Assignment Two: The MAUP and Multilevel Modelling

Contents

1 Demonstrating the MAUP

1.1 Background

Areal units in zoning systems amalgamate into objects that constitute the basic units for the observation and analysis of spatial phenomena (Openshaw 2015). Yet, no gold standard for guiding the spatial aggregation process exists, with the validity of zonal objects subject to the arbitrary and modifiable decision-making of quantitative geographers. Problematically, the analysis of socioeconomic data involving areal units is encumbered by the modifiable areal unit problem (MAUP): "the sensitivity of analytical results to the definition of units for which data are collected." According to the literature, the MAUP constrains the reliability of analyses for aggregated spatial data, as findings have shown varying results with the scale of aggregation and configuration of zoning systems (Avery and Clark 2015).

In practice, the MAUP is condensed into two issues which this paper will attempt to demonstrate in Section 2. The first issue, described as the *scale problem*, is the variation in findings when data for zonal units are progressively aggregated. This has been demonstrated empirically by Yule and Kendall (2015) who found correlations between what yields and potato yield

The second issue, the *aggregation problem*, pertains to the variation in findings when alternative combinations of zonal units are analysed when the scale or number of units are held constant (Openshaw 2015).

1.2 Data

To demonstrate the MAUP issue, we analyse the correlation between property price data derived from Land Registry (**???**)

```
# fit random intercept model - i.e. model intercept term which varies across MSOAs
OAdata$H_bad_Prop <- (OAdata$H_Vbad + OAdata$H_bad) / OAdata$pop

model.1 <- lmer(unemp ~ S_Rent + dis_ind + Ethnic + (1|MSOA_CD), data = OAdata)
summary(model.1)
```

2 MAUP Analysis

3 Multilevel Modelling

3.1 Interpretation

4 Bibliography

Avery and Clark. 2015. "R: A Language and Environment for Statistical Computing." Journal Article. http://www.R-project.org.

Openshaw. 2015. "R: A Language and Environment for Statistical Computing." Journal Article. http://www.R-project.org.

Yule and Kendall. 2015. "R: A Language and Environment for Statistical Computing." Journal Article. http://www.R-project.org.