Supplementary Material

Table 1. Dates of the most recent available IMD data for each UK country

Country	Publication	Underlying data	Income data	Employment data
England	2015	2008 to 2013	2012	2012/13
Northern Ireland	2010	2004 to 2009	2008/09	2008/09
Scotland	2012	2001* to 2011	2011	2010/11
Wales	2014	2003 to 2014	2012/13	2012/13

* Scottish housing indicators were from the 2001 census; other indicators were from 2006 or later

Table 2. Number of indicators within each IMD domain and relative weighting of domain

	England 2015		Northern Ireland 2010		Scotland 2012		Wales 2014	
Domain	N	Weight (%)	N	Weight (%)	N	Weight (%)	N	Weight (%)
Income	6	22.5	6	25	4	28	1	23.5
Employment	5	22.5	6	25	3	28	1	23.5
Health	4	13.5	7	15	7	14	4	14
Education & training	7	13.5	10	15	5	14	6	14
Access/barriers to services	7	9.3	12	10	8	9	9	10
Living environment/housing	4	9.3	4	5	2	2	2	5
Physical environment	0	0	0	0	0	0	4	5
Crime	4	9.3	6	5	6	5	6	5

N = number of component indicators in domain

APPENDIX – DETAILS OF REGRESSION MODELS CONSIDERED

We considered two models (for each country) to predict the deprivation score Y_i from the income domain I_i and employment domain E_i for each LSOA, output area or datazone i.

The first model was:

$$Y_i = \beta_0 + \beta_1 I_i + \beta_2 E_i + \epsilon_i$$

where ϵ_i is the residual value.

Graphical residual plots revealed some issues with fit, with slightly skewed residuals and suggestions of a quadratic relationship for both income and employment (appendix figure 1).

The second model considered was:

$$Y_i = \beta_0 + \beta_1 I_i + \beta_2 E_i + \beta_3 I_i^2 + \beta_4 E_i^2 + \beta_5 I_i \times E_i + \epsilon_i$$

Residuals for this model were still slightly skewed, but correlations between residuals and fitted values, income domain score or employment domain scores were clearly reduced (appendix figure 2). Interactions and quadratic terms were each statistically significant in the model for at least one country.

Model 2 had better fit than model 1, but this had minimal impact on the accuracy in predicting the deprivation score. Changes in R^2 between models were minimal, with the largest change being from

0.965 to 0.970 for Scotland (appendix table 1). Changes in root mean square error were also small, from 3.1 to 2.8 for Scotland, with observed deprivation scores for Scottish datazones ranging from 0.9 to 89.9.

Appendix Table 1. R^2 and root mean square error (RMSE) for models 1 and 2 for each country. The more complex model 2 always had minimal increases in R^2 and root mean square error over model 1.

	England		Northern Ireland		Scotland		Wales	
	R^2	RMSE	R^2	RMSE	R^2	RMSE	R^2	RMSE
Model 1	0.943	3.730	0.968	2.855	0.965	3.091	0.943	3.678
Model 2	0.943	3.708	0.971	2.738	0.970	2.849	0.952	3.393