

The use of Linked Consumer Registers to understand social and residential mobility

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Summary

This paper develops an empirical framework to better understand social and residential mobility in terms of outcomes as revealed using Linked Consumer Registers that detail individual level origins and destinations throughout the nations of the UK. We describe work to analyse these data at a range of geographic scales and to link them to further data sources. We discuss the value and applicability of the data sources and set out a research agenda.

KEYWORDS: linked consumer register, address matching, social mobility, residential mobility

1. Introduction

Population movements data can be used for understanding residential mobility (Coulter et al., 2016), which is an indicator of social mobility (Fielding, 1992; Tyrrell & Kraftl, 2016). Although UK censuses provide detailed origin-destination information on population moves, precise locations of origins and destinations are not known and updates occur only every ten years (Lomax & Stillwell, 2017). Given this limited availability of frequently updated data on individual mobility, this paper aims to report a framework to investigate social and residential mobility using Linked Consumer Registers (LCRs) data, updated annually from 1997 to 2020. We exploit longitudinal linkage of all household register records to unpack patterns through two exploratory English case studies at various granularities. Given that linkage for the period 2017-2020 is still provisional and ongoing, we use the series for 1997-2016 in order to develop proof of concept of the ideas that we present.

2. Linking deprivation and housing performance data to LCRs data

The LCRs data have been introduced by Lansley et al. (2019), who developed models to assemble individual level annual public electoral and consumer registers with multiple data sources over the period covers 1997-2016 for the entire UK. This work detailed comprehensive information on highly disaggregate and frequently updatable population structure, filling in the gaps when currently available data failed to detect continuity of residence in particular years. The LCRs data used in this paper contain over 32 million unique register entries with origin-destination Unique Property Reference Numbers (UPRNs) and postal addresses. Each UPRN is a unique number assembling up to 12 digits in length for each property, created for Great Britain by Ordnance Survey (OSGB).

Building on this frame, small area social deprivation and individual property household energy performance data are linked and analysed at a number of geographical scales in order to understand social and residential mobility. Social deprivation and household energy performance data are represented, respectively, by English Index of Multiple Deprivation (IMD) and Domestic Energy

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Performance Certificates (EPCs). The English IMD provides a set of measurements of relative social deprivation for small areas at Lower layer Super Output Area (LSOA) level across England, based on seven constituent domains including income, employment, health, education, housing, crime and living environment (MHCLG, 2011). It is constructed by the Ministry of Housing, Communities & Local Government in England (MHCLG), with higher IMD scores denoting more deprived neighbourhoods. Domestic energy performance certificates (EPCs) provide another release from MHCLG, and provide information on the energy efficiency of individual buildings alongside total floor areas and numbers of habitable rooms.

A workflow is proposed to demonstrate the data linkage process, shown in Figure 1. For social mobility, the ONS Postcode Directory (ONSPD) of current and terminated postcodes is used to create a set of area geographies in the UK (Office for National Statistics, 2017). Postal addresses recorded in the LCRs are used to create aggregations at different spatial granularities, such as LSOA, administrative local authority districts (LADs), and European Electoral Regions (EER). Index of Multiple Deprivation (IMD) data are subsequently linked using the same LSOA codes. For residential mobility, linked EPCs are added along with Land Registry Price Paid Data (PPD) through a complex address-based matching process. PPD provide transactional information on all property sales in England and Wales since 1995, and are published by HM Land Registry (e.g. HM Land Registry, 2014). They comprise transaction values, property tenures, property types and detailed address data processed as part of OSGB's AddressBase Premium product. Then, the linked EPCs data are merged into linked LCRs data using common UPRNs.

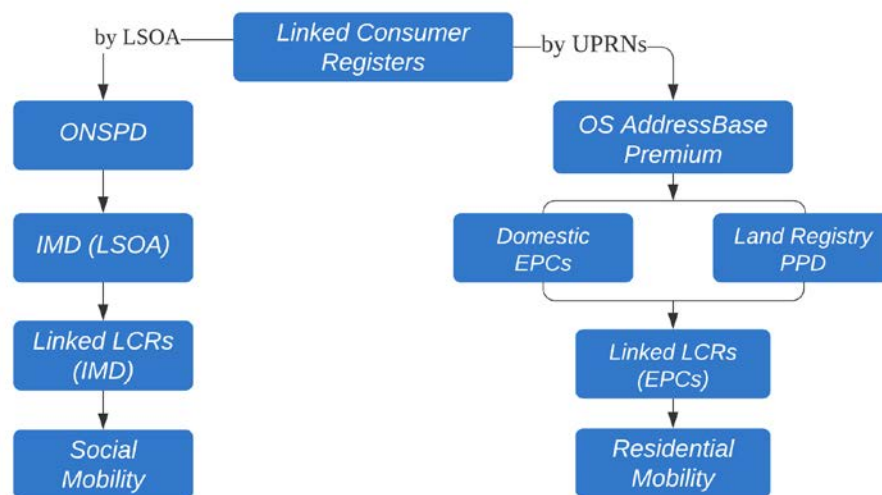


Figure 1 Workflow of the data linkage process developed in this study

3. Case studies

Using the linked dataset, two all-England case studies are developed in order to demonstrate proof of concept. Figure 2 displays the principal origin-destination population flows cover the period 1997-2016 using the LCRs data.

Population Migration between LADs in England

- 700 to 1,524
- 1,525 to 2,755
- 2,756 to 4,498
- 4,500 to 7,064
- 7,066 to 10,818
- 10,818 to 18,258
- 18,259 to 26,958

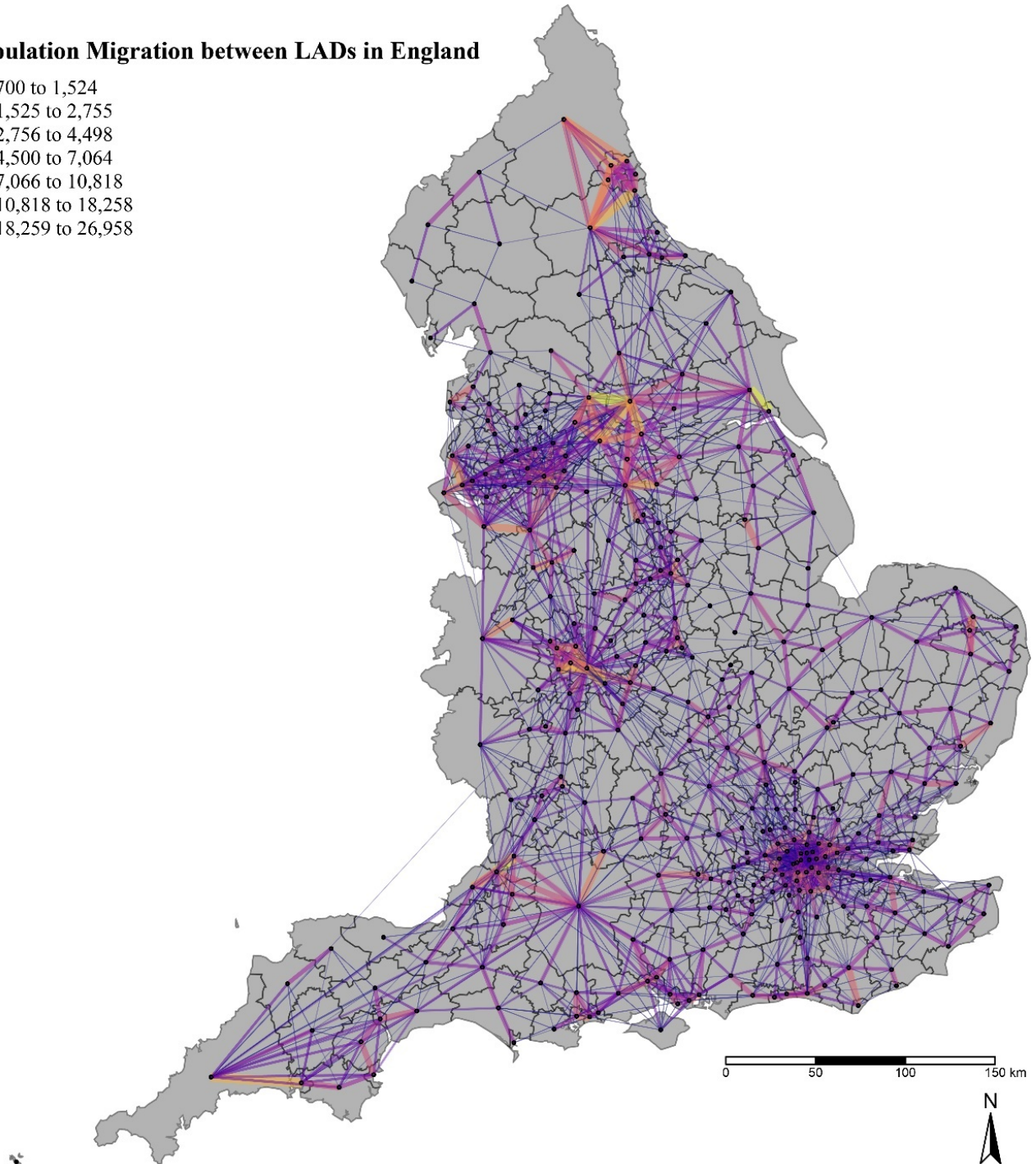


Figure 2 England -wide residential flows between Local Authorities in 2011 as estimated by the LCRs

3.1 Understanding social mobility through origin – destination deprivation outcomes

To confirm the applicability of the LCRs in understanding social mobility, English IMD 2010 scores are mapped onto 2011 CDRC Maps (<https://data.cdrc.ac.uk/dataset/index-multiple-deprivation-imd>) in order to demonstrate changing residential circumstances following moves. IMD2011 is selected since 2011 was a Census year during the study period of 1997-2016, whereas subsequent indicators could be considered for later years in the interests of consistency. An alluvial plot (Figure 3) is used to illustrate changes in IMD deciles between origins and destinations consequent upon moves, where deciles 1-10 range from the most deprived to the least deprived areas. The lines connect deciles from origins to destinations and represent the percentage of population movers, with thicker line identifying greater changes in social mobility.

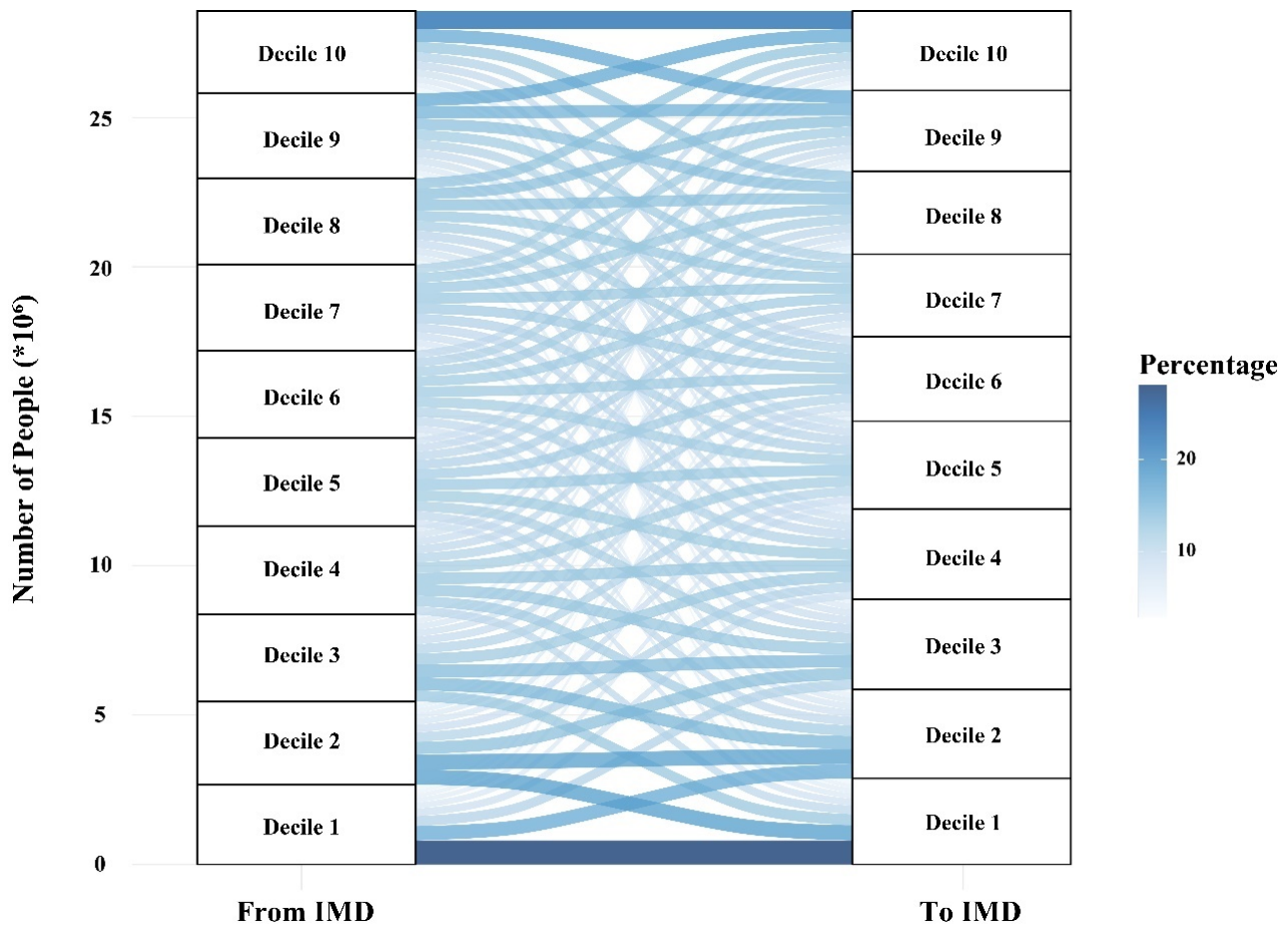


Figure 3 Changes in IMD deciles consequent upon moves between origins and destinations in England in 2011.

A high percentage of movers retain the same IMD deciles when they move from origins to destinations. The population at decile 1 (the most deprived) and Decile 10 (the least deprived) have a tendency to remain at identical deciles, suggesting that the circumstances of the poorest and the richest population change only rarely following moves. Households originating in IMD deciles 2 and 9 primarily move to destinations in adjacent deciles, further implying somewhat limited social mobility. However, residents leaving the central deciles present more diverse patterns, with destinations quite evenly spread across IMD deciles, suggesting that the corresponding neighbourhoods are those in which the greatest changes occur.

3.2 Owner-occupied residential mobility in England

More than six million unique addresses are identified as owner-occupier movers in this study. The attendant floor area changes present new insight into residential mobility associated with changes in property size (i.e., total floor area). Over half of owner-occupier residential movers are observed to result in moves to a bigger property. Figure 4 presents details of the regional origin and destination changes in this context. Residential moves originating from the same region are coloured in the same colour tone. 20 % of such moves are Londoners. 19% of owner-occupied residents move out of the South East to bigger properties. 12% of owner-occupier residents move out of the East of England to get a larger property. The remaining six regions each account for less than 10% of residential moves destined for a bigger property. 69% of owner occupier Londoners' moves are within in London to larger properties. The remaining homeowner moves out of London are principally distributed across the South East and East of England.

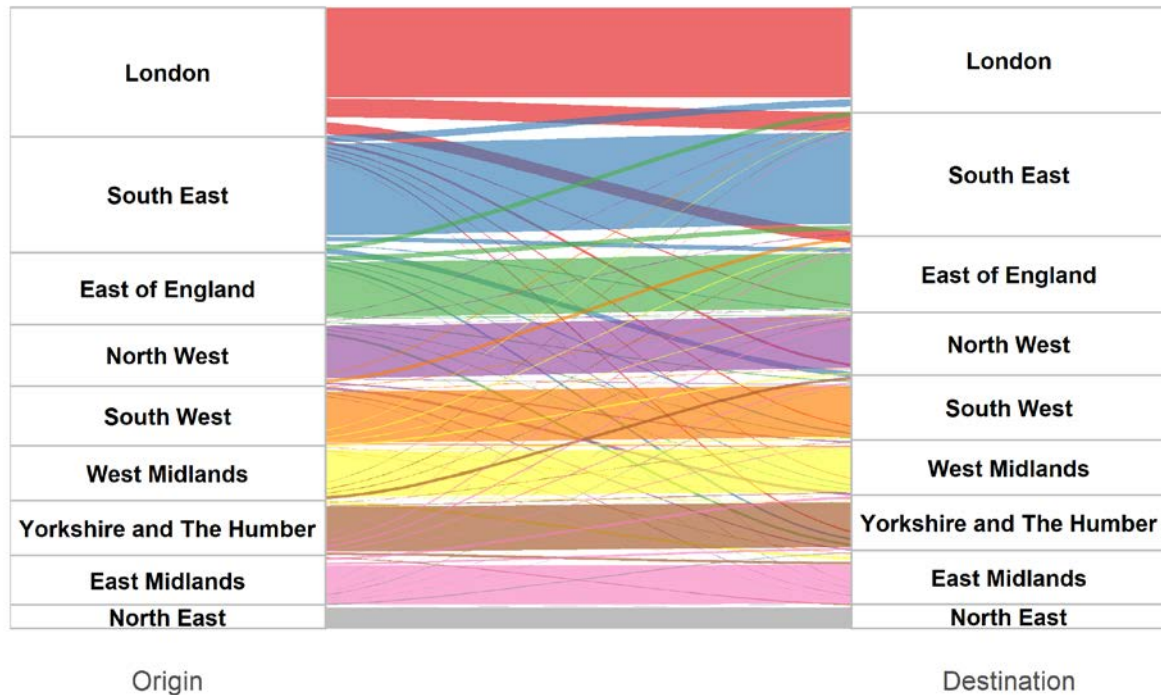


Figure 4 Owner-occupier resident destinations ending in larger houses in England

4. Conclusion and future work

This paper proposes a framework for linkage of various consumer and conventional statistical data sources developed around the LCRs, demonstrating the usability of LCRs in understanding social and residential mobility. Our ongoing work will focus on the period 1997-2020 and will incorporate more sources such as Zoopla rental listings data and additional domestic EPC data in order to further realise the potential of the LCRs in understanding residential mobility and social change. As a consequence, new indicators with improved temporal granularity will be developed for larger study areas (e.g., the UK) in order to profile the changing characteristics of neighbourhoods and the households that reside within them.

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Biographies

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Paul Longley is Professor of Geographic Information Science at University College London and director of the UK Consumer Data Research Centre at UCL. His publications include 18 books and more than 150 refereed journal articles and book chapters.