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**Article:**

Kilian, L [orcid.org/0000-0002-0885-1198](https://orcid.org/0000-0002-0885-1198), Owen, A [orcid.org/0000-0002-3872-9900](https://orcid.org/0000-0002-3872-9900), Newing, A [orcid.org/0000-0002-3222-6640](https://orcid.org/0000-0002-3222-6640) et al. (1 more author) (2022) Microdata selection for estimating household consumption-based emissions. *Economic Systems Research*. ISSN 0953-5314

<https://doi.org/10.1080/09535314.2022.2034139>

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## Supplementary Materials: Microdata selection for estimating household consumption-based emissions

### 1 Appendices

Appendix A. Table: Output Area Classification levels and descriptions from the year 2011.

Supergroup	Group	Subgroup	
1 Rural Residents	1A Farming Communities	1A1 Rural Workers and Families	
		1A2 Established Farming Communities	
		1A3 Agricultural Communities	
		1A4 Older Farming Communities	
	1B Rural Tenants	1B1 Rural Life	
		1B2 Rural White-Collar Workers	
		1B3 Ageing Rural Flat Tenants	
	1C Ageing Rural Dwellers	1C1 Rural Employment and Retirees	
		1C2 Renting Rural Retirement	
1C3 Detached Rural Retirement			
2 Cosmopolitans	2A Students Around Campus	2A1 Student Communal Living	
		2A2 Student Digs	
		2A3 Students and Professionals	
	2B Inner-City Students	2B1 Students and Commuters	
		2B2 Multicultural Student Neighbourhoods	
	2C Comfortable Cosmopolitans	2C1 Migrant Families	
		2C2 Migrant Commuters	
		2C3 Professional Service Cosmopolitans	
	2D Aspiring and Affluent	2D1 Urban Cultural Mix	
		2D2 Highly-Qualified Quaternary Workers	
		2D3 EU White-Collar Workers	
	3 Ethnicity Central	3A Ethnic Family Life	3A1 Established Renting Families
3A2 Young Families and Students			
3B Endeavouring Ethnic Mix		3B1 Striving Service Workers	
		3B2 Bangladeshi Mixed Employment	
		3B3 Multi-Ethnic Professional Service Workers	
3C Ethnic Dynamics		3C1 Constrained Neighbourhoods	
		3C2 Constrained Commuters	
3D Aspirational Techies		3D1 New EU Tech Workers	
		3D2 Established Tech Workers	
		3D3 Old EU Tech Workers	
4 Multicultural Metropolitans		4A Rented Family Living	4A1 Social Renting Young Families
			4A2 Private Renting New Arrivals
	4A3 Commuters with Young Families		
	4B Challenged Asian Terraces	4B1 Asian Terraces and Flats	
		4B2 Pakistani Communities	
	4C Asian Traits	4C1 Achieving Minorities	
		4C2 Multicultural New Arrivals	
		4C3 Inner City Ethnic Mix	
	5 Urbanites	5A Urban Professionals and Families	5A1 White Professionals
5A2 Multi-Ethnic Professionals with Families			
5A3 Families in Terraces and Flats			
5B Ageing Urban Living		5B1 Delayed Retirement	
		5B2 Communal Retirement	
		5B3 Self-Sufficient Retirement	
6 Suburbanites	6A Suburban Achievers	6A1 Indian Tech Achievers	
		6A2 Comfortable Suburbia	

			6A3 Detached Retirement Living
			6A4 Ageing in Suburbia
	6B	Semi-Detached Suburbia	6B1 Multi-Ethnic Suburbia
			6B2 White Suburban Communities
			6B3 Semi-Detached Ageing
			6B4 Older Workers and Retirement
7	Constrained City Dwellers	7A	Challenged Diversity
		7A1	Transitional Eastern European Neighbourhoods
		7A2	Hampered Aspiration
		7A3	Multi-Ethnic Hardship
		7B	Constrained Flat Dwellers
		7B1	Eastern European Communities
		7B2	Deprived Neighbourhoods
		7B3	Endeavouring Flat Dwellers
		7C	White Communities
		7C1	Challenged Transitionaries
		7C2	Constrained Young Families
		7C3	Outer City Hardship
		7D	Ageing City Dwellers
		7D1	Ageing Communities and Families
		7D2	Retired Independent City Dwellers
		7D3	Retired Communal City Dwellers
		7D4	Retired City Hardship
8	Hard-Pressed Living	8A	Industrious Communities
		8A1	Industrious Transitions
		8A2	Industrious Hardship
		8B	Challenged Terraced Workers
		8B1	Deprived Blue-Collar Terraces
		8B2	Hard-Pressed Rented Terraces
		8C	Hard-Pressed Ageing Workers
		8C1	Ageing Industrious Workers
		8C2	Ageing Rural Industry Workers
		8C3	Renting Hard-Pressed Workers
		8D	Migration and Churn
		8D1	Young Hard-Pressed Families
		8D2	Hard-Pressed Ethnic Mix
		8D3	Hard-Pressed European Settlers

## Appendix B. UK Geographies

The UK Statistics Authority divides the UK into a nested hierarchy of geographic zones for the dissemination of census and population data at various spatial scales. Output Areas (OAs) provide the highest level of geographic detail in the 2011 census, followed by Lower Super Output Areas (LSOAs), and Middle Super Output Areas (MSOAs) in England and Wales (ONS, n.d.), and by Data Zones (DZs) and Intermediate Geographies (IGs) in Scotland (Scotland's Census, 2013). In the Northern Irish census, OAs are introduced in 2001, and not redefined in 2011. The 2011 census introduces Small Areas (SAs), which combine the 5,022 OAs to 4,537 SAs and are followed by Super Output Areas (SOAs) in Northern Ireland (NISRA, 2013). Population sizes of these areas are shown in Table 1. Municipality level geographies, in the UK, are referred to as Local Authority Districts (LADs). The UK is made up of 434 LADs, which are also contained in this nested hierarchy, such that LADs can be subdivided into unique MSOAs, LSOAs, or OAs.

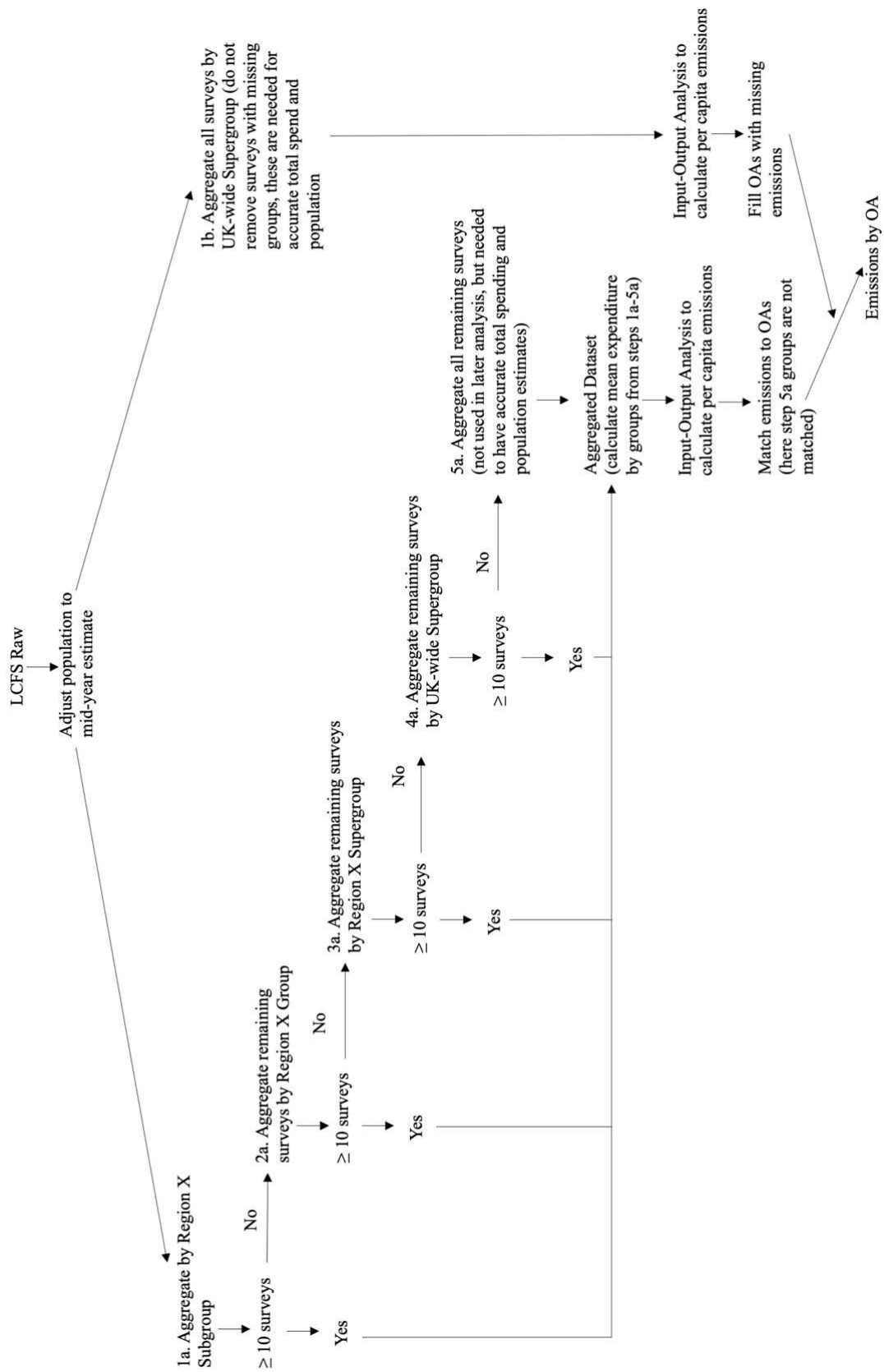
Table 1. Population ranges of 2011 UK census geographies.

Territory	Geography	Minimum	Maximum
England, Wales	OA	100	625
	LSOA	1,000	3,000
	MSOA	5,000	15,000
Northern Ireland	OA (2001 census)	100	700
	SA	100	1,500
	SOA	800	4,000
	Ward	950	9,000
Scotland	OA	50	500
	DZ	400	1,500
	IG	1,900	7,500

\*\* Note: To round and remove extreme outliers, <1% of values are removed. Sources: ONS (n.d.), NISRA (2013b), and Scotland's Census (2013).

OAs are built from neighbouring postcode which are within the same ward. In Scotland OAs depend only on geography, while in England, Wales, and Northern Ireland levels of socio-demographic homogeneity and levels of rural- and urbanity are also considered (ONS, n.d.). Higher level geographies are clusters of OAs, and thus have lower levels of socio-demographic homogeneity. They are made to fit within SOAs (ONS, n.d.). Whereas Scottish DZs and IGs are roughly equivalent to English and Welsh LSOAs and MSOA, respectively, Northern Irish SOAs are comparable to LSOAs. Where MSOA level aggregation is done, therefore, this research uses ward level data for Northern Ireland as an additional, higher-level geography.

Appendix C. Figure: Aggregation of the LCFS into groups representing geographic areas.



## Appendix D. Table: COICOP Codes and Descriptions

### Food and non-alcoholic beverages (1)

COICOP 2	COICOP 3
1.1 Food	1.1.1 Bread, rice, and cereals
	1.1.2 Pasta products
	1.1.3 Buns, cakes, biscuits etc
	1.1.4 Pastry (savoury)
	1.1.5 Beef (fresh, chilled, or frozen)
	1.1.6 Pork (fresh, chilled, or frozen)
	1.1.7 Lamb (fresh, chilled, or frozen)
	1.1.8 Poultry (fresh, chilled, or frozen)
	1.1.9 Bacon and ham
	1.1.10 Other meat and meat preparations
	1.1.11 Fish and fish products
	1.1.12 Milk
	1.1.13 Cheese and curd
	1.1.14 Eggs
	1.1.15 Other milk products
	1.1.16 Butter
	1.1.17 Margarine, other vegetable fats and peanut butter
	1.1.18 Cooking oils and fats
	1.1.19 Fresh fruit
	1.1.20 Other fresh, chilled, or frozen fruits
	1.1.21 Dried fruit and nuts
	1.1.22 Preserved fruit and fruit-based products
	1.1.23 Fresh vegetables
	1.1.24 Dried vegetables
	1.1.25 Other preserved or processed vegetables
	1.1.26 Potatoes
	1.1.27 Other tubers and products of tuber vegetables
	1.1.28 Sugar and sugar products
	1.1.29 Jams, marmalades
	1.1.30 Chocolate
	1.1.31 Confectionery products
	1.1.32 Edible ices and ice cream
	1.1.33 Other food products
1.2 Non-alcoholic beverages	1.2.1 Coffee
	1.2.2 Tea
	1.2.3 Cocoa and powdered chocolate
	1.2.4 Fruit and vegetable juices (inc. fruit squash)
	1.2.5 Mineral or spring waters
	1.2.6 Soft drinks (inc. fizzy and ready to drink fruit drinks)

### Alcoholic beverages, tobacco, and narcotics (2)

COICOP 2	COICOP 3
2.1 Alcoholic beverages	2.1.1 Spirits and liqueurs (brought home)
	2.1.2 Wines, fortified wines (brought home)
	2.1.3 Beer, lager, ciders and perry (brought home)
	2.1.4 Alcopops (brought home)
2.2 Tobacco and narcotics	2.2.1 Cigarettes
	2.2.2 Cigars, other tobacco products and narcotics

### Clothing and footwear (3)

COICOP 2	COICOP 3
3.1 Clothing	3.1.1 Men's outer garments
	3.1.2 Men's under garments
	3.1.3 Women's outer garments
	3.1.4 Women's under garments
	3.1.5 Boys' outer garments (5-15)
	3.1.6 Girls' outer garments (5-15)
	3.1.7 Infants' outer garments (under 5)
	3.1.8 Children's under garments (under 16)
	3.1.9 Accessories
	3.1.10 Haberdashery, clothing materials and clothing hire
	3.1.11 Dry cleaners, laundry and dyeing
3.2 Footwear	3.2 Footwear

### Housing, water, electricity, gas and other fuels (4)

COICOP 2	COICOP 3
4.1 Rentals for housing	4.1.1 Actual rentals
	4.1.2 Imputed rent
4.2 Maintenance, repair, and security of the dwelling	4.2 Maintenance, repair, and security of the dwelling
4.3 Water supply and miscellaneous services relating to the dwelling	4.3 Water supply and miscellaneous services relating to the dwelling
4.4 Electricity, gas, and other fuels	4.4.1 Electricity
	4.4.2 Gas
	4.4.3 Other fuels

### Furnishings, household equipment and routine household maintenance (5)

COICOP 2	COICOP 3
5.1 Furniture, furnishings, and loose carpets	5.1.1 Furniture and furnishings
	5.1.2 Floor coverings
5.2 Household textiles	5.2 Household textiles
5.3 Household appliances	5.3 Household appliances
5.4 Glassware, tableware, and household utensils	5.4 Glassware, tableware, and household utensils
5.5 Tools and equipment for house and garden	5.5 Tools and equipment for house and garden
5.6 Goods and services for routine household maintenance	5.6.1 Cleaning materials
	5.6.2 Household goods and hardware
	5.6.3 Domestic services, carpet cleaning, hire of furniture/furnishings

### Health (6)

COICOP 2	COICOP 3
6.1 Medicines and health products	6.1.1 Medicines, prescriptions, and healthcare products
	6.1.2 Spectacles, lenses, accessories, and repairs
6.2 Outpatient care services	6.2 Hospital services

## Transport (7)

COICOP 2		COICOP 3	
7.1	Purchase of vehicles	7.1.1	Purchase of new cars and vans
		7.1.2	Purchase of second hand cars or vans
		7.1.3	Purchase of motorcycles and other vehicles
7.2	Operation of personal transport equipment	7.2.1	Spares and accessories
		7.2.2	Petrol, diesel, and other motor oils
		7.2.3	Repairs and servicing
		7.2.4	Other motoring costs
7.3	Passenger transport services	7.3.1	Rail and tube fares
		7.3.2	Bus and coach fares
		7.3.3	Combined fares
		7.3.4	Other travel and transport

## Information and communication (8)

COICOP 2		COICOP 3	
8.1	Postal services	8.1	Postal services
8.2	Telephone and telefax equipment	8.2	Telephone and telefax equipment
8.3	Telephone and telefax services	8.3	Telephone and telefax services
8.4	Internet subscription fees	8.4	Internet subscription fees

## Recreation, sport and culture (9)

COICOP 2		COICOP 3	
9.1	Recreational durables	9.1.1	Audio equipment and accessories, CD players
		9.1.2	TV, video, and computers
		9.1.3	Photographic, cine and optical equipment
9.2	Other major durables for recreation and culture	9.2	Other major durables for recreation and culture
9.3	Hobbies and pets	9.3.1	Games, toys, and hobbies
		9.3.2	Computer software and games
		9.3.3	Equipment for sport, camping and open-air recreation
		9.3.4	Horticultural goods, garden equipment and plants
		9.3.5	Pets and pet food
9.4	Recreational services	9.4.1	Sports admissions, subscriptions, leisure class fees
		9.4.2	Cinema, theatre, and museums
		9.4.3	TV, video, satellite rental, cable subscriptions
		9.4.4	Miscellaneous entertainments
		9.4.5	Development of film, deposit for film development
		9.4.6	Gambling payments
9.5	Newspapers, books and stationery	9.5.1	Books
		9.5.2	Diaries, address books, cards etc
		9.5.3	Diaries, address books, cards etc
		9.5.4	Newspapers
		9.5.5	Magazines and periodicals

## Education services (10)

COICOP 2		COICOP 3	
10.1	Education fees	10.1	Education fees
10.2	Payments for school trips, other ad-hoc	10.2	Payments for school trips, other ad-hoc



## Restaurants and accommodation services (11)

COICOP 2	COICOP 3
11.1 Food and beverage serving services	11.1.1 Restaurant and café meals
	11.1.2 Alcoholic drinks (away from home)
	11.1.3 Take away meals eaten at home
	11.1.4 Other take-away and snack food
	11.1.5 Contract catering (food) and canteens
11.2 Accommodation services	11.2.1 Holiday in the UK
	11.2.2 Holiday abroad
	11.2.3 Room hire

## Other Miscellaneous Products and Services (12)

COICOP 2	COICOP 3
12.1 Personal care	12.1.1 Hairdressing, beauty treatment
	12.1.2 Toilet paper
	12.1.3 Toiletries and soap
	12.1.4 Baby toiletries and accessories (disposable)
	12.1.5 Hair products, cosmetics, and related electrical appliances
12.2 Other personal effects	12.2 Personal effects
12.3 Social protection	12.3 Social protection
12.4 Insurance	12.4.1 Household insurances - structural, contents
	12.4.2 Medical insurance premiums
	12.4.3 Vehicle insurance including boat insurance
	12.4.4 Non-package holiday, other travel insurance
12.5 Other Products and Services	12.5.1 Moving house
	12.5.2 Bank, building society, post office, credit card charges
	12.5.3 Other services and professional fees

## 2 Appendix References

NISRA. (2013). Geography Fact Sheet. Retrieved January 22, 2020, from

[http://www.ninis2.nisra.gov.uk/public/documents/NISRA Geography Fact Sheet.pdf](http://www.ninis2.nisra.gov.uk/public/documents/NISRA%20Geography%20Fact%20Sheet.pdf)

ONS. (n.d.). Census geography: An overview of the various geographies used in the production of statistics collected via the UK census. Retrieved August 23, 2019, from

<https://www.ons.gov.uk/methodology/geography/ukgeographies/censusgeography>

Scotland's Census. (2013). Scotland's Census 2011: Census Geographies Guide. Retrieved January 22, 2020, from <https://www.scotlandscensus.gov.uk/census-geographies>