

## Additional file 2

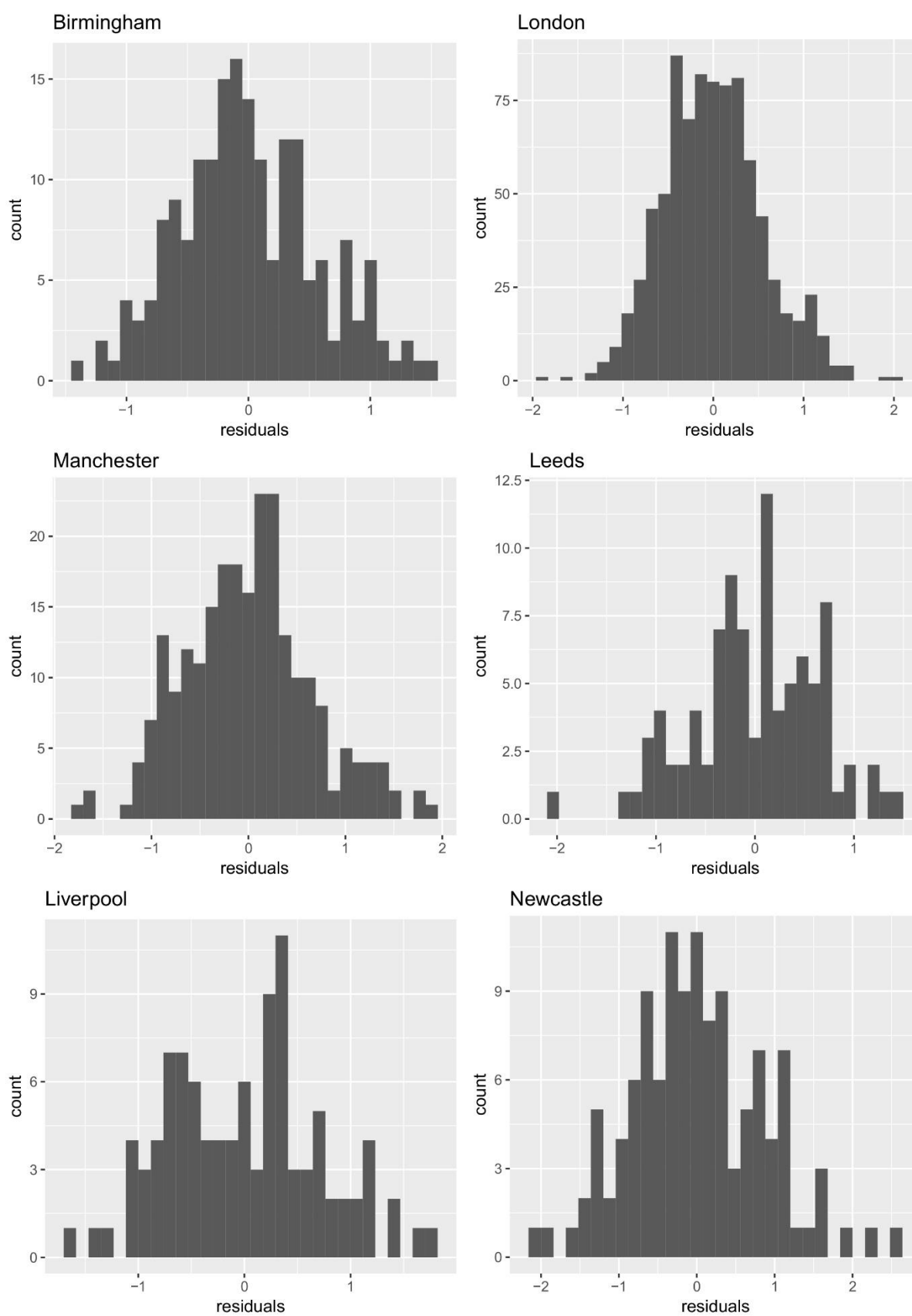


Figure 1. Frequency distributions of the residuals of the SAR models.

Four on six distributions (i.e., Birmingham, London, Manchester, and Newcastle) appear to be normal. This suggests that linear regression seems to be an appropriate technique for carrying out this analysis. Two distributions (i.e., Leeds and Liverpool) appear to slightly deviate from the normal. However, we argue that this is due to the small number of observations for these two cities rather than non-linear behaviours. Indeed, Leeds and Liverpool are the urban areas with the fewest wards compared to the other four (i.e., Leeds has 93 wards, Liverpool has 100 wards).