**“Associations between air pollution and socioeconomic characteristics, ethnicity and age profile of neighbourhoods in England and the Netherlands”**

*SUMMARY STATISTICS*

“We used [descriptive statistics](https://www.sciencedirect.com/topics/economics-econometrics-and-finance/descriptive-statistics), Pearson's correlations and box plots to describe air pollution concentrations and the social and demographic variables. Concentrations were approximately normally distributed so not transformed ([Supplement material, Fig. S1](https://www.sciencedirect.com/science/article/pii/S0269749114005144" \l "appsec1)). We used univariate and multiple linear regression to explore associations between air pollution concentrations (as the dependent variable) and population characteristics. Multivariate regression analysis was conducted at national, regional and city level and models were mutually adjusted for urbanisation (categorised into urban/rural), percentage of income support recipients (quintiles), ethnicity (categorised into White/non-White), percentage children and percentage 65 plus population (quintiles). All statistical analysis was performed with open-source software R version 3.0.1.”

A screenshot of a graph

AI-generated content may be incorrect.

A screenshot of a computer

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**Independent Variables (Socioeconomic Characteristics)**

From ONS and other sources, per region/year:

* **Count of Active Enterprises**
* **Labour Market Indicators** (e.g. employment rate, claimant count, job density)
* **Population Density**
* **Rural/Urban classification**

| **Type** | **Examples** | **How It Helps** |
| --- | --- | --- |
| **Socioeconomic data** | Median income, deprivation index, unemployment, education, industry employment | Shows structural correlates of pollution |
| **Land use** | % urban, % agriculture, protected areas | Tests whether pollution relates to land pressure |
| **Demographics** | Population density, age, minority % | Helps evaluate environmental justice dimensions |
| **Health outcomes (if available)** | Asthma, cancer, child development scores | Explores consequences |

**Pearson’s correlation** between:

* Pollution quantity ↔ number of enterprises
* Pollution quantity ↔ unemployment or claimant count

**Regression analysis**

* :measures of economic activity, health, welfare, policy…
* : pollution measure
* , : control variables (demographics, river characteristics, …)

*Issues that you need to consider and discuss carefully:*

* Reverse causality
* Sample selection
* Behavioural response of sample subjects
* Functional forms (nonlinearities)
* Definition and measure of pollution
* Measurement error and bias

**RESEARCH QUESTION EXAMPLES**

"How do local socioeconomic characteristics in England relate to water pollution?"

“To what extent does economic activity contribute to industrial pollution incidents in England, and how do these effects vary across different regions between 2021 and 2023?”

"What is the spatial relationship between pollutant emissions and socioeconomic indicators in English regions from 2021 to 2023?"

"Do regions with more industrial or economic activity report higher levels of pollution, and how consistent is this across different pollutants?"

"Can regional pollution patterns across England between 2021 and 2023 be explained by local economic structure, enterprise density, and labour market strength?"