

Appendix A

Hedonic regressions: Further data description

The environmental data used to construct variables for the hedonic regressions come from the Centre for Ecology and Hydrology, the Generalised Land Use Database (GLUD), the Strategi dataset and the Met Office. This appendix contains a detailed description of the dataset. ARCGIS9 (Arcmap version 9.3) was used to carry out all GIS calculations.

Land cover variables

Land cover data come from the Centre for Ecology and Hydrology and a full data description can be found in the Land Cover Map 2000 (LCM2000) report (Fuller et al., 2002). LCM2000 is a thematic classification of spectral data recorded by satellite images; external datasets add context to help refine the spectral classification. The spectral classes defined in this process can be combined into thematic components which can in turn be aggregated to build various classification schemes. LCM2000 is made up of 1000s of spectral classes; these come together thematically as 72 class variants of 26 subclasses, the latter mapped consistently throughout the UK. We further aggregate these 26 land cover subclasses into nine (i to ix) broad habitat categories of interest for our analysis. We calculate the shares (0 to 1) of each one of these 9 categories at a 1 kilometer square grid level and then we assign each housing transaction to the 1km square in which it is located. In other words, first we converted the land cover map 2000 (LCM2000) from the 25m to a 1km square grid and then the individual housing transactions were linked to the proportions of land cover categories of 1km square in which the houses are located. The twenty six LCM2000 subclasses and the final **9 broad habitat categories** used in our analysis are depicted in Table A.1.a. Summary statistics for the broad habitat categories are contained in Table A.1.b.

Figures A.1 to A.9 contain maps of the nine broad habitats considered in the hedonics analysis.

Table A.1.a: Broad habitat categories considered

Final habitat categories	LCM 26 Subclasses
(i) Marine and coastal margins	1. Sea / estuary
	2. Littoral rock
	3. Littoral sediment
	4. Salt marsh
	5. Supra-littoral rock
	6. Supra-littoral sediment
(ii) Freshwater, wetlands and flood plains	7. Water (inland)
	8. Fen, marsh, swamp
(iii) Mountains, moors and heathland	9. Bogs (deep peat)
	10. Dense dwarf
	11. Shrub heath
	12. Montane habitats
	13. Bracken
(iv) Semi-natural grasslands	14. Neutral grass
	15. Calcareous grass
	16. Acid grass
(v) Enclosed farmland	17. Arable cereals
	18. Arable horticulture
	19. Non-rotational horticulture
	20. Improved grassland
	21. Set-aside grass
(vi) Coniferous woodland	22. Coniferous woodland
(vii) Broad-leaved / mixed woodland	23. Broad-leaved / mixed
(viii) Urban	24. Suburban/rural developed
	25. Continuous urban
(ix) Inland Bare Ground	26. Inland bare ground

Note: Own elaboration based on LCM2000.

Land use variables

We use the Generalised Land Use Database (GLUD) 2005 (Enhanced Basemap) statistics, produced by Communities and Local Government (on behalf of Office for National Statistics-ONS), for information on **land type** (areas in thousands of metres squared at ward level). These land types are only provided for England as of January 2005, hence our analysis being currently restricted to this country. We calculate the shares (0 to 1) of land types for each one of the 7,969 Census wards, 6-digit ONS code (as defined for 2003). Nine simplified land use categories and an additional

'unclassified' category are used to calculate the land use shares at the ward level. Then, we assign each house to the ward where it is located. The **land use shares** are: (1) Domestic gardens; (2) Green space; (3) Water; (4) Domestic buildings; (5) Non-domestic buildings; (6) Roads; (7) Paths; (8) Rail; (9) Other land uses (largely hard-standing); and Unclassified. Further details are contained in Table A.2.

Table A.1.b: - Summary statistics for the broad habitat categories (Percentage)

Final habitat categories	England	Wales	Scotland	UK
(i). Marine and coastal margins	0.3%	0.8%	0.4%	0.4%
(ii). Freshwater, wetlands and flood plains	0.6%	0.5%	1.8%	1.0%
(iii). Mountains, moors and heathland	3.4%	7.2%	39.7%	16.1%
(iv). Semi-natural grasslands	12.0%	29.0%	18.2%	15.7%
(v). Enclosed farmland	61.5%	42.4%	22.7%	46.6%
(vi). Coniferous woodland	2.3%	6.9%	10.9%	5.6%
(vii). Broad-leaved / mixed woodland	8.4%	7.8%	3.4%	6.7%
(viii). Urban	10.6%	4.2%	1.9%	7.0%
(ix). Inland Bare Ground	0.9%	1.3%	1.0%	0.9%
Total	100.0%	100.0%	100.0%	100.0%

Note: LCM2000 statistics from a full count of cover based on a 25 m grid

Figure A.1: Marine and coastal margins

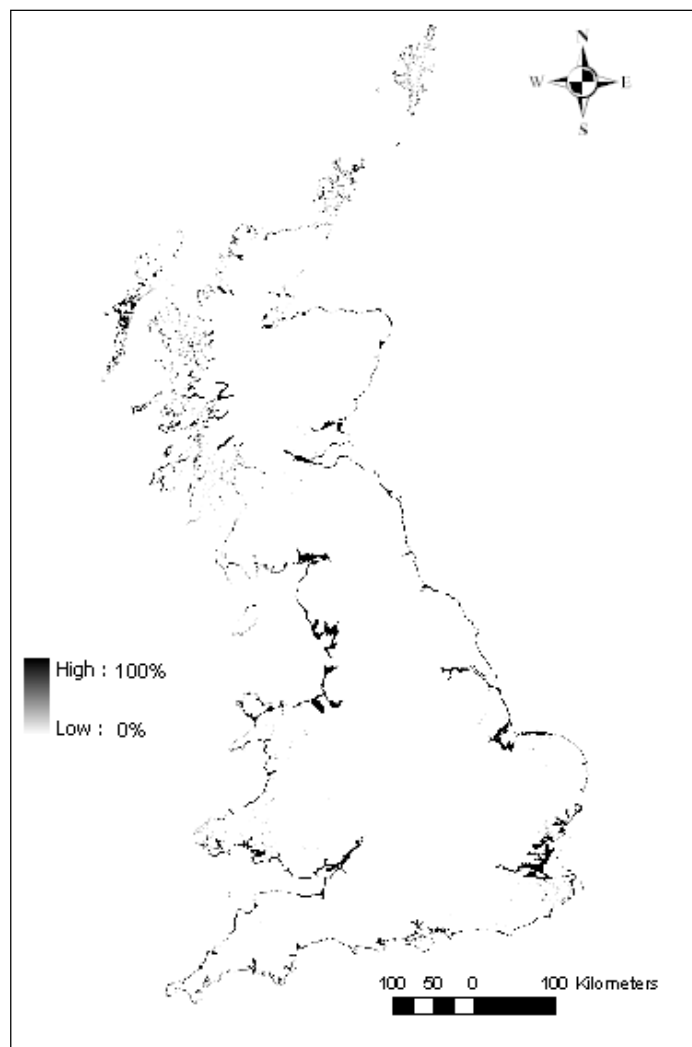
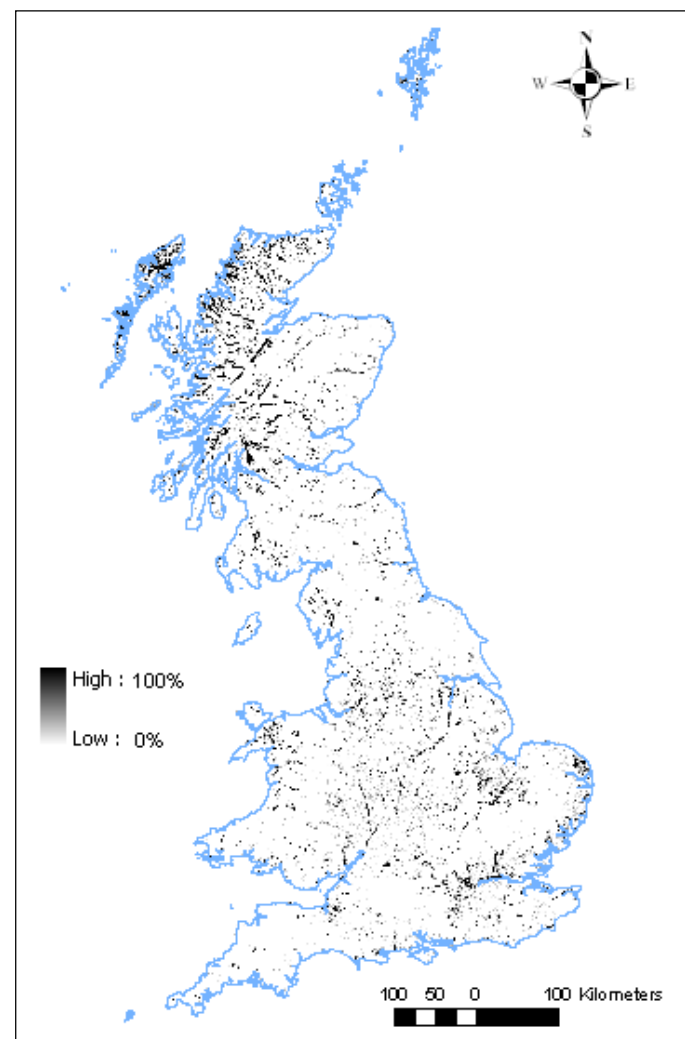


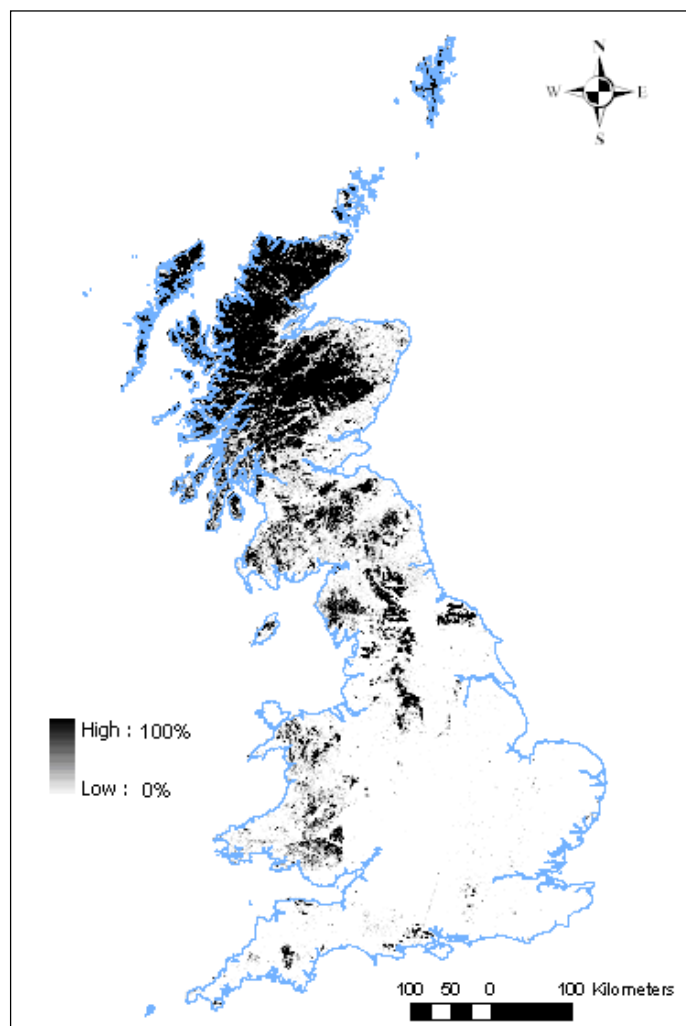
Figure A.2: Freshwater, wetlands and flood plains



Note: Own elaboration based on LCM2000.

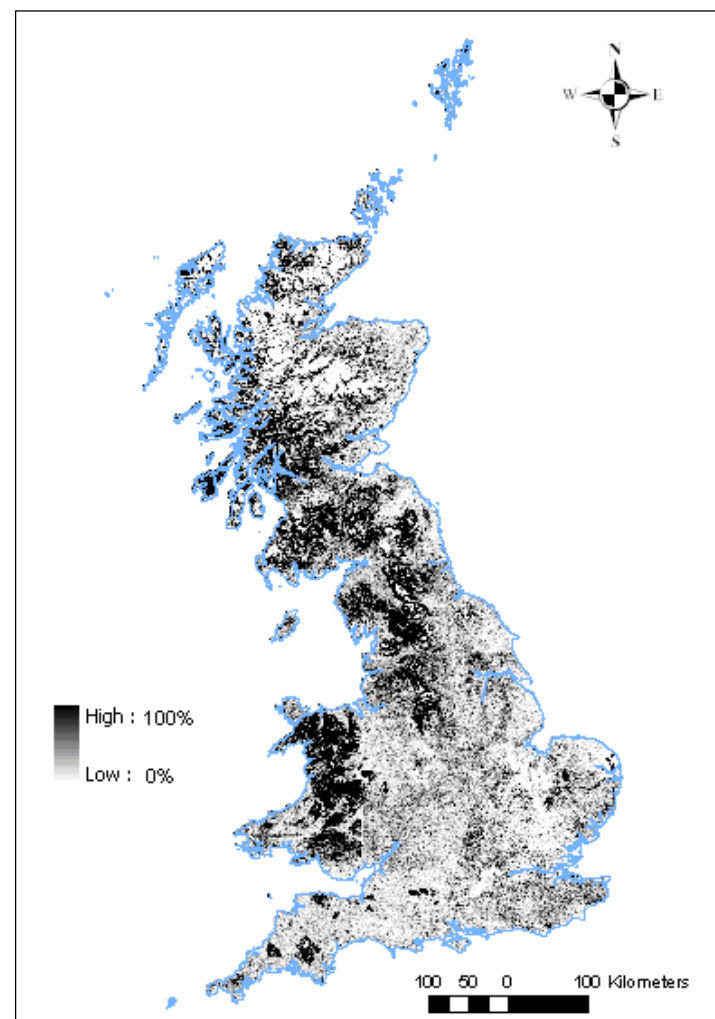
Note: Own elaboration based on LCM2000.

Figure A.3: Mountains, moors and heathland



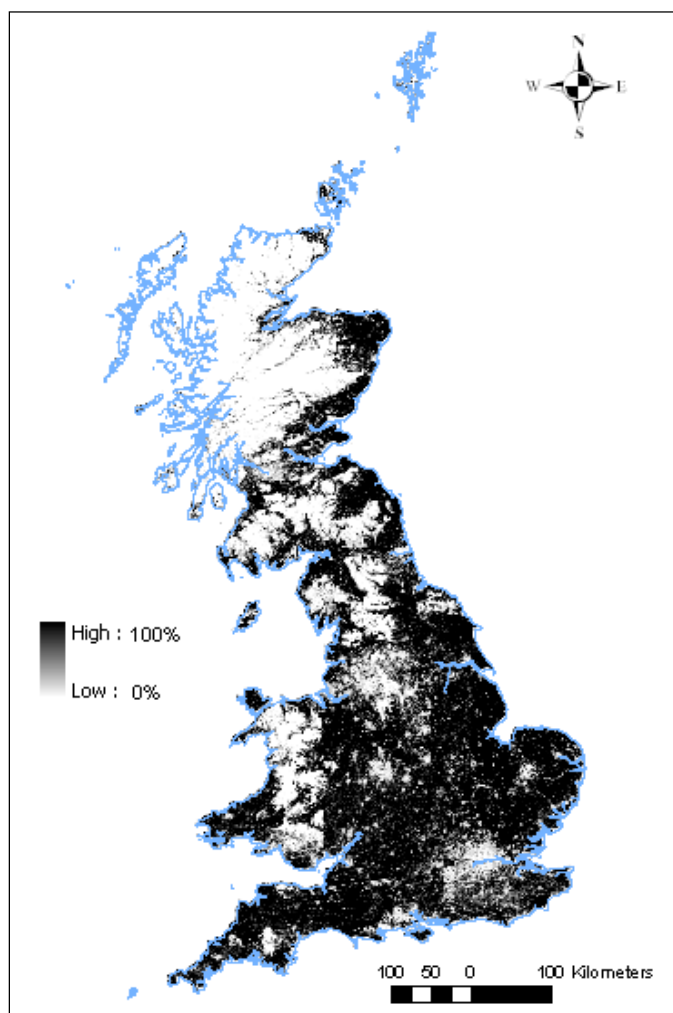
Note: Own elaboration based on LCM2000.

Figure A.4: Semi-natural grasslands



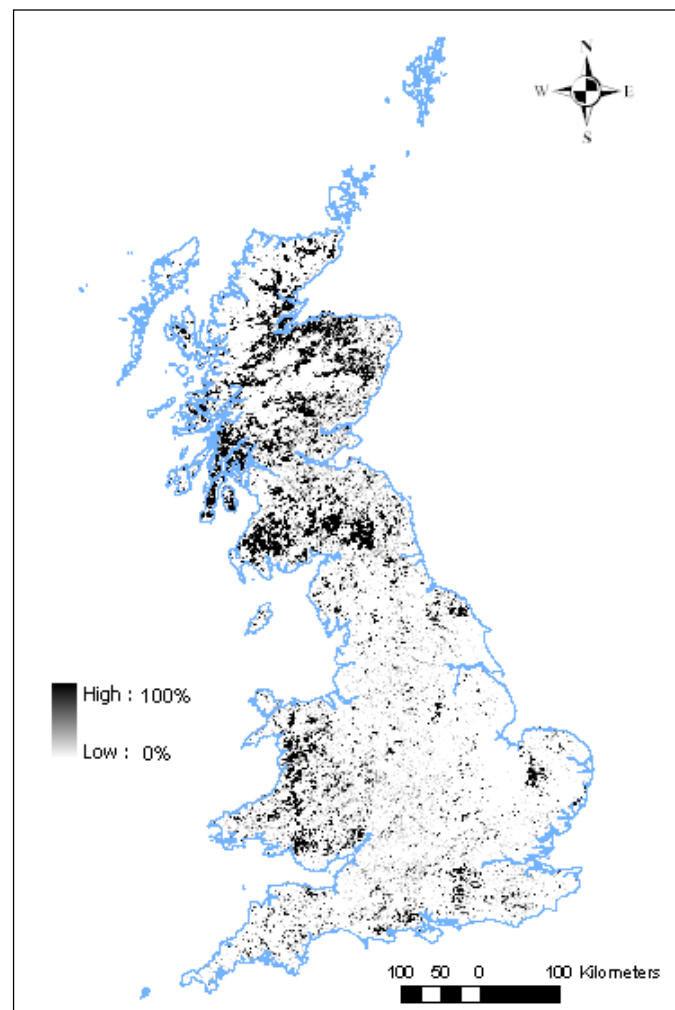
Note: Own elaboration based on LCM2000.

Figure A.5: Enclosed farmland



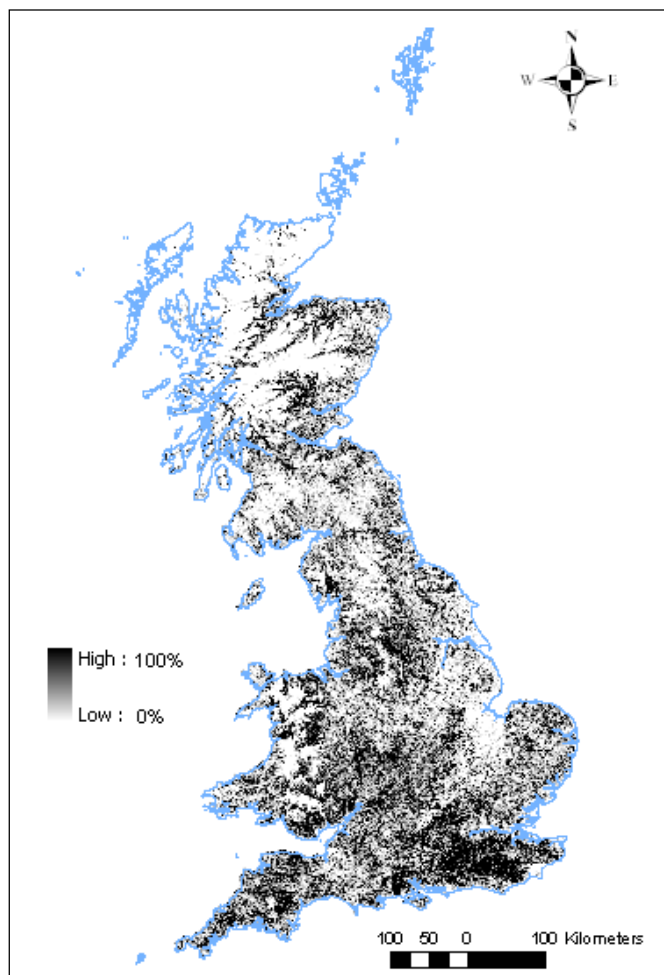
Note: Own elaboration based on LCM2000.

Figure A.6: Coniferous woodland



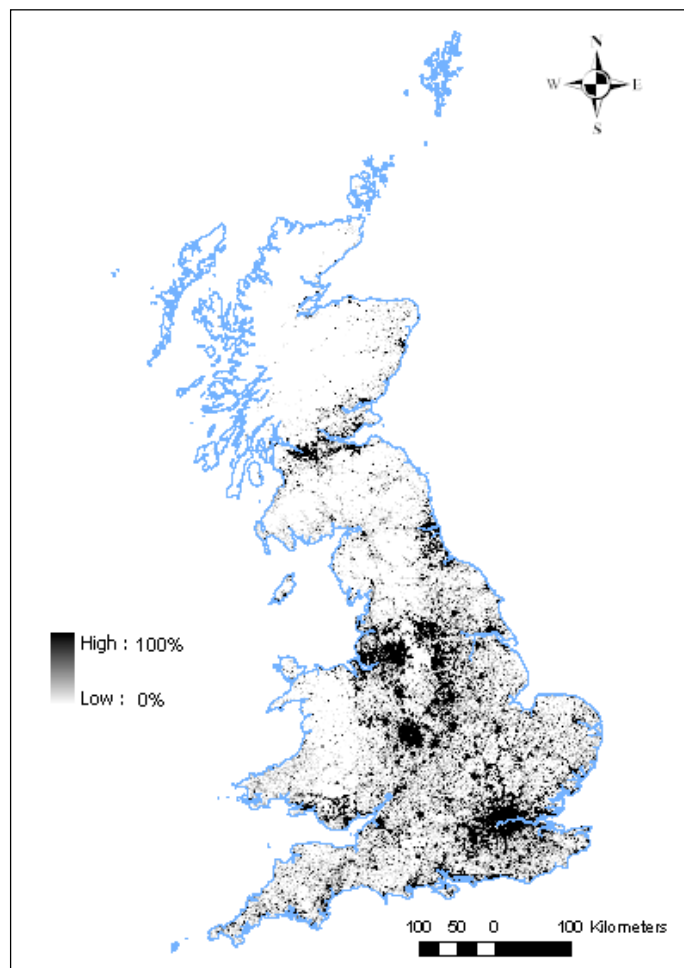
Note: Own elaboration based on LCM2000.

Figure A.7: Broad-leaved / mixed

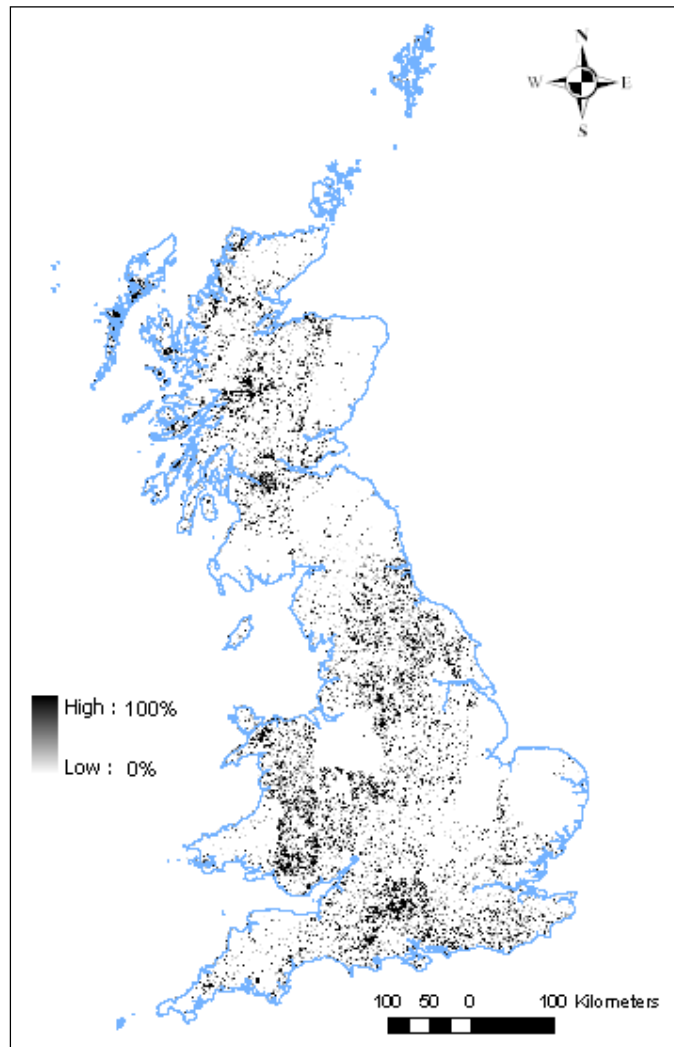


Note: Own elaboration based on LCM2000.

Figure A.8: Urban



Note: Own elaboration based on LCM2000.

Figure A.9: Inland Bare Ground

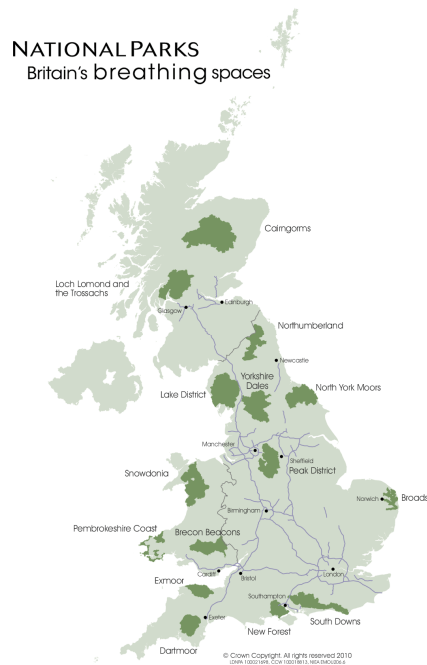
Note: Own elaboration based on LCM2000.

We also constructed two additional **nature-related variables** depicting, respectively, the proportion (0-1) of **Green Belt** land and of **National Park** land in the Census ward in which a house is located. A map of UK National Parks is presented in Figure A.10, while Table A.3 contains their key summary statistics.

Table A.2: Summary statistics for the land use types in England

Variable Heading	Measurement Unit	Variable Description	Total Area (Km2)	Percentage
1. Area of Domestic Gardens	Kilometres squared (km2)	Area (in kilometres squared) of 'Domestic Gardens' in England.	5,645	4.3%
2. Area of Greenspace	Kilometres squared (km2)	Area (in kilometres squared) of 'Greenspace' in England.	115,742	87.5%
3. Area of Water	Kilometres squared (km2)	Area (in kilometres squared) of 'Water' in England.	3,436	2.6%
4. Area of Domestic Buildings	Kilometres squared (km2)	Area (in kilometres squared) of 'Domestic Buildings' in England.	1,508	1.1%
5. Area of Non Domestic Buildings	Kilometres squared (km2)	Area (in kilometres squared) of 'Non-Domestic Buildings' in England.	869	0.7%
6. Area of Road	Kilometres squared (km2)	Area (in kilometres squared) of 'Road' in England.	2,950	2.2%
7. Area of Path	Kilometres squared (km2)	Area (in kilometres squared) of 'Path' in England.	143	0.1%
8. Area of Rail	Kilometres squared (km2)	Area (in kilometres squared) of 'Rail' in England.	179	0.1%
9. Area of Other Land Uses	Kilometres squared (km2)	Area (in kilometres squared) of 'Other' land in England.	1,850	1.4%
10. Area of Unclassified Land	Kilometres squared (km2)	Area (in kilometres squared) of 'Unclassified' land in England.	2	0.0%
Total Area of All Land Types	Kilometres squared (km2)	Total area (kilometres squared)	132,324	100.0%

Note: Own elaboration based on Generalised Land Use Database 2005.

Figure A.10: National Parks Map***'Distance to' variables***

The Strategi dataset (available at <http://edina.ac.uk/digimap>) gives us information that can be used to create **'distance to' variables** across England, Wales and Scotland. For each layer of road category, railway/metro station, river, coastline or church, we calculate the distance in meters between the variables listed below and each house identified by its postcode. We also use the National Park (NP) boundary and National Nature Reserves (NNR) boundary (both available at <http://www.edina.ac.uk/ukborders>) to generate the nearest 'distance to' the boundaries of NP or NNR (in meters). National Trust provides geo-referenced information of the National Trust (NT) properties to generate the nearest 'distance to' variable. With regard these latter three 'distance to' variables, it is important to note that if the house postcode falls inside the National Park or National Nature Reserves or National Trust boundaries the distance is set equal to zero (0). The twelve 'distance to' variables used in the analysis are: (1) distance to Coastline; (2) distance to Rivers; (3) distance to National Parks (England and Wales); (4) distance to

National Nature Reserves (England and Scotland); (5) distance to Stations; (6) distance to Motorways; (7) distance to Primary Routes; (8) distance to A Roads; (9) distance to B Roads; (10) distance to Churches (only for some urban regions in England); (11) distance to National Trust properties; and (12) distance to Schools. Further details are contained in Table A.4.

National Parks have already been described above. **National Nature Reserves** (NNRs) is another well-known designation that emerged in the post-war years alongside the early National Parks. They are used to manage some of the UK's most pristine habitats, rarest species and most significant geology and are a selection of the very best parts of the country's Sites of Special Scientific Interest. There are currently 224 NNRs in England (and one Marine Nature Reserve, Lundy) with a total area of over 94,400 hectares, which is approximately 0.6% of the country's land surface. The largest is The Wash NNR, covering almost 8,800 hectares, whilst Horn Park Quarry in Dorset, at 0.32 hectares, is the smallest. There are 55 promoted NNRs in Scotland and 72 in Wales, covering just under 1.5% of each country.

Other variables

Another variable created for the hedonics analysis was UK population density at a 1 kilometer square grid level. Then we assign each housing transaction to the 1km square in which it is located.

Schools data on age 7-11 valued added was obtained from data derived for Gibbons, Machin and Silva (2009) from the National Pupil Database. The value-added variable relates to the gain in mean point scores awarded to pupils in standard national tests at age 7 and 11.

Table A.3: National Parks statistics

Country	Park	Area (Km2)	Year of designation	Resident population (2007)	Most recent annual day visitor numbers (million)	Most recent annual visitor spending (millions £)
<u>England</u> 10 National Parks (9.3% of total land area)	Dartmoor	953	1951	34,977	2.5	£123
	Exmoor	693	1954	10,857	1.4	£83
	Lake District	2,292	1951	42,407	8.3	£659
	New Forest	570	2005	34,935	<i>n.a.</i>	£123
	Northumberland	1,049	1956	1,973	1.7	£104
	North York Moors	1,436	1952	24,128	6.3	£317
	Peak District	1,438	1951	38,409	10.1	£97
	Yorkshire Dales	1,769	1954	20,229	9.5	£400
	South Downs	1,637	2010	120,000	<i>n.a.</i>	<i>n.a.</i>
	Broads	303	1989	6,370	5.8	£296
<u>Wales</u> 3 National Parks (19.9% of total land area)	Brecon Beacons	1,344	1957	32,987	3.8	£143
	Pembrokeshire Coast	621	1952	22,359	4.2	£500
	Snowdonia	2,176	1951	25,807	4.27	£396
<u>Scotland</u> 2 National Parks (7.2% of total land area)	Cairngorms	3,800	2003	16,000	1.48	£174
	Loch Lomond and the Trossachs	1,865	2002	15,600	2.1	£247

Sources: Natural England (2010), Office for National Statistics (2007), National Parks (2010)

Note: the analysis uses information on National Parks in England and Wales only

Table A.4: Summary statistics for the “distance to” variables in UK

'Distance to' variables	Minimum (in metres)	Maximum (in metres)	Mean (in metres)	Standard Deviation
1. Distance to Coastline	0.0	102,773	25,942	27,344
2. Distance to Rivers	0.0	137,931	2,550	14,109
3. Distance to National Parks (England and Wales)	0.0	580,542	53,449	42,195
4. Distance to National Nature Reserves (England and Scotland)	0.0	166,728	16,266	18,741
5. Distance to Stations	1.4	284,252	4,549	15,755
6. Distance to Motorways	0.1	508,854	18,117	37,928
7. Distance to Primary Routes	0.0	282,762	3,658	15,413
8. Distance to A Roads	0.0	90,705	2,249	9,389
9. Distance to B Roads	0.0	137,738	2,658	14,097
10. Distance to Churches (only for some urban regions in England)	0.5	55,430	2,302	4,218
11. Distance to National Trust properties (England and Wales)	0.0	45,900	7,248	5,316
12. Distance to Schools (England)	0.0	85,434	842	2,064

Note: Own elaboration based on Strategi dataset. The UK statistics include England, Wales and Scotland.