

Accessibility and Regeneration

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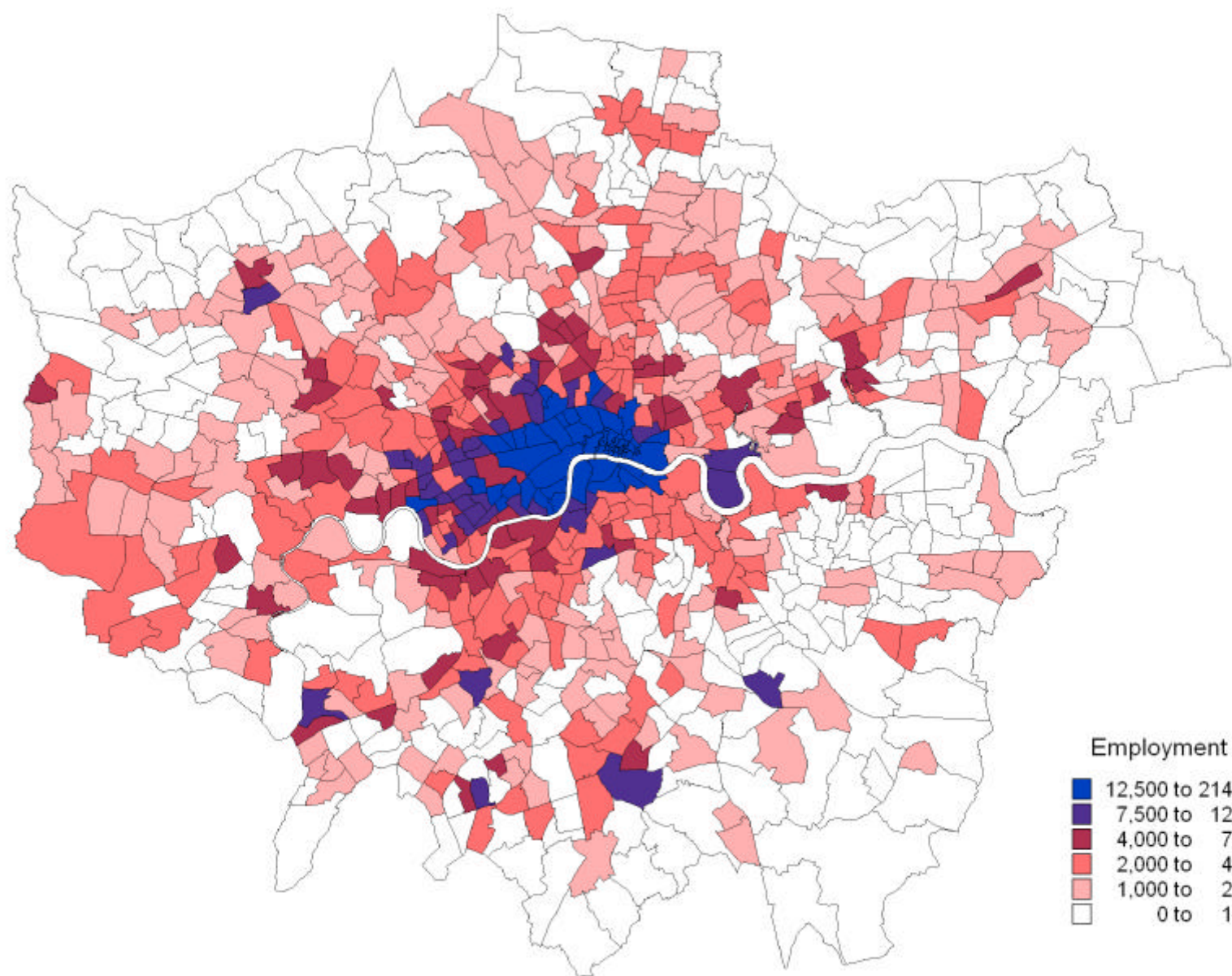


- *A priori*, it is likely that there is a positive connection between 1) the employment density of an area and the number of people who can access it and 2) the population density of an area and the number of jobs they can access from it
- This study investigates the empirical evidence for these hypotheses, using data on the 700+ wards of Greater London

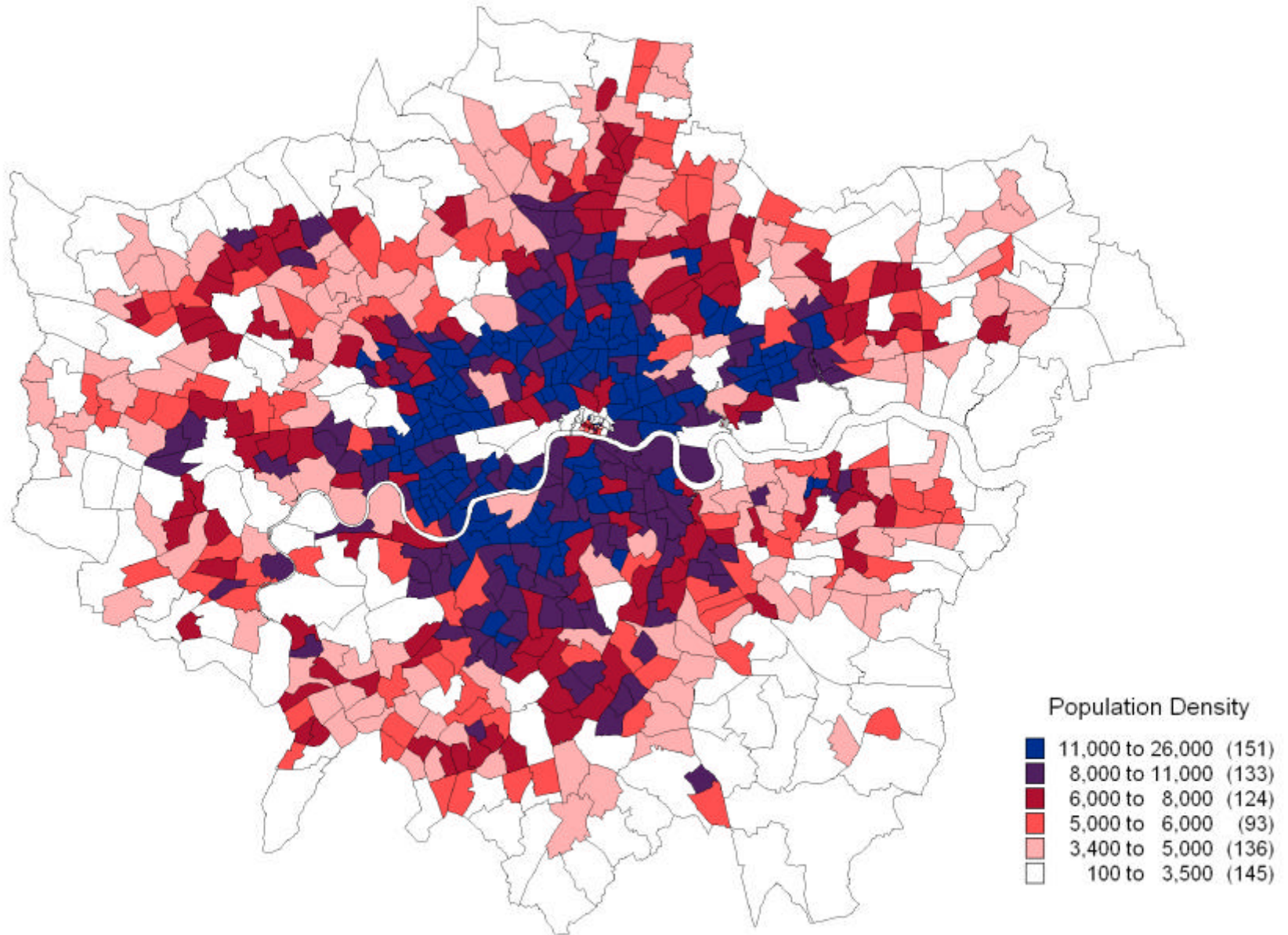
Outline of presentation

- The data which was used
- Practical and theoretical issues in the choice of analytical method
- Summary of results

Map of employment density (people per square kilometre)



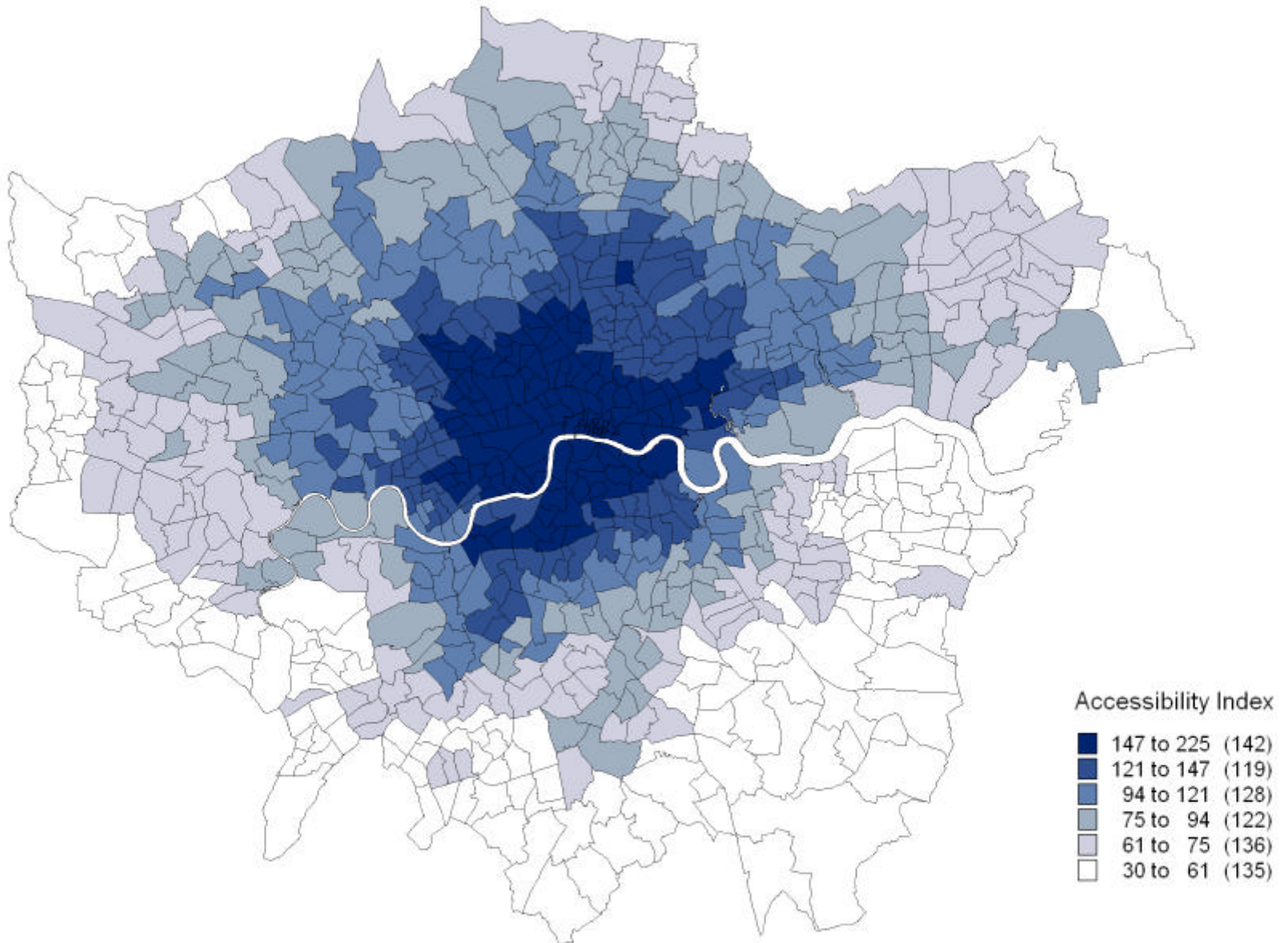
Map of population density (people per square kilometre)



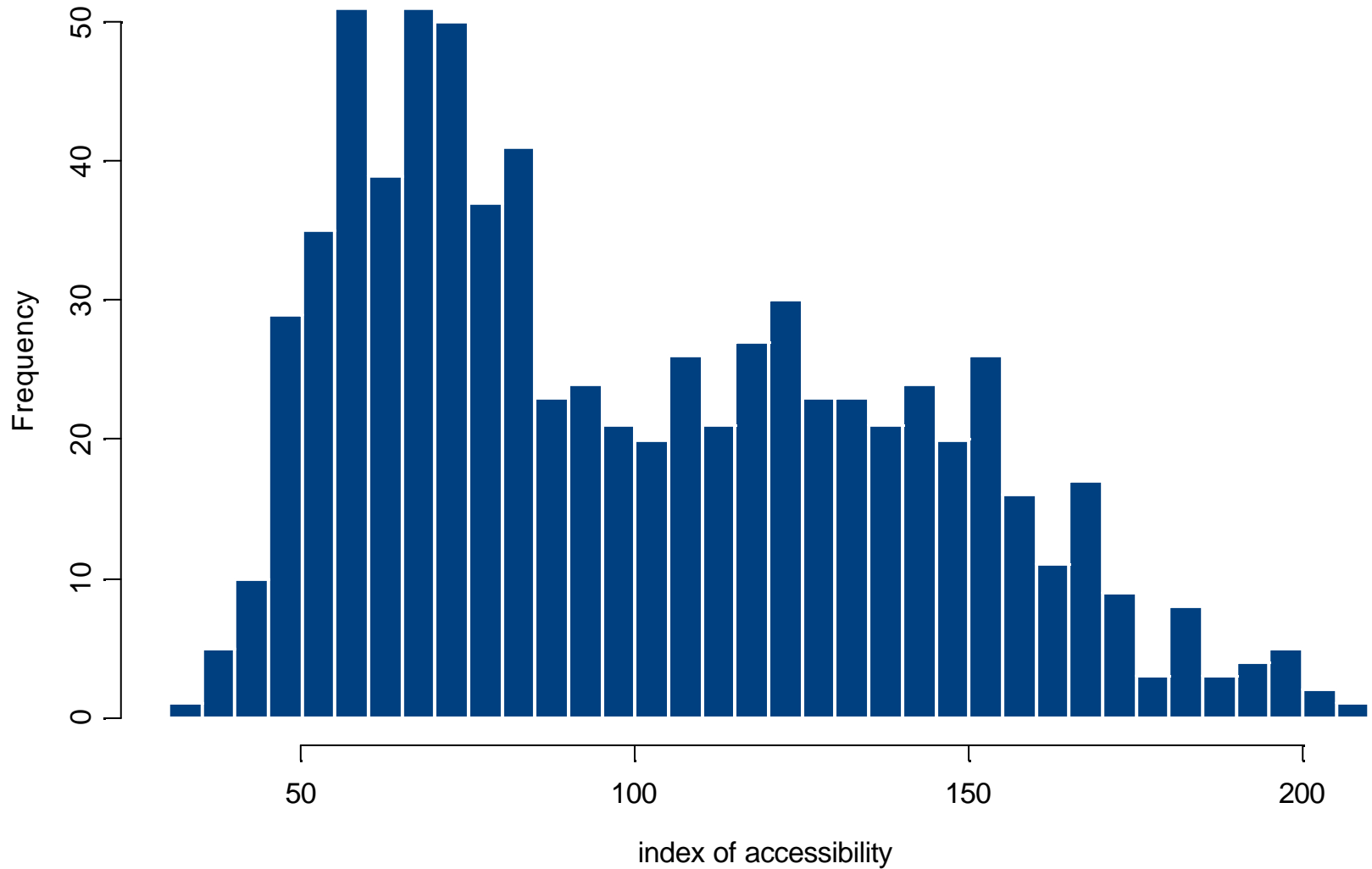
Accessibility data

- Provided by Transport for London
- Number of people able to access the ward by highway within 45 minutes
- Number of people able to access the ward by public transport within 45 minutes
- Number of jobs accessible to people in the ward by highway within 45 minutes
- Number of jobs accessible to people in the ward by public transport within 45 minutes
- Summarise these in an Overall Index of Accessibility

Map of 2001 accessibility index (AI)

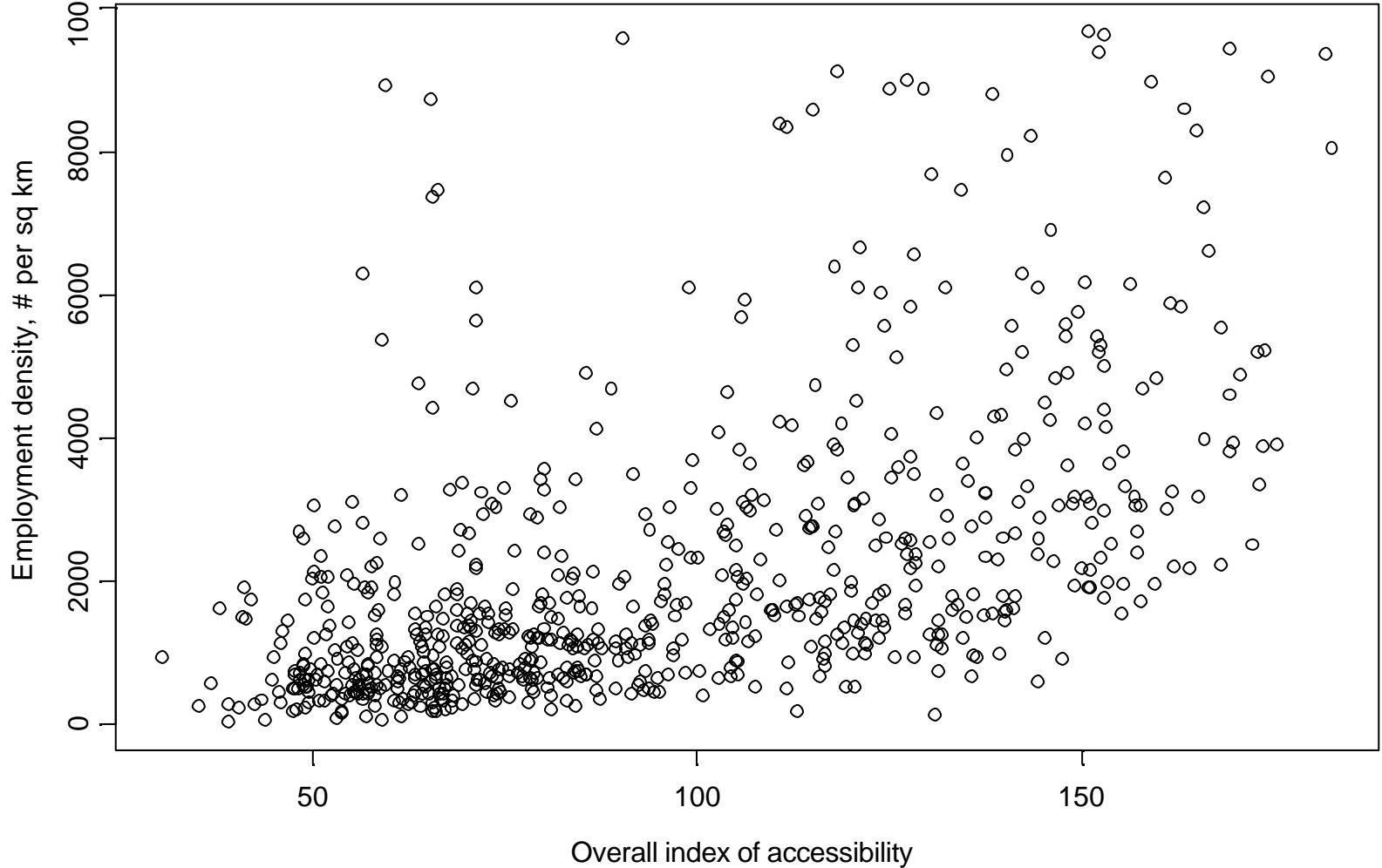


Index of overall accessibility of wards in Greater London Histogram

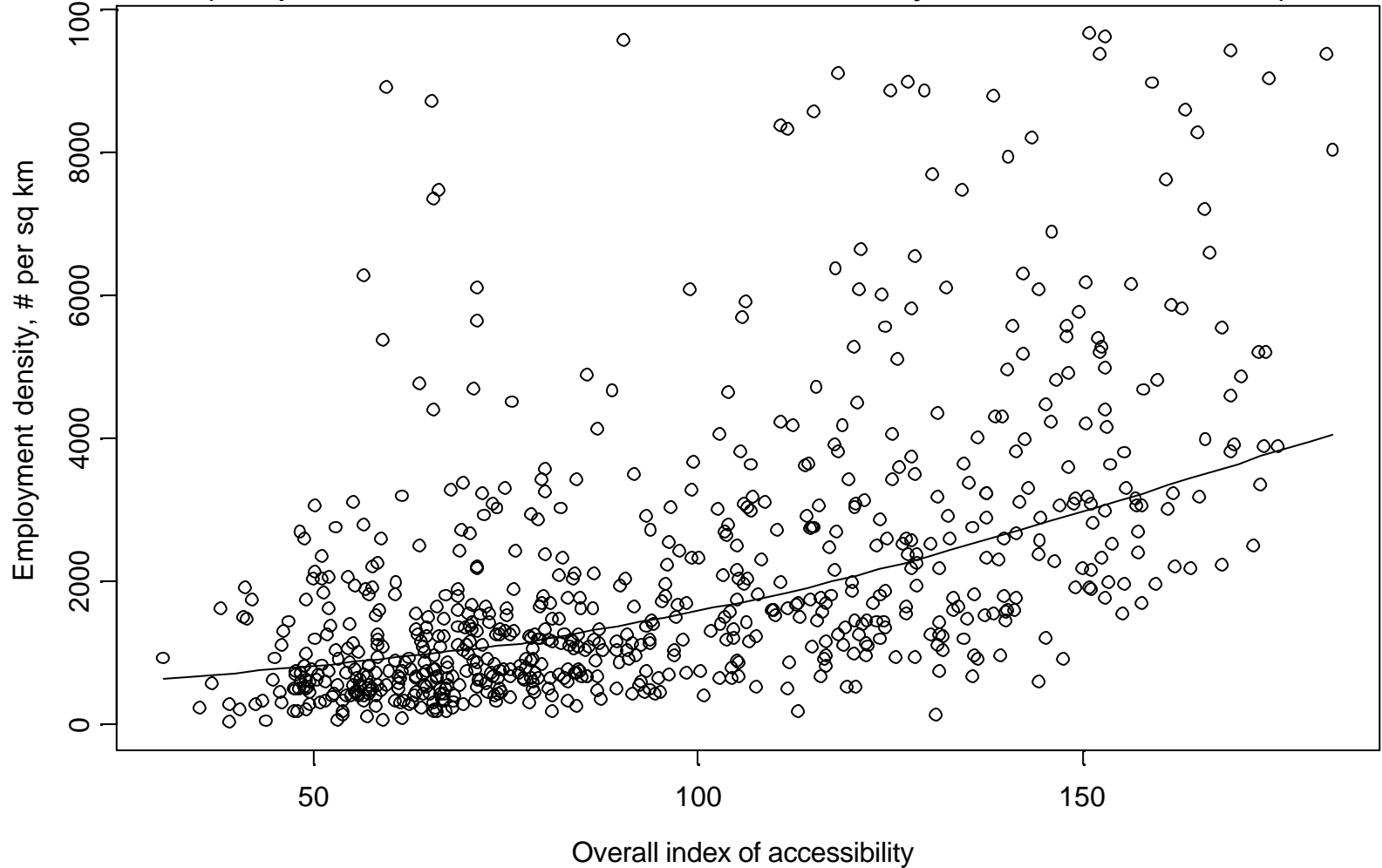


- There are strong positive correlations between employment density and overall accessibility and population density and overall accessibility

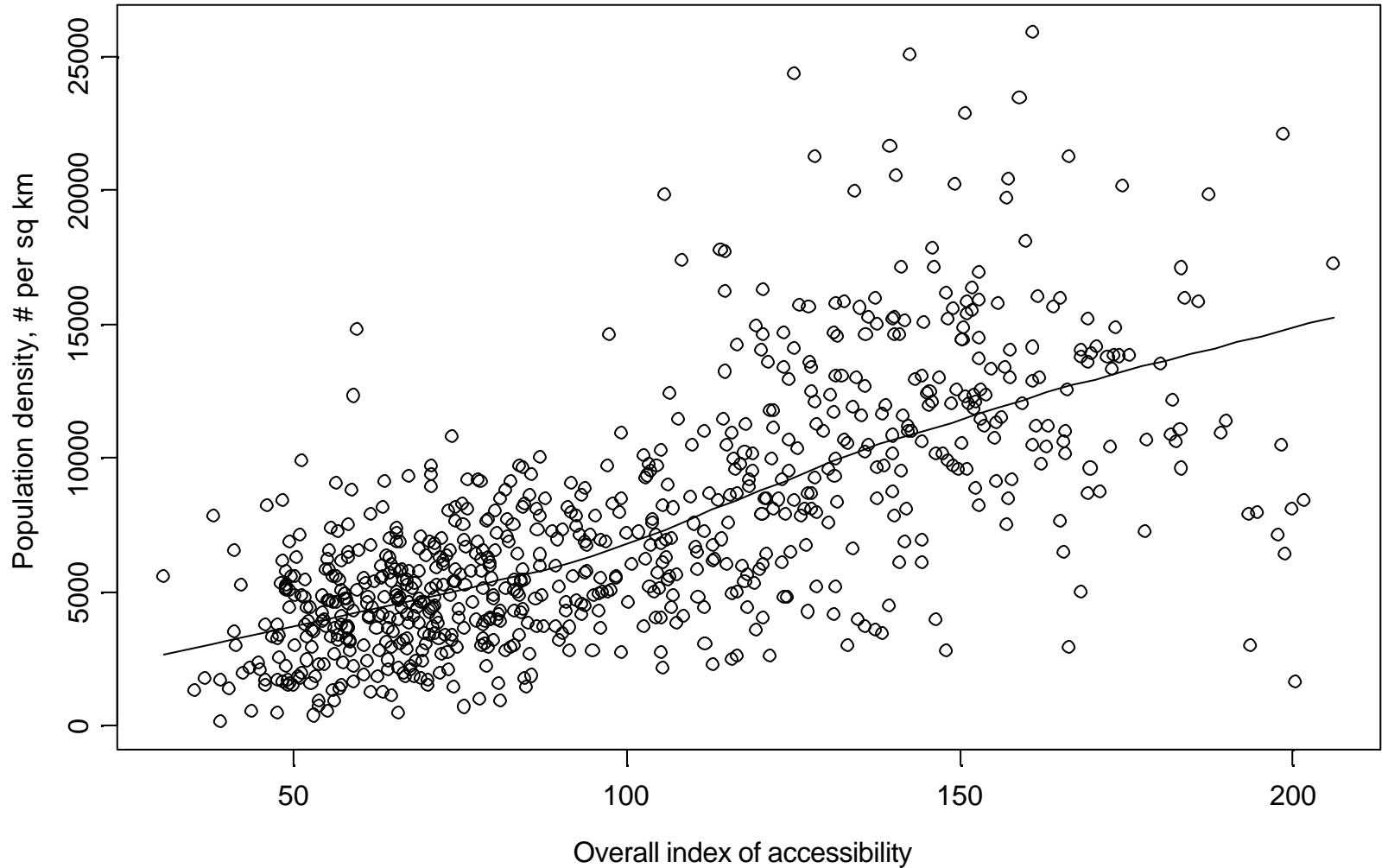
Employment density and overall index of accessibility of Greater London ward
(Emp dens limited to <10,000 for clarity, 71 wards omitted)



Employment density and overall index of accessibility of Greater London ward
(Emp dens limited to <10,000 for clarity, 71 wards omitted)



Population density and overall index of accessibility of Greater London wards
(excluding 25 wards in City of London)



- A regression approach may therefore be indicated
- But there are serious practical and theoretical difficulties with this
- Omitted variables
- Spatial autocorrelation

Employment density

- many factors account for the employment density of a local area
- but there is no agreed theoretical model – model uncertainty
- and we only have a very limited set of data
- employment density in neighbouring wards will tend to be highly correlated
- this reduces dramatically the effective number of observations, and biases the results

Clustering

- cluster analysis is a standard statistical technique
- the aim is to form the data into groups
- wards within any one group have similar characteristics
- the typical characteristics of each of the groups are sufficiently different from those of the others

- the problem of spatial autocorrelation is reduced dramatically – most wards will be in the same cluster as their neighbours
- the effects of the (unknown and/or unavailable) omitted explanatory variables are to a considerable extent incorporated implicitly
- clustering does not solve these inherent problems completely, but offers a much more effective methodology than regression

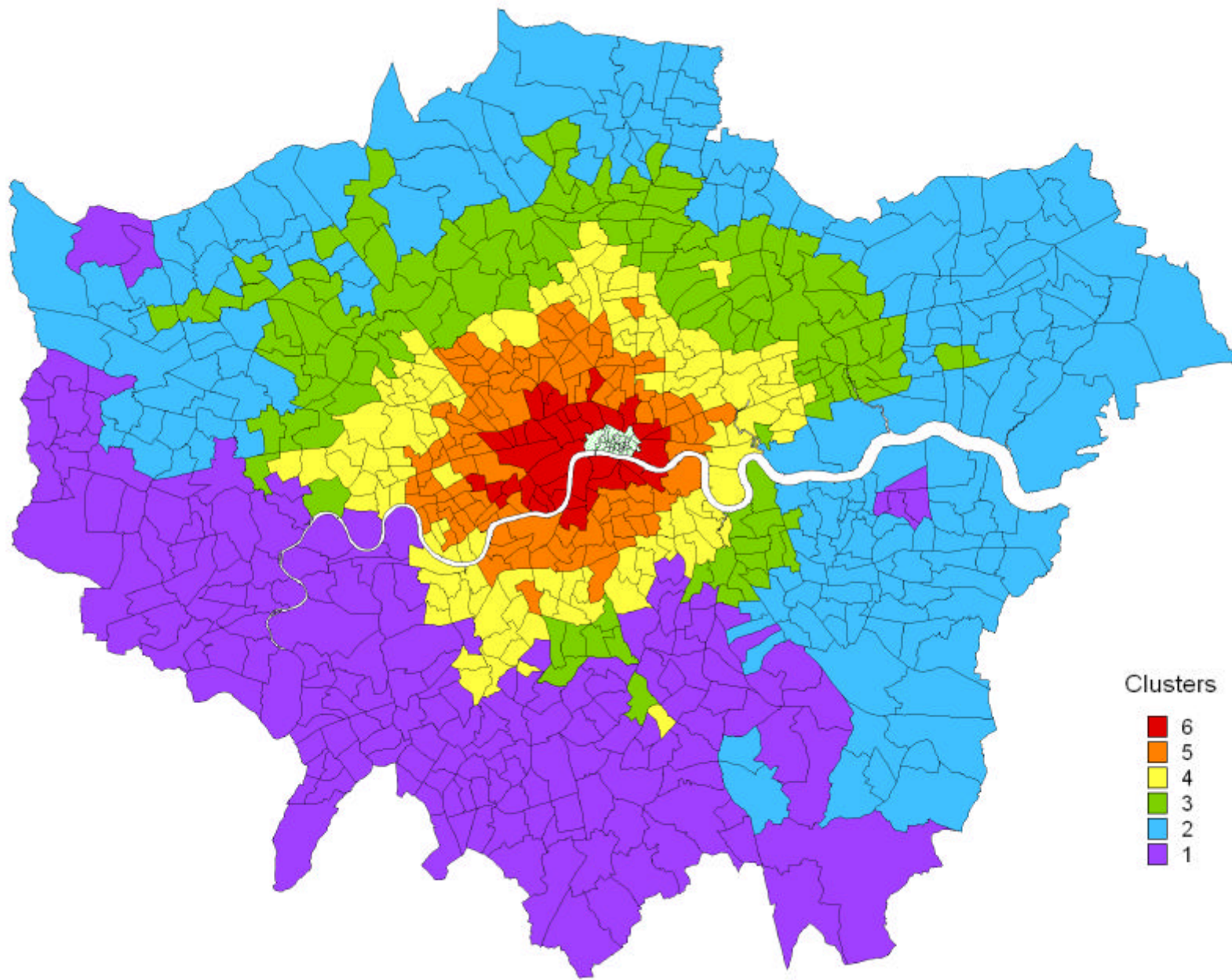
- in standard methods of clustering each ward is allocated unequivocally to a single group
- there is no way of distinguishing between those on the margin of any particular group from those in the centre
- the approach often gives too many clusters for practical comprehension
- fuzzy clustering combines the ideas of standard clustering methods and fuzzy logic
- instead of forcing each area into a single cluster, it is given some degree of membership of every one of the clusters

- we cluster the wards on their accessibility characteristics
- we map the cluster membership back onto employment and population density data
- we cluster on accessibility *and* density characteristics, and examine cluster characteristics
- in practice, the two approaches give very similar results

Definitive results for the positions of the cluster centres for six clusters

Cluster	Employment Density	Population Density	Access Index (AI)
	people / sq.km		
1	1,400	4,600	62
2	1,200	4,600	71
3	1,900	6,400	101
4	3,100	10,200	126
5	5,200	13,100	152
6	24,700	12,000	179

Map of fuzzy clustering memberships (excluding the City of London)



- Relationships between accessibility and both employment and population densities of local areas can be used to estimate the potential impact of infrastructure projects which increase accessibility

- a certain amount of judgement is always required in translating technical results into inputs into policy making
- in this context, for example, how far can we extrapolate the strong non-linearity between employment density and accessibility indicated at the level of cluster 6?

Conclusion

- Clustering does offer a practical way of quantifying the connections between employment, population and accessibility
- It is therefore a way of assessing the impact of infrastructure spend via its effect on accessibility
- We used it to assess the potential regeneration impact in terms of employment and population at ward level of the Thames Gateway Bridge