the proportion from a Cameo group is statistically different than the Scottish average at 5 per cent of significance.

Table A.6: Scotland - Mean and standard deviation of expenditure share of weekly purchases by red and preserved meat categories and CAMEO groups (%) 1/ 2/ 3/
Period: 4-12-06 to 24-11-08

Categories	CAMEO groups																				Scotland
	Group 1	Sig.	**Group 2**	Sig.	**Group 3**	Sig.	**Group 4**	Sig.	**Group 5**	Sig.	**Group 6**	Sig.	**Group 7**	Sig.	**Group 8**	Sig.	**Group 9**	Sig.	**Group 10**	Sig.	
Red meat	51.8		52.8		52.2		53.6		54.0		53.7		52.4		52.9		53.6		54.2		53.1
sd	2.2		1.9		2.1		2.1		1.7		1.8		2.2		2.0		2.2		3.2		1.8
Of which:																					
Beef (raw)	26.0		26.9		25.6		26.5		26.7		26.8		25.0		27.7		27.6		27.4		26.7
sd	1.6		1.4		1.6		1.6		1.3		1.4		1.6		1.7		1.9		3.1		1.4
Burgers & meatballs	2.3		2.7		2.8		3.3		3.3		3.1		2.6		2.9		2.2		2.6		2.9
sd	0.9		0.9		0.9		0.8		0.9		1.0		0.8		1.0		0.8		1.1		0.9
Lamb (raw)	6.2		5.2		5.0		5.2		4.1		4.6		5.0		5.4		8.0		6.9		5.1
sd	0.8		0.7		0.8		0.8		0.6		0.6		0.9		0.7		1.1		1.7		0.6
Meat pies	4.5		4.8		5.0		4.8		6.1		5.6		5.3		4.7		4.0		4.4		5.2
sd	0.7		0.8		0.8		0.8		0.9		0.9		0.8		0.8		0.7		1.1		0.8
Pork (raw)	6.7		6.4		6.7		7.1		6.0		6.3		6.7		5.7		6.1		6.5		6.3
sd	0.9		0.9		1.1		1.1		0.8		0.9		1.0		0.8		1.0		1.4		0.8
Preserved	48.2		47.2		47.8		46.4		46.0		46.3		47.6		47.1		46.4		45.8		46.9
sd	2.2		1.9		2.1		2.1		1.7		1.8		2.2		2.0		2.2		3.2		1.8
Of which:																					
Bacon & gammon (raw)	16.9		15.9		15.8		14.4		15.3		15.4		15.8		15.2		16.2		16.3		15.7
sd	2.2		1.8		1.9		1.8		1.5		1.7		2.0		1.9		2.0		2.4		1.7
Ham (raw)	16.4		15.9		16.0		14.3		14.5		15.0		15.5		16.4		16.3		14.7		15.5
sd	1.4		1.4		1.4		1.4		1.4		1.4		1.6		1.5		1.6		1.7		1.4
Sausages	10.4		10.2		10.6		11.9		10.4		10.6		10.2		10.7		9.7		10.3		10.4
sd	0.8		0.8		0.9		0.8		0.7		0.7		0.9		0.8		0.9		1.5		0.7
Total	100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0

Source: Own elaboration based on information from the dunnhumby database, © dunnhumby 2009
Notes:
1/ The CAMEO groups are: 1='Affluent Home-Owners', 2='Comfortable Mixed Neighbourhoods', 3='Less Affluent Families', 4='Less Affluent Singles and Students',
   5='Poorer Council Tenants - Many Single Parents', 6='Poorer Family and Single Parent Households', 7='Poorer White and Blue Collar Workers', 8='Smaller Private
   Family Homes', 9='Wealthy Retired Neighbourhoods', 10='Young and Affluent Singles'.
2/ For each category, the first figure corresponds to the mean and the second, denoted with sd, is the standard deviation.
3/ '*' indicates that the proportion from a Cameo group is statistically different than the Scottish average at 5 per cent of significance.

Table A.7: Scotland - Mean and standard deviation of weekly number of units purchased of red and preserved meat categories and CAMEO groups 1/ 2/ 3/
Figures per total number of customers in the group, Period: 4-12-06 to 24-11-08

Categories	CAMEO groups																				Scotland
	Group 1	Sig.	Group 2	Sig.	Group 3	Sig.	Group 4	Sig.	Group 5	Sig.	Group 6	Sig.	Group 7	Sig.	Group 8	Sig.	Group 9	Sig.	Group 10	Sig.	
Red meat	0.18	*	0.26	*	0.16	*	0.13	*	0.30	*	0.27	*	0.14	*	0.18	*	0.17	*	0.10	*	0.22
sd	0.01		0.02		0.01		0.01		0.02		0.02		0.01		0.01		0.01		0.01		0.01
Of which:																					
Beef (raw)	0.07	*	0.11	*	0.06	*	0.05	*	0.11	*	0.10	*	0.05	*	0.08	*	0.07	*	0.04	*	0.09
sd	0.00		0.01		0.00		0.00		0.01		0.01		0.00		0.01		0.01		0.01		0.01
Burgers & meatballs	0.01	*	0.02	*	0.01	*	0.01	*	0.02	*	0.02	*	0.01	*	0.01	*	0.01	*	0.01	*	0.02
sd	0.00		0.01		0.00		0.00		0.01		0.01		0.00		0.00		0.00		0.00		0.01
Lamb (raw)	0.01		0.02	*	0.01	*	0.01	*	0.01		0.01		0.01		0.01	*	0.01	*	0.02	*	0.01	*	0.01
sd	0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Meat pies	0.03	*	0.04	*	0.03	*	0.02	*	0.05	*	0.04	*	0.02	*	0.03	*	0.02	*	0.01	*	0.04
sd	0.00		0.00		0.00		0.00		0.01		0.01		0.00		0.00		0.00		0.00		0.00
Pork (raw)	0.02	*	0.02	*	0.01	*	0.01	*	0.02	*	0.02	*	0.01	*	0.02	*	0.02	*	0.01	*	0.02
sd	0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Preserved	0.23	*	0.33	*	0.20	*	0.16	*	0.36	*	0.33	*	0.17	*	0.24	*	0.22	*	0.12	*	0.28
sd	0.02		0.03		0.02		0.01		0.03		0.03		0.02		0.02		0.02		0.01		0.03
Of which:																					
Bacon & gammon (raw)	0.07	*	0.09	*	0.05	*	0.04	*	0.10	*	0.09	*	0.05	*	0.06	*	0.06	*	0.04	*	0.08
sd	0.01		0.01		0.01		0.01		0.01		0.01		0.01		0.01		0.01		0.01		0.01
Ham	0.08	*	0.11	*	0.06	*	0.05	*	0.11	*	0.10	*	0.05	*	0.08	*	0.07	*	0.04	*	0.09
sd	0.01		0.01		0.01		0.01		0.01		0.01		0.01		0.01		0.01		0.00		0.01
Sausages	0.06	*	0.09	*	0.06	*	0.05	*	0.10	*	0.09	*	0.04	*	0.07	*	0.06	*	0.03	*	0.08
sd	0.01		0.01		0.01		0.01		0.02		0.01		0.01		0.01		0.01		0.01		0.01
Total	0.41	*	0.59	*	0.36	*	0.29	*	0.67	*	0.59	*	0.31	*	0.42	*	0.39	*	0.23	*	0.50
sd	0.03		0.05		0.03		0.02		0.05		0.04		0.02		0.03		0.03		0.02		0.04

Source: Own elaboration based on information from the dunnhumby database, © dunnhumby 2009

Notes:

1/ The CAMEO groups are: 1='Affluent Home-Owners', 2='Comfortable Mixed Neighbourhoods', 3='Less Affluent Families', 4='Less Affluent Singles and Students',
    5='Poorer Council Tenants - Many Single Parents', 6='Poorer Family and Single Parent Households', 7='Poorer White and Blue Collar Workers', 8='Smaller Private
    Family Homes', 9='Wealthy Retired Neighbourhoods', 10='Young and Affluent Singles'.

2/ For each category, the first figure corresponds to the mean and the second, denoted with sd, is the standard deviation.

3/ '*' indicates that the mean from a Cameo group is statistically different than the Scottish mean at 5 per cent of significance.

Table A.8: Scotland - Mean and standard deviation of weekly number of units purchased of red and preserved meat categories and CAMEO groups 1/ 2/ 3/

Figures per purchasing customers, Period: 4-12-06 to 24-11-08

Categories	Group 1	Sig.	Group 2	Sig.	Group 3	Sig.	Group 4	Sig.	Group 5	Sig.	Group 6	Sig.	Group 7	Sig.	Group 8	Sig.	Group 9	Sig.	Group 10	Sig.	Scotland
Red meat	1.24	*	1.21		1.21		1.20		1.19	*	1.20	*	1.20	*	1.21	*	1.23	*	1.25	*	1.21
sd	0.02		0.01		0.02		0.02		0.01		0.01		0.02		0.02		0.02		0.05		0.01
Of which:																					
Beef (raw)	1.27	*	1.23	*	1.22		1.22		1.19	*	1.21	*	1.20	*	1.24	*	1.28	*	1.27	*	1.22
sd	0.03		0.02		0.03		0.03		0.02		0.02		0.03		0.03		0.03		0.07		0.02
Burgers & meatballs	1.36	*	1.32		1.34		1.27	*	1.32		1.33		1.31		1.33		1.35	*	1.34		1.33
sd	0.06		0.05		0.08		0.07		0.05		0.06		0.08		0.06		0.10		0.17		0.05
Lamb (raw)	1.18	*	1.16		1.13	*	1.15		1.13	*	1.14	*	1.14	*	1.17	*	1.19	*	1.21	*	1.16
sd	0.04		0.04		0.05		0.06		0.03		0.04		0.06		0.04		0.06		0.12		0.03
Meat pies	1.22	*	1.20		1.22	*	1.19	*	1.21		1.21		1.22	*	1.19	*	1.21		1.23	*	1.21
sd	0.04		0.04		0.05		0.05		0.04		0.04		0.04		0.04		0.06		0.10		0.03
Pork (raw)	1.13	*	1.12	*	1.11	*	1.15	*	1.10	*	1.11	*	1.09	*	1.12		1.14	*	1.16	*	1.12
sd	0.03		0.02		0.03		0.04		0.02		0.02		0.04		0.03		0.05		0.08		0.02
Preserved	1.26	*	1.21		1.22	*	1.20	*	1.19	*	1.20	*	1.21	*	1.22	*	1.24	*	1.24	*	1.21
sd	0.02		0.02		0.02		0.02		0.02		0.02		0.02		0.02		0.03		0.04		0.02
Of which:																					
Bacon & gammon (raw)	1.31	*	1.27		1.28		1.24	*	1.25	*	1.26		1.27		1.28		1.30	*	1.31	*	1.27
sd	0.05		0.05		0.06		0.06		0.05		0.05		0.06		0.05		0.06		0.09		0.05
Ham	1.23	*	1.19		1.20	*	1.19		1.16	*	1.17	*	1.17	*	1.19		1.22	*	1.22	*	1.19
sd	0.04		0.03		0.04		0.04		0.03		0.03		0.03		0.03		0.04		0.06		0.03
Sausages	1.25	*	1.20		1.21	*	1.20		1.18	*	1.20		1.19	*	1.21	*	1.22	*	1.23	*	1.20
sd	0.03		0.02		0.03		0.03		0.03		0.03		0.03		0.02		0.04		0.06		0.02
Total	2.49	*	2.42		2.43	*	2.41	*	2.39	*	2.40	*	2.40	*	2.43	*	2.47	*	2.49	*	2.42
sd	0.03		0.03		0.03		0.03		0.02		0.02		0.03		0.03		0.04		0.07		0.02

Source: Own elaboration based on information from the dunnhumby database.

Notes:

1/ The CAMEO groups are: 1='Affluent Home-Owners', 2='Comfortable Mixed Neighbourhoods', 3='Less Affluent Families', 4='Less Affluent Singles and Students', 5='Poorer Council Tenants - Many Single Parents', 6='Poorer Family and Single Parent Households', 7='Poorer White and Blue Collar Workers', 8='Smaller Private Family Homes', 9='Wealthy Retired Neighbourhoods', 10='Young and Affluent Singles'.

2/ For each category, the first figure corresponds to the mean and the second, denoted with sd, is the standard deviation.

3/ '*' indicates that the mean from a Cameo group is statistically different than the Scottish mean at 5 per cent of significance.

Table A.9: Scotland - Mean and standard deviation of the proportion of total customers by that purchase red meat by Lifestage groups (%) 1/ 2/ 3/
Period: 1-01-07 to 22-12-08

Categories	Lifestage groups												Scotland
	Group 1	Sig.	Group 2	Sig.	Group 3	Sig.	Group 4	Sig.	Group 5	Sig.	Group 6	Sig.	
Red meat	21.80		19.42		15.75		17.80		15.68		23.14		18.44
sd	1.38		1.27		1.14		1.16		1.13		1.49		1.17
Of which:													
Beef (raw)	8.63		7.31		6.21		6.55		6.25		9.34		7.23
sd	0.53		0.44		0.41		0.46		0.42		0.67		0.44
Burgers & meatballs	1.69		1.07		1.10		0.66		1.19		1.94		1.29
sd	0.51		0.33		0.34		0.21		0.34		0.56		0.38
Lamb (raw)	1.17		1.38		0.98		1.42		0.83		1.14		1.10
sd	0.17		0.20		0.13		0.20		0.11		0.16		0.15
Meat pies	3.40		3.32		2.51		3.51		2.34		3.38		2.94
sd	0.36		0.34		0.27		0.37		0.28		0.36		0.30
Pork (raw)	2.07		1.94		1.52		1.60		1.62		2.17		1.78
sd	0.26		0.20		0.17		0.17		0.20		0.25		0.19
Preserved	26.75		23.14		19.44		21.37		19.88		30.53		22.94
sd	2.23		1.90		1.76		1.62		1.81		2.19		1.83
Of which:													
Bacon & gammon (raw)	6.98		6.26		5.01		5.77		4.88		7.18		5.85
sd	0.91		0.76		0.67		0.58		0.64		0.90		0.72
Ham	8.31		7.59		6.15		7.39		6.29		9.59		7.31
sd	0.84		0.83		0.62		0.83		0.64		0.92		0.72
Sausages	7.54		5.37		5.34		4.28		5.67		9.74		6.29
sd	1.07		0.77		0.77		0.50		0.84		1.10		0.83
Total	48.55		42.56		35.19		39.17		35.56		53.67		41.38
sd	3.19		2.84		2.67		2.41		2.70		3.28		2.69

Source: Own elaboration based on information from the dunnhumby database.
Notes:
1/ The Lifestage groups are: 1='Older Families', 2='Older adults', 3='Other', 4='Pensioners', 5='Young Adults (inc Students)', 6='Young Families'
2/ For each category, the first figure corresponds to the mean and the second, denoted with sd, is the standard deviation.
3/ '*' indicates that the proportion from a Lifestage group is statistically different than the Scottish proportion at 5 per cent of significance.

Table A.10: Scotland - Mean and standard deviation of expenditure share of weekly purchases by red and preserved meat categories and Lifestage groups (%) 1/ 2/ 3/
Period: 1-01-07 to 22-12-08

Categories	Lifestage groups												Scotland
	Group 1	Sig.	Group 2	Sig.	Group 3	Sig.	Group 4	Sig.	Group 5	Sig.	Group 6	Sig.	
Red meat	53.9		54.2		53.4		53.7		52.7		51.6		53.2
sd	1.8		1.7		1.8		1.9		1.7		1.8		1.7
Of which:													
Beef (raw)	27.8		26.4		27.0		24.8		26.7		26.6		26.8
sd	1.4		1.4		1.3		1.3		1.4		1.5		1.3
Burgers & meatballs	3.2		2.3		2.9		1.6		3.1		3.4		2.9
sd	1.0		0.6		0.9		0.4		0.9		1.1		0.8
Lamb (raw)	4.7		6.3		5.3		7.2		4.6		4.2		5.2
sd	0.6		0.8		0.6		0.9		0.5		0.5		0.6
Meat pies	5.0		5.4		5.1		6.4		4.8		4.6		5.1
sd	0.7		0.6		0.7		0.6		0.7		0.7		0.7
Pork (raw)	6.5		6.7		6.4		6.2		6.5		6.1		6.4
sd	0.9		0.8		0.8		0.8		0.8		0.8		0.8
Preserved	46.1		45.8		46.6		46.3		47.3		48.4		46.8
sd	1.8		1.7		1.8		1.9		1.7		1.8		1.7
Of which:													
Bacon & gammon (raw)	15.8		16.3		15.6		16.7		14.9		14.9		15.6
sd	1.9		1.5		1.7		1.6		1.7		1.8		1.7
Ham	14.8		15.4		15.3		15.9		15.7		16.2		15.5
sd	1.4		1.6		1.4		1.7		1.4		1.4		1.4
Sausages	10.5		8.7		10.4		7.8		11.1		12.5		10.5
sd	0.9		0.7		0.8		0.6		0.9		0.9		0.8
Total	100.0		100.0		100.0		100.0		100.0		100.0		100.0

Source: Own elaboration based on information from the dunnhumby database, © dunnhumby 2009
Notes:
1/ The Lifestage groups are: 1='Older Families', 2='Older adults', 3='Other', 4='Pensioners', 5='Young Adults (inc Students)', 6='Young Families'
2/ For each category, the first figure corresponds to the mean and the second, denoted with sd, is the standard deviation.
3/ '*' indicates that the proportion from a Lifestage group is statistically different than the Scottish mean at 5 per cent of significance.

Table A.11: Scotland - Mean and standard deviation of weekly number of units purchased of red and preserved meat categories and Lifestage groups 1/ 2/ 3/ Figures per total number of customers in the group, Period: 1-01-07 to 22-12-08

Categories	Group 1	Sig.	Group 2	Sig.	Group 3	Sig.	Group 4	Sig.	Group 5	Sig.	Group 6	Sig.	Scotland
Red meat	0.27	*	0.23	*	0.19	*	0.20	*	0.19	*	0.28	*	0.22
sd	0.02		0.02		0.01		0.01		0.01		0.02		0.01
Of which:													
Beef (raw)	0.11	*	0.09	*	0.08	*	0.07	*	0.08	*	0.12	*	0.09
sd	0.01		0.01		0.01		0.01		0.01		0.01		0.01
Burgers & meatballs	0.02	*	0.01	*	0.01	*	0.01	*	0.02	*	0.03	*	0.02
sd	0.01		0.00		0.00		0.00		0.00		0.01		0.01
Lamb (raw)	0.01	*	0.02	*	0.01	*	0.02	*	0.01	*	0.01	*	0.01
sd	0.00		0.00		0.00		0.00		0.00		0.00		0.00
Meat pies	0.04	*	0.04	*	0.03	*	0.04	*	0.03	*	0.04	*	0.04
sd	0.00		0.00		0.00		0.00		0.00		0.00		0.00
Pork (raw)	0.02	*	0.02	*	0.02	*	0.02	*	0.02	*	0.02	*	0.02
sd	0.00		0.00		0.00		0.00		0.00		0.00		0.00
Preserved	0.33	*	0.28		0.24	*	0.25	*	0.23	*	0.38	*	0.28
sd	0.03		0.03		0.02		0.02		0.02		0.03		0.03
Of which:													
Bacon & gammon (raw)	0.09	*	0.08	*	0.06	*	0.07	*	0.06	*	0.09	*	0.07
sd	0.01		0.01		0.01		0.01		0.01		0.01		0.01
Ham	0.10	*	0.09		0.07	*	0.08		0.07	*	0.12	*	0.09
sd	0.01		0.01		0.01		0.01		0.01		0.01		0.01
Sausages	0.09	*	0.06	*	0.06	*	0.05	*	0.07	*	0.12	*	0.08
sd	0.01		0.01		0.01		0.01		0.01		0.01		0.01
Total	0.60	*	0.51		0.43	*	0.45		0.42	*	0.66	*	0.50
sd	0.04		0.04		0.04		0.03		0.03		0.04		0.04

Source: Own elaboration based on information from the dunnhumby database, © dunnhumby 2009
Notes:
1/ The Lifestage groups are: 1='Older Families', 2='Older adults', 3='Other', 4='Pensioners', 5='Young Adults (inc Students)', 6='Young Families'
2/ For each category, the first figure corresponds to the mean and the second, denoted with sd, is the standard deviation.
3/ '*' indicates that the mean from a Lifestage group is statistically different than the Scottish mean at 5 per cent of significance.

Table A.12: Scotland - Mean and standard deviation of weekly number of units purchased of red and preserved meat categories and Lifestage groups 1/ 2/ 3/ Figures per customers, Period: 1-01-07 to 22-12-08

Categories	Group 1	Sig.	Group 2	Sig.	Group 3	Sig.	Group 4	Sig.	Group 5	Sig.	Group 6	Sig.	Scotland
					Lifestage groups								Scotland
Red meat	1.22	*	1.18	*	1.22	*	1.14	*	1.19	*	1.22	*	1.20
sd	0.01		0.01		0.01		0.01		0.01		0.01		0.01
Of which:													
Beef (raw)	1.23	*	1.19	*	1.23	*	1.14	*	1.21	*	1.24	*	1.22
sd	0.03		0.02		0.02		0.02		0.02		0.02		0.02
Burgers & meatballs	1.37	*	1.30	*	1.34		1.22	*	1.27	*	1.35	*	1.33
sd	0.06		0.05		0.05		0.06		0.05		0.05		0.04
Lamb (raw)	1.17	*	1.14	*	1.16		1.10	*	1.15		1.19	*	1.15
sd	0.05		0.04		0.03		0.04		0.04		0.04		0.03
Meat pies	1.23	*	1.20		1.22	*	1.17	*	1.18	*	1.21		1.21
sd	0.04		0.03		0.03		0.03		0.03		0.04		0.03
Pork (raw)	1.13	*	1.09	*	1.12		1.08	*	1.11		1.14	*	1.12
sd	0.03		0.02		0.02		0.02		0.02		0.03		0.02
Preserved	1.23	*	1.20	*	1.23	*	1.16	*	1.18	*	1.23	*	1.21
sd	0.02		0.02		0.02		0.02		0.02		0.02		0.02
Of which:													
Bacon & gammon (raw)	1.29	*	1.26		1.29	*	1.21	*	1.24	*	1.29	*	1.27
sd	0.05		0.04		0.05		0.05		0.05		0.06		0.05
Ham (raw)	1.19		1.18		1.20	*	1.15	*	1.15	*	1.21	*	1.19
sd	0.03		0.03		0.03		0.03		0.03		0.03		0.03
Sausages	1.23	*	1.19	*	1.21	*	1.14	*	1.18	*	1.22	*	1.20
sd	0.03		0.03		0.03		0.02		0.02		0.03		0.02
Total	2.45		2.38	*	2.44	*	2.30	*	2.37	*	2.45	*	2.42
sd	0.03		0.03		0.03		0.02		0.03		0.03		0.03

Source: Own elaboration based on information from the dunnhumby database.
Notes:
1/ The Lifestage groups are: 1='Older Families', 2='Older adults', 3='Other', 4='Pensioners', 5='Young Adults (inc Students)', 6='Young Families'
2/ For each category, the first figure corresponds to the mean and the second, denoted with sd, is the standard deviation.
3/ '*' indicates that the mean from a Lifestage group is statistically different than the Scottish mean at 5 per cent of significance.

Table A.13: Scotland - Mean and standard deviation of the share of 'Scotch' and other Scottish products on the total value of the purchased of red and preserved meat categories (%) 1/
Period: 1-01-07 to 22-12-08

Categories	Scotch	Other Scottish	Total Scottish
Red meat	7.46	34.61	42.07
sd	1.00	2.71	2.89
Of which:			
Beef (raw)	12.02	50.22	62.24
sd	1.31	3.35	3.60
Burgers & meatballs	..	13.57	13.57
sd	..	6.01	6.01
Lamb (raw)	14.50	23.58	38.08
sd	3.61	4.16	5.51
Meat pies	..	34.18	34.18
sd	..	4.38	4.38
Pork (raw)	..	1.91	1.91
sd	..	0.99	0.99
Preserved	..	7.86	7.86
sd	..	0.93	0.93
Of which:			
Bacon & gammon (raw)	..	13.91	13.91
sd	..	2.29	2.29
Ham	..	1.28	1.28
sd	..	0.21	0.21
Sausages	..	12.55	12.55
sd	..	1.57	1.57
Total	3.96	22.09	26.05
sd	0.50	1.70	2.1

Source: Own elaboration based on information from the dunnhumby database, © dunnhumby 2009

Notes:
1/ For each category, the first figure corresponds to the mean and the second, denoted with sd, is the standard deviation.

Table A.14: Scotland - Mean and standard deviation of expenditure share of weekly purchases of sausages by nutritional categories and CAMEO groups (%) 1/ 2/ 3/
Period: 4-12-06 to 24-11-08

Categories	CAMEO groups										Scotland
	Group 1 Sig.	Group 2 Sig.	Group 3 Sig.	Group 4 Sig.	Group 5 Sig.	Group 6 Sig.	Group 7 Sig.	Group 8 Sig.	Group 9 Sig.	Group 10 Sig.	
Share of expenditure	10.4	10.2	10.6	11.9	10.4	10.6	10.2	10.7	9.7	10.3	10.4
sd	0.8	0.8	0.9	0.8	0.7	0.7	0.9	0.8	0.9	1.5	0.7
Energy from saturated fat	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
≤ 23.02 %	20.0	22.1	20.5	19.8	21.4	21.1	17.3	22.6	20.5	19.2	21.3
sd	2.3	2.1	3.2	2.6	2.5	2.2	2.7	2.4	3.3	5.3	2.1
23.02 % - 28.72 %	49.4	47.2	48.7	47.2	48.1	47.0	47.9	48.1	50.2	48.9	47.9
sd	3.8	3.7	4.1	4.8	4.2	4.0	4.2	3.5	4.3	8.1	3.6
≥ 28.72 %	30.6	30.7	30.8	32.9	30.4	31.9	34.8	29.3	29.3	31.8	30.8
sd	3.5	3.8	4.0	4.5	4.9	4.5	4.7	3.5	4.2	7.1	3.9
Saturated fat in total product weight	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
≤ 22.0 g.	19.9	22.7	20.8	24.4	23.3	22.9	19.1	23.1	21.5	22.6	22.4
sd	2.4	2.0	2.6	3.1	2.2	2.1	2.7	2.5	3.3	5.4	2.0
22 g. - 35.8 g.	44.4	45.5	48.4	43.8	46.3	46.1	50.3	44.6	43.8	43.6	45.7
sd	3.1	3.3	3.6	3.7	3.8	3.7	4.3	3.3	3.7	7.2	3.2
≥ 35.8 g.	35.7	31.8	30.8	31.9	30.3	31.0	30.6	32.2	34.7	33.8	31.9
sd	3.9	3.9	4.4	4.5	4.4	4.2	4.5	3.7	4.2	7.5	3.8
Sodium in total product weight	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
≤ 2.0 g.	31.9	31.1	30.0	30.8	28.8	30.6	27.6	31.6	33.7	32.8	30.6
sd	3.5	3.3	3.6	3.7	3.7	3.4	3.8	3.3	3.9	7.3	3.2
2.0 g. - 2.72 g.	45.8	43.4	43.3	42.4	40.1	40.4	46.4	43.2	46.8	43.7	42.6
sd	3.4	3.2	3.6	4.2	3.9	3.7	4.2	3.3	4.3	7.4	3.2
≥ 2.72	22.2	25.6	26.7	26.8	31.1	29.1	26.0	25.2	19.5	23.5	26.7
sd	2.6	3.0	3.7	3.1	3.8	3.3	3.7	2.9	3.1	6.1	2.9

Continues

Categories	CAMEO groups																				Scotland
	Group 1	Sig.	Group 2	Sig.	Group 3	Sig.	Group 4	Sig.	Group 5	Sig.	Group 6	Sig.	Group 7	Sig.	Group 8	Sig.	Group 9	Sig.	Group 10	Sig.	
Salt in total product weight	100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0
≤ 5.084 g.	33.6		32.6		31.2		33.3		29.7		31.8		28.7		33.0		35.2	0.28	34.5		32.0
sd	3.3		3.2		3.6		3.5		3.6		3.4		3.8		3.2		3.8		7.3		3.1
5.084 g. - 6.92 g.	44.8		42.7		42.9		41.7		40.1		40.1		46.2		42.7		46.0		43.3		42.2
sd	3.3		3.2		3.4		4.4		3.9		3.7		4.3		3.2		4.2		7.1		3.2
≥ 6.92 g.	21.6		24.7		25.9		25.1		30.2		28.1		25.1		24.4		18.8		22.2		25.9
sd	2.6		2.9		3.5		3.2		3.7		3.2		3.6		2.9		3.1		5.6		2.9
Price per unit	100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0
≤ £ 1.29	23.3	*	27.8		28.2		29.1		33.3		31.6		28.3		25.7		20.2	0.01	23.9		28.6
sd	2.7		3.1		3.4		4.3		4.1		3.6		3.9		3.0		3.3		5.3		3.2
£ 1.29 - £ 1.99	34.2		39.6		39.8		37.4		45.1		42.2		37.3		40.7		34.4		36.1		40.3
sd	2.8		2.9		3.0		4.1		3.4		3.1		3.7		2.8		3.5		6.2		2.7
≥ £ 1.99	42.5		32.6		32.0		33.5		21.5		26.2		34.4		33.6		45.4		40.1		31.1
sd	3.1		2.9		3.6		3.7		3.0		3.2		4.2		3.2		3.9		6.8		2.8
Price per 100g	100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0
≤ £ 0.43	20.2		24.7		25.7		19.8		33.4		29.6		25.2		23.8		16.3	0.02	18.2	*	26.1
sd	2.8		3.1		3.5		3.1		3.8		3.6		3.6		2.7		3.1		5.0		3.1
£ 0.43 - £ 0.57	53.3		53.8		53.4		53.5		51.4		52.0		52.8		53.5		53.5		51.2		52.9
sd	4.1		4.0		4.3		4.8		4.2		4.1		4.6		3.7		4.9		7.4		3.8
≥ £ 0.57	26.5		21.6		20.9		26.7		15.3		18.5		22.0		22.7		30.2		30.7		21.0
sd	2.8		2.6		2.6		3.9		2.0		2.4		3.2		2.7		3.6		6.8		2.3

Source: Own elaboration based on information from the dunnhumby database, © dunnhumby 2009

Notes:

1/ The CAMEO groups are: 1='Affluent Home-Owners', 2='Comfortable Mixed Neighbourhoods', 3='Less Affluent Families', 4='Less Affluent Singles and Students', 5='Poorer Council Tenants - Many Single Parents', 6='Poorer Family and Single Parent Households', 7='Poorer White and Blue Collar Workers', 8='Smaller Private Family Homes', 9='Wealthy Retired Neighbourhoods', 10='Young and Affluent Singles'.

2/ For each category, the first figure corresponds to the mean and the second, denoted with sd, is the standard deviation.

3/ '*' indicates that the distribution observed from a CAMEO group is statistically different than the Scottish population distribution (Chi-square test).

Table A.15: Scotland - Mean and standard deviation of expenditure share of weekly purchases of sausages by nutritional categories and Lifestage groups (%) 1/ 2/

Categories	Lifestage groups										Scotland
	Group 1	Sig.	**Group 2-3**	Sig.	**Group 4**	Sig.	**Group 5**	Sig.	**Group 6**	Sig.	
Share of expenditure	10.5		9.8		7.8		11.1		12.5		10.5
sd	0.9		0.8		0.6		0.9		0.9		0.8
Energy from saturated fat	100.0		100.0		100.0		100.0		100.0		100.0
≤ 23.02 %	20.2		20.4		17.5		21.1		24.4		21.4
sd	2.2		2.1		2.3		2.0		2.3		2.0
23.02 % - 28.72 %	48.2		49.4		55.7		45.9		43.8		47.4
sd	4.0		3.7		3.7		3.7		3.5		3.6
≥ 28.72 %	31.7		30.2		26.8		33.0		31.8		31.2
sd	4.3		3.9		4.0		3.7		3.7		3.8
Saturated fat in total product weight	100.0		100.0		100.0		100.0		100.0		100.0
≤ 22.0 g.	21.2		21.8		20.0		22.9		23.9		21.9
sd	2.2		2.3		2.4		2.3		2.1		2.0
22 g. - 35.8 g.	46.1		44.6		45.8		45.4		46.9		45.8
sd	3.6		3.1		3.5		3.2		3.2		3.1
≥ 35.8 g.	32.7		33.6		34.3		31.7		29.2		32.3
sd	3.8		3.8		4.4		3.7		3.6		3.6
Sodium in total product weight	100.0		100.0		100.0		100.0		100.0		100.0
≤ 2.0 g.	29.3		29.9		29.8		30.1		32.8		30.6
sd	3.4		3.1		3.2		3.4		3.1		3.0
2.0 g. - 2.72 g.	42.5		43.0		39.2		44.3		42.5		42.5
sd	3.8		3.2		3.4		3.6		3.4		3.2
≥ 2.72	28.2		27.1		31.0		25.6		24.7		26.8
sd	3.6		2.9		3.6		2.9		2.9		2.9

Continues

Continues

Categories	Lifestage groups											Scotland
	Group 1	Sig.	**Group 2-3**	Sig.	**Group 4**	Sig.	**Group 5**	Sig.	**Group 6**	Sig.		
Salt in total product weight	100.0		100.0		100.0		100.0		100.0			100.0
≤ 5.084 g.	30.6		31.2		30.3		32.2		34.0			32.0
sd	3.2		3.0		3.1		3.2		3.0			2.9
5.084 g. - 6.92 g.	42.1		42.4		39.3		43.6		42.2			42.0
sd	3.7		3.2		3.4		3.5		3.4			3.2
≥ 6.92 g.	27.4		26.4		30.4		24.3		23.8			25.9
sd	3.6		2.8		3.4		2.7		2.9			2.8
Price per unit	100.0		100.0		100.0		100.0		100.0			100.0
≤ £ 1.29	30.0		27.4		27.8		28.2		28.9			28.5
sd	3.7		3.1		3.0		3.1		3.2			3.1
£ 1.29 - £ 1.99	40.0		40.0		45.2		39.0		40.8			40.1
sd	3.2		2.6		3.1		3.1		2.8			2.6
≥ £ 1.99	30.1		32.6		26.9		32.8		30.3			31.5
sd	3.2		2.8		3.3		2.8		3.1			2.7
Price per 100g	100.0		100.0		100.0		100.0		100.0			100.0
≤ £ 0.43	28.4		26.0		31.8		22.5		24.6			26.0
sd	3.5		3.0		3.2		2.9		2.9			2.9
£ 0.43 - £ 0.57	52.2		52.9		52.3		54.8		53.2			53.3
sd	4.1		3.7		3.8		3.9		3.7			3.7
≥ £ 0.57	19.3		21.1		15.9		22.7		22.2			20.6
sd	2.3		2.5		2.5		3.0		2.5			2.3

Source: Own elaboration based on information from the dunnhumby database, © dunnhumby 2009
Notes:
1/ The Lifestage groups are: 1='Older Families', 2-3='Older adults and others', 4='Pensioners', 5='Young Adults (inc Students)',6='Young Families'
2/ For each category, the first figure corresponds to the mean and the second, denoted with sd, is the standard deviation.
3/ '*' indicates that the distribution observed from a Lifestage group is statistically different than the Scottish population distribution (Chi-square test).