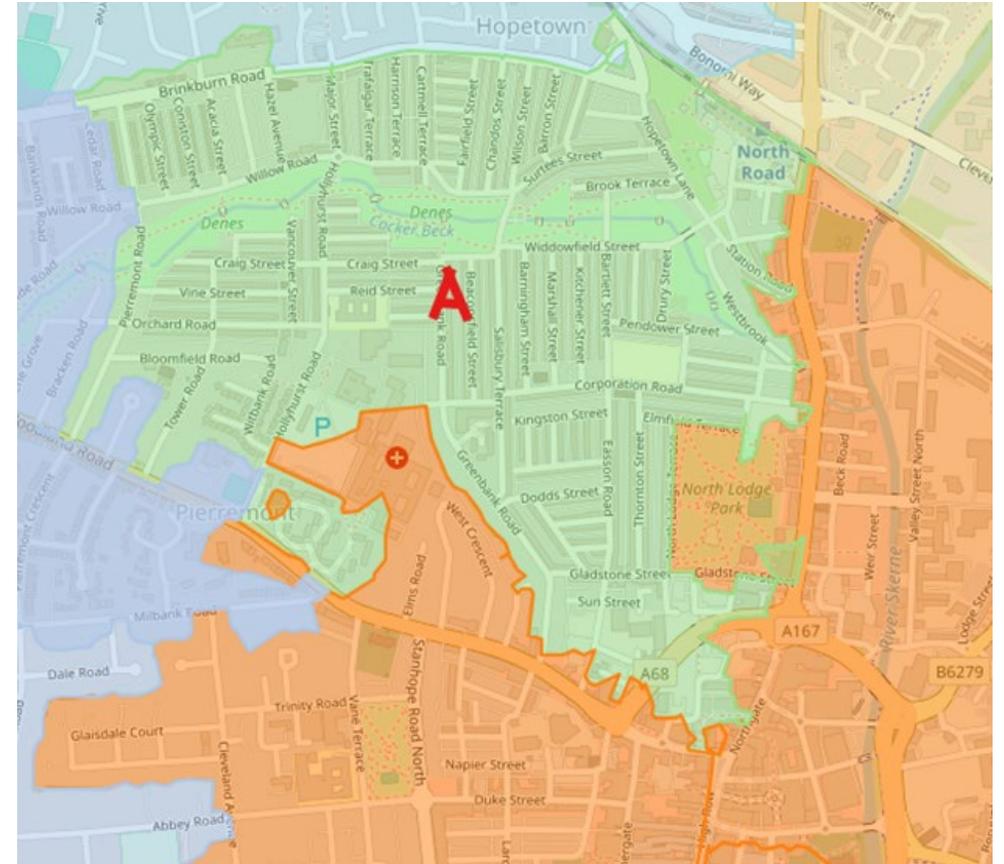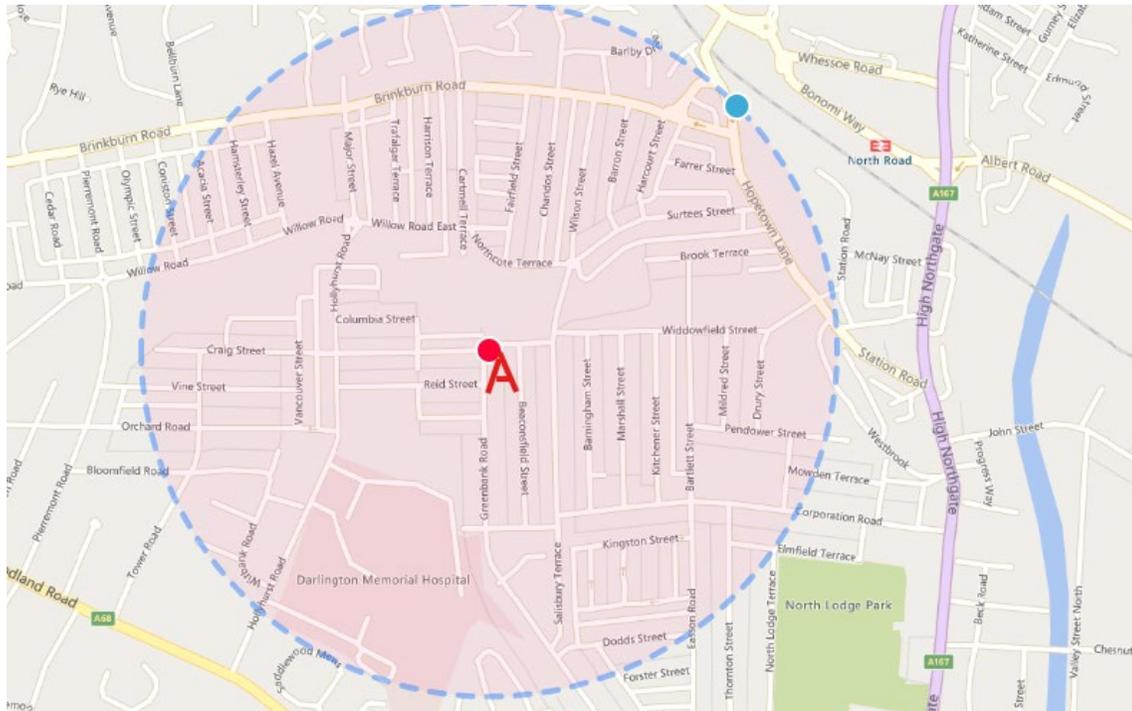# Estimating geographical retail markets from card spending data

CMA and ONS Data Science Campus

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Imagine your local grocery store raised prices

Why does it matter?

Consumer behaviour	Demographics
	Economic shocks
Market power	Casework
	Economy-wide
Infrastructure	

How do we define these local markets?

What we do

Visa card spending data → Clustering to define markets → Verify robustness: survey data

Main findings

Markets differ in shape and size, across space and time

Substantial rural-urban differences

Demographic variation

Roadmap

Data → Methodology → Results

Data

Card spending data

Visa F2F transactions	Held by ONS
Observes:	Total spend
	Cardholder - merchant postal sector - flows
	Merchant category
Frequency:	Monthly
Timespan:	2019 to mid 2024
Postal sector level:	~12,000 total → ~11,000 covered → ~5,000 per month

AREA

DISTRICT

NP10 8XG

SECTOR
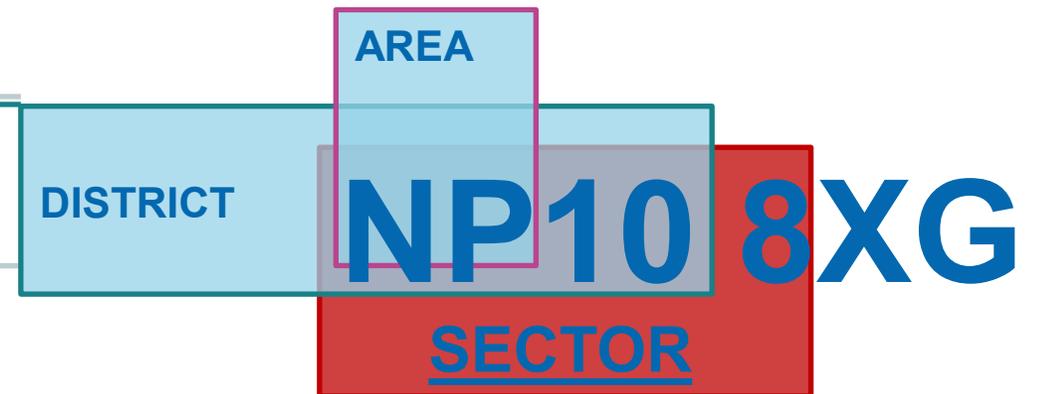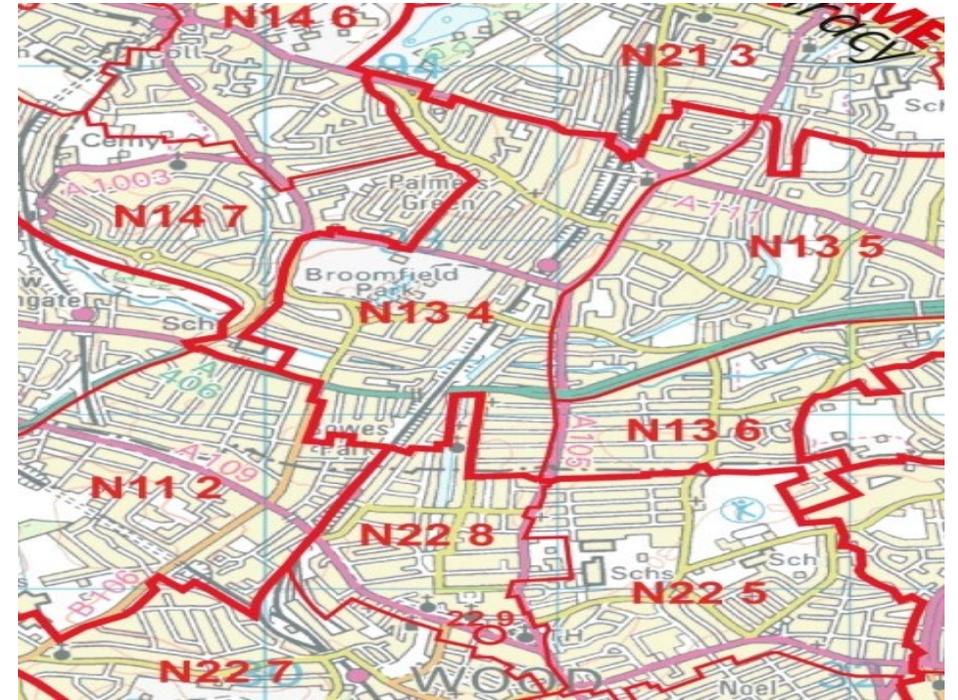
Merchant categories

Restaurants	**Home Improvement & Supply**	**Food & Grocery**	Department Stores	**Vehicle Rental**
Automotive	**Professional Services**	**Retail Goods**	Lodging	**Entertainment**
Travel Services	**Fuel**	**Retail Services**	**Telecom/utilities**	Wholesale Clubs
Discount Stores	Apparel & Accessories	B2B	**Health Care**	**Electronics**
Education & Government	Quick Service Restaurants	**Transportation**	**Airlines**	Direct Marketing

Methodology

Hierarchical clustering algorithm

Assume different cluster for each postal sector.

→

Calculate dissimilarity matrix between all postal sectors, based on spending flows.

→

Assess dissimilarity between postal sector pairs.

If dissimilarity < cutoff, they go into the same cluster.

→

Keep doing this until maximum threshold reached.
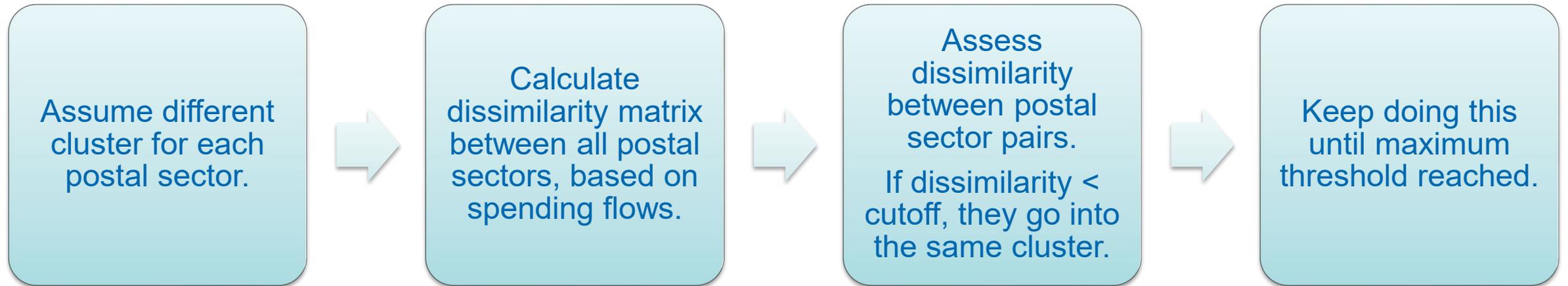
What are we looking for in a cluster?

Merchants in them should be substitutable for consumers, and vice-versa

Imposed with algorithm

Appropriate in size

Imposed with threshold selection

Geographical contiguity

Verified with data

Results

Results

~ 2,000 – 3,000 UK markets, Food & Grocery

Markets mostly consistent except for lockdowns

London: smaller markets, more spend

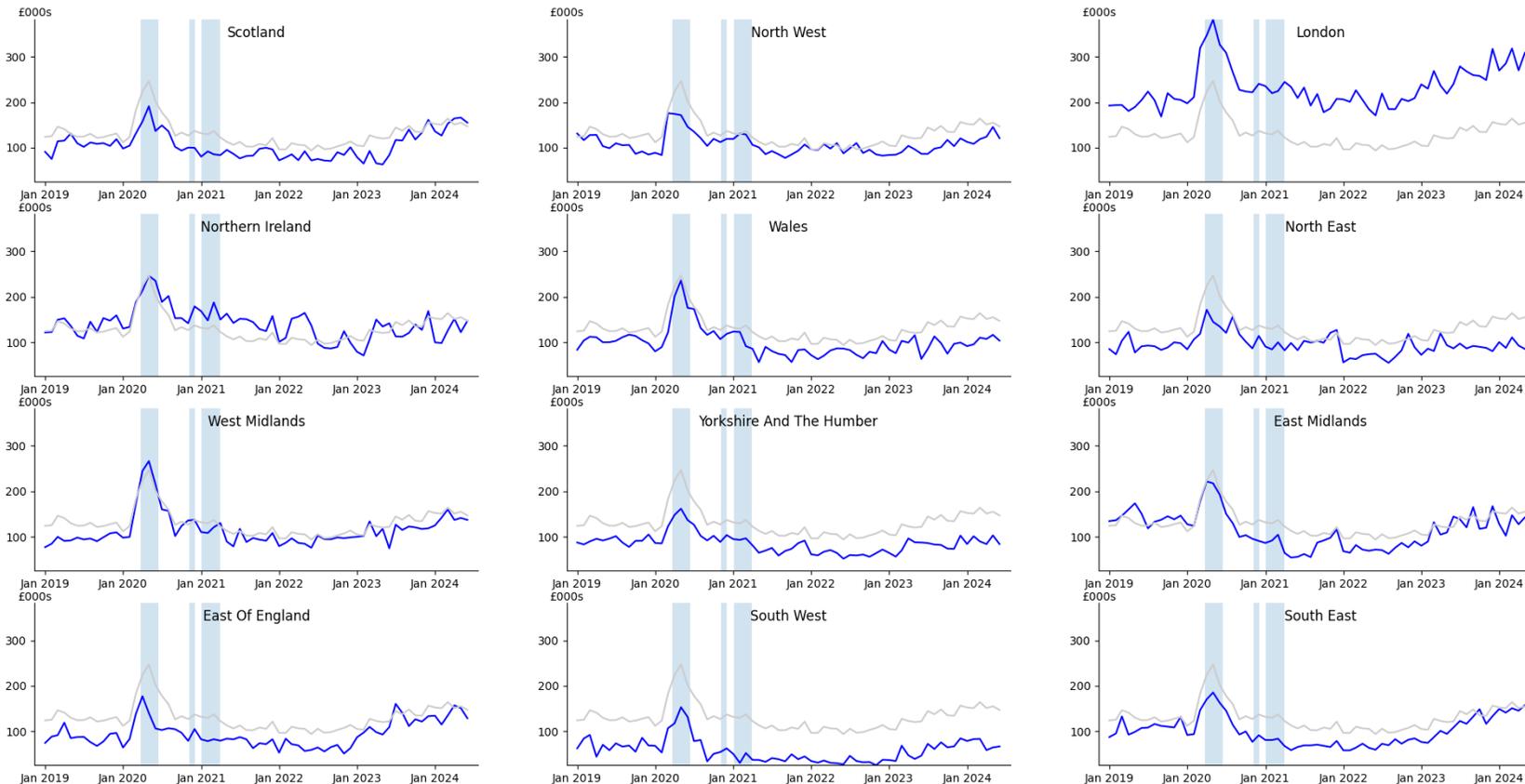Variable similarity of market distributions across industries

Demographics affects market size

Size and density varies across UK

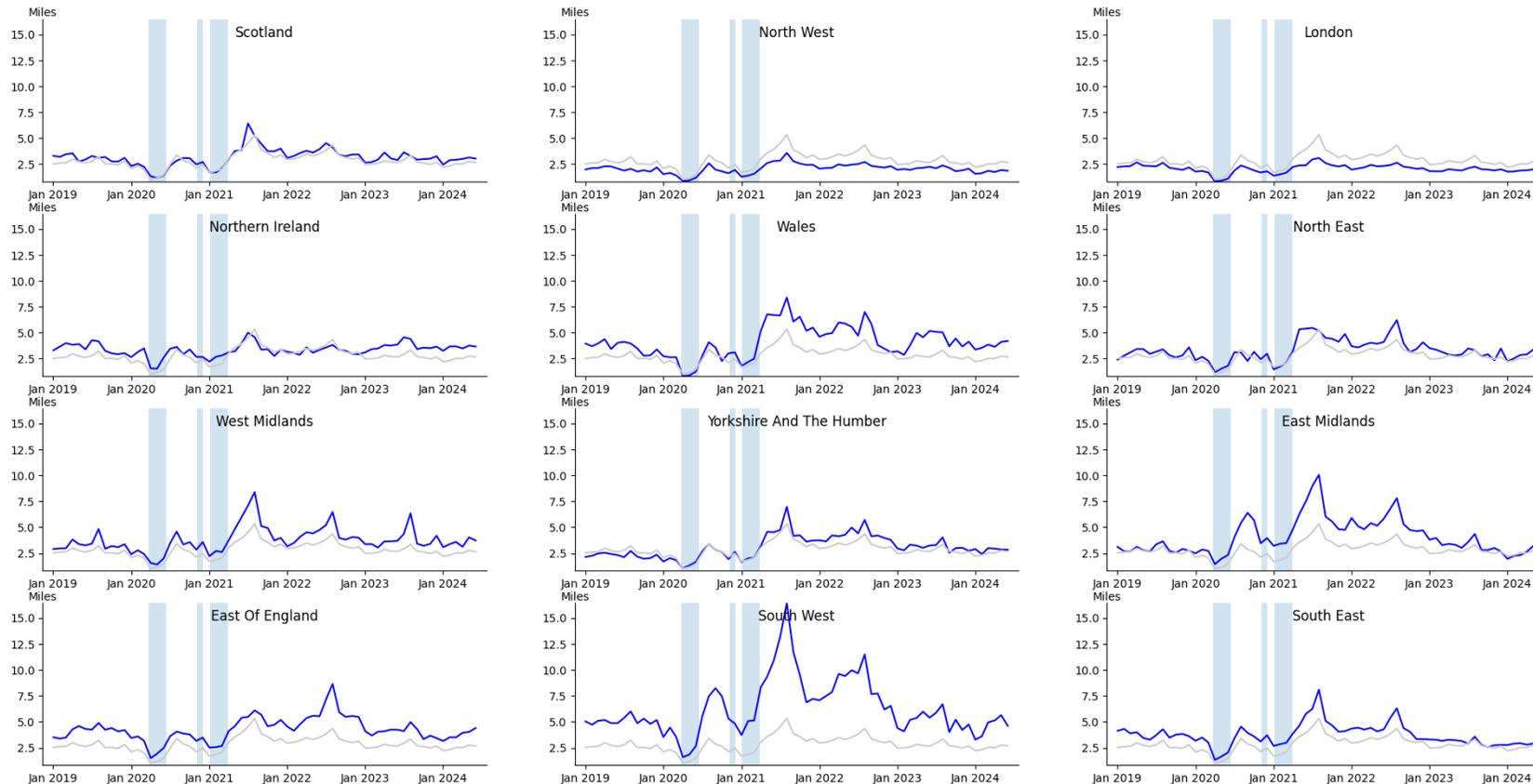# Markets are shaped by geography and density

Darlington

Edinburgh

London

Manchester

Spend is consistent, but higher in London

Distance travelled varies across regions

Median weighted distance travelled per market, Food and Grocery, Jan 2019 – June 2024

Market correlations vary

MCG probabilities

March 2024
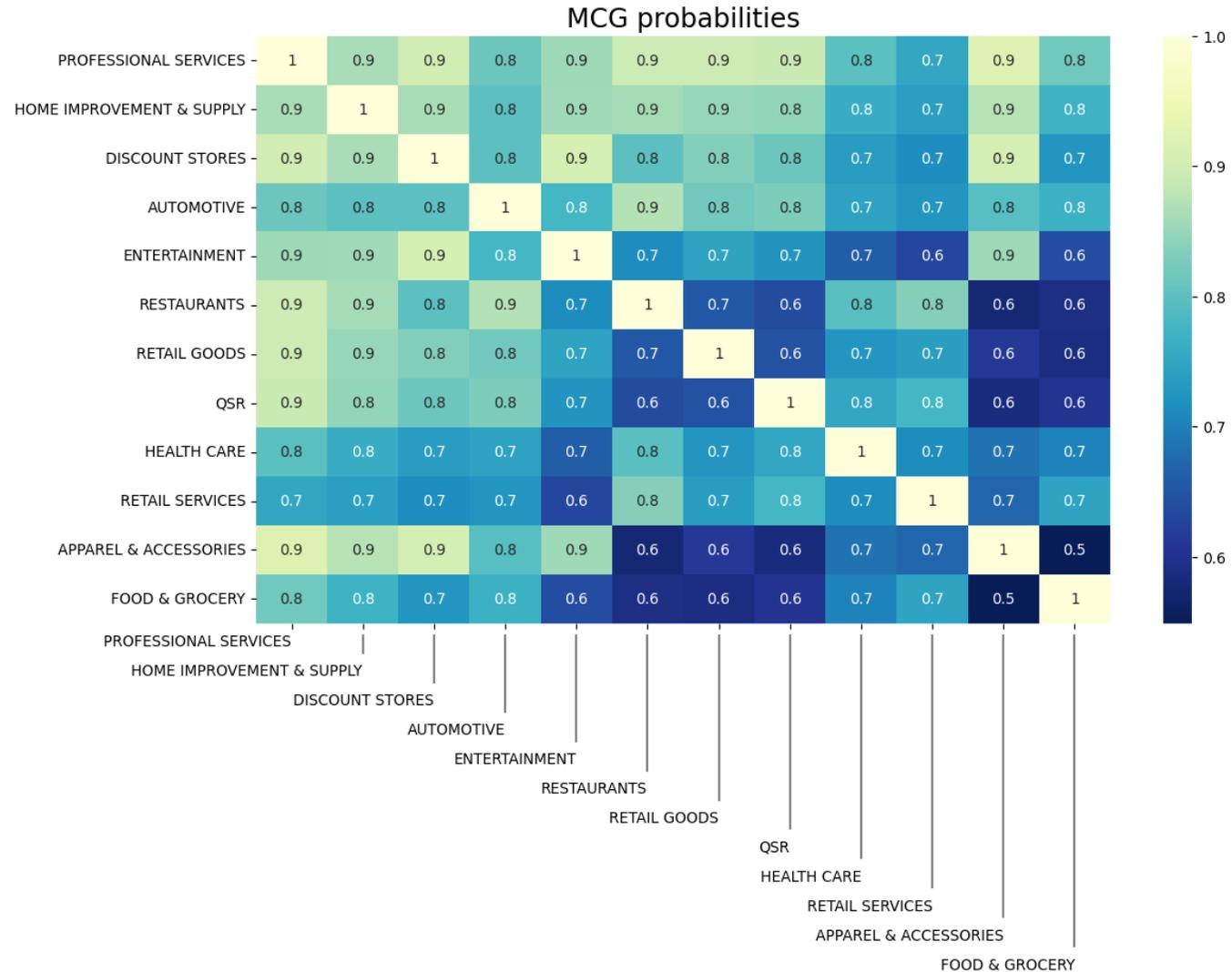
Demographics – ONS Census (2021)

- Output areas → postal sectors. Imperfect linkage

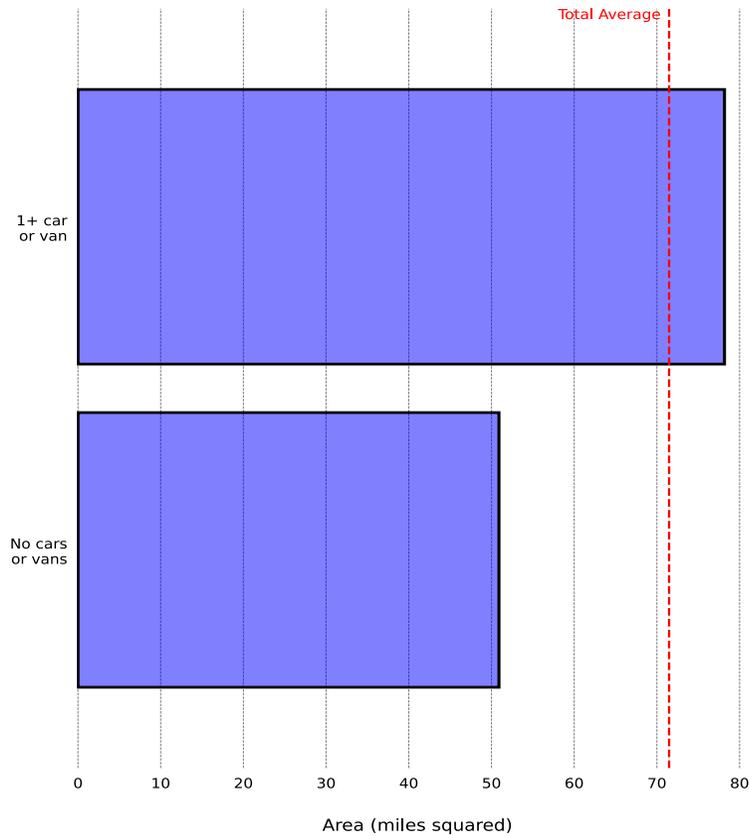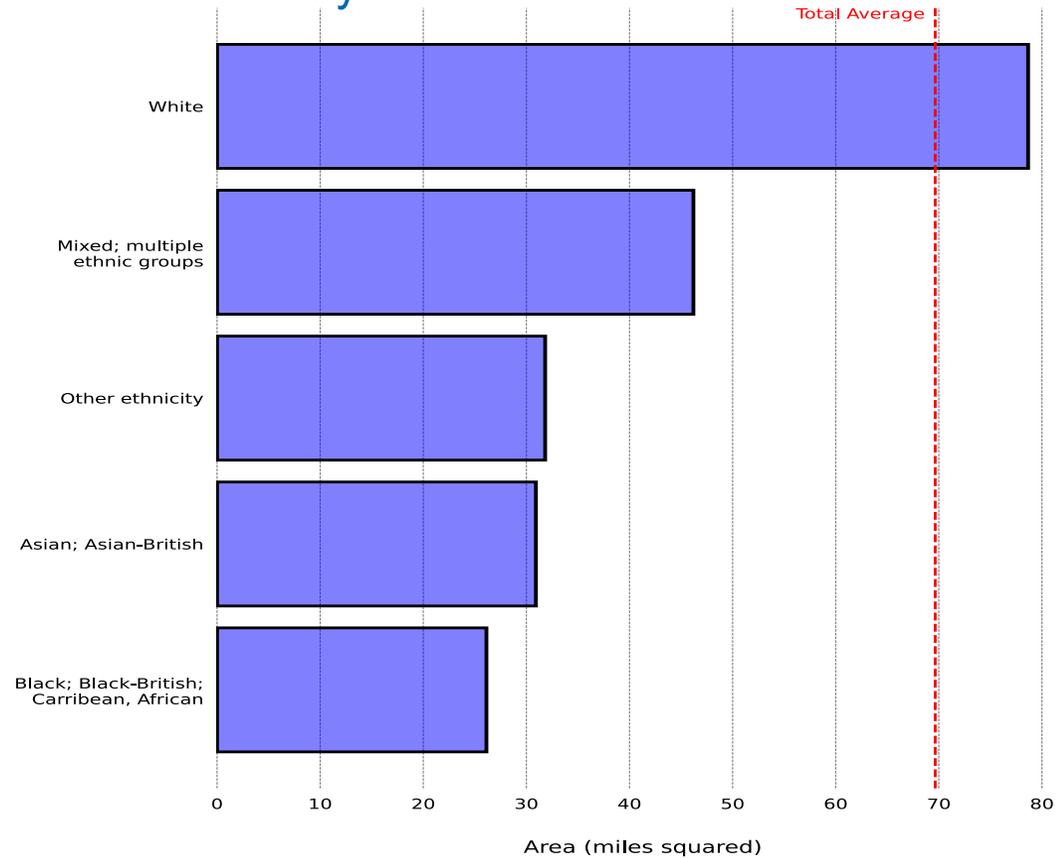|	
Population density	Economic activity status
Car / van availability	Age
Ethnicity	Employment industry
Gender	Accommodation type
Household composition	Travel to work vehicle
Education	Expenditure per cardholder (Visa data)

Market size varies by demographics

Car / Van availability

Ethnicity

Food and Grocery, March 2024
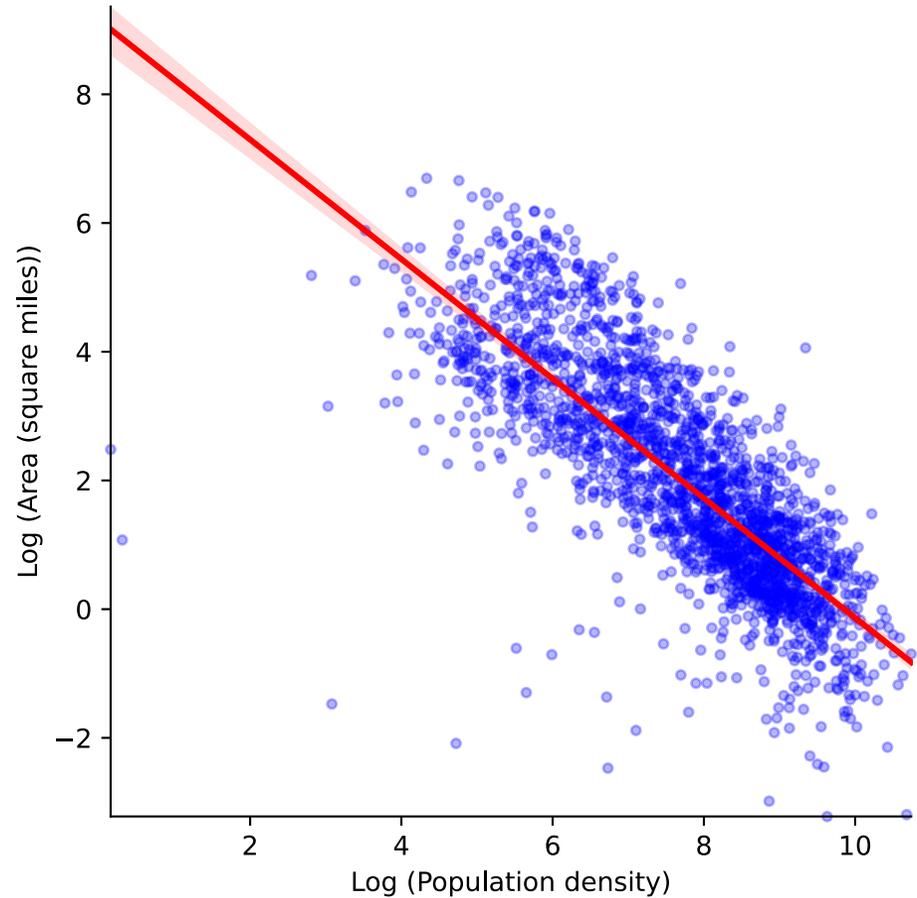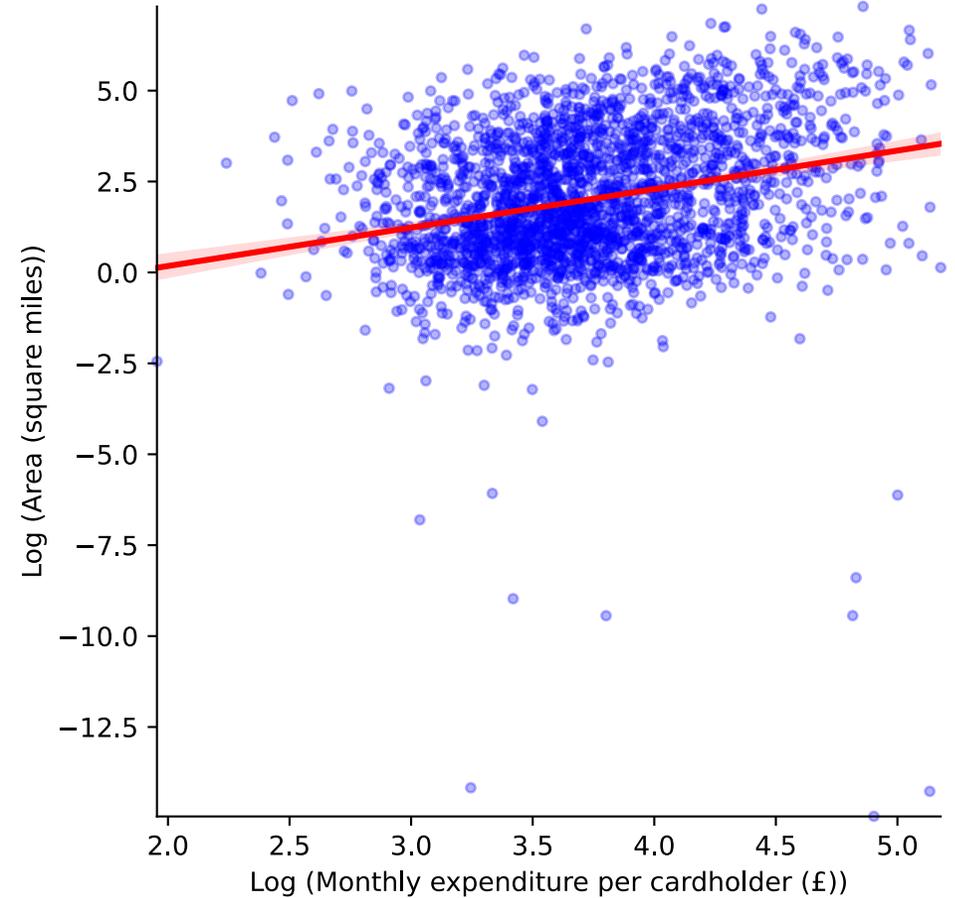
And wider characteristics

Population density

Expenditure per cardholder

Limitations and robustness

Visa transactions

Postal sector level

Industry definitions

Robustness:

Threshold selection

DfT linkage

Disclosure control

Extensions

Measure local competition	Regional inequalities
Comparisons	Casework
	TTWA
Infrastructure	Local policies
Consumer shopping patterns	Demographics
	Market symmetries

Conclusions

New UK market definitions

Results:

Market sizes vary predictably over time and region

Relates to economic characteristics such as resident age, mode of transport and dwelling type

Industry markets have some correlations – further work needed

Data:

Out now!