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Not so Welcome Here? Modelling the Impact of Ethnic In-movers on the Length of Stay of Home-owners in Micro-Neighbourhoods

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3 **Not so Welcome Here? Modelling the Impact of Ethnic In-movers on the Length of Stay of**
4 **Home-owners in Micro-Neighbourhoods**
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10 **Abstract**
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12 This paper considers the length of stay of home-owners with white British names in the 40% most
13 deprived census areas of Glasgow, Scotland. We estimate the impact of ethnically ‘other’ name-
14 group inflows through property purchases at the micro-neighbourhood level. We use a novel
15 longitudinal dataset, constructed from the population of home-buyers recorded in all property
16 transaction records from 2003 to 2014, from which we impute ethnicity using name-matching
17 software. We estimate how the survival time (length of ownership) of homeowners with white British
18 names is affected by in-migration of house-buyers from different ethnic name-groups into the micro-
19 neighbourhood, defined as a 50m radius around each home. Results suggest a complex set of
20 associations between ethnically “other” purchasers/inmovers (based on name groups) and duration
21 of home-ownership. The most consistent finding is for in-moving purchasers with Pakistani
22 (primarily Muslim) names, which tend to have a relatively large accelerant effect on the moving
23 propensity of homeowners that have white British names. This was true in areas of both high and low
24 non-white ethnic population share. We also find evidence of nonlinearity in this relationship: the
25 accelerant effect diminishes with each additional in-move from purchasers with Pakistani names. The
26 name group with the largest overall accelerant effect was for inmovers with non-white Other names,
27 which were also primarily Muslim in origin, though this effect was less consistent across models.
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44 **Keywords**
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46 Neighbourhood, Housing, Diversity, Cohesion, Segregation, Migration, Race, Ethnicity, White Flight
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1. Introduction

The surge in anti-immigration and xenophobic sentiment in the UK in the run-up to, and aftermath of, the 2016 Brexit Referendum (Jeory, 2016) exemplified wider concerns in Western democracies about migration, social cohesion and the socio-spatial segregation of minority ethnic populations.

These macro-political developments affect, and are affected by, micro-level processes that shape the geographical patterns of ethnicity and social characteristics in towns and cities. Dynamics of household mobility and local neighbourhood choice, whether motivated by racism or upward social mobility, underpin the (re)production of residential segregation and socio-spatial inequalities over time (Hedman, 2011), which in turn impact the potential for inter-group contact (Allport, 1954).

One mechanism of ethnic-social sorting, which has received particular attention from both researchers and the media, is the phenomenon of so-called 'white flight'. Originating in 1970's USA, the term refers to the outmigration of pre-existing white residents in response to the changing ethnic mix of their neighbourhood (Galster, 1987). Studies in the European context (Nordvik and Turner 2015; Finney and Simpson, 2009) have shown such outflows to be largely the result of 'aspirational' moves linked to age and stage of life.

Existing research, however, has tended to overlook the issue of "duration dependence"—where the probability of moving is affected by the duration of stay up to that point. This is a potentially important omission. There is also been a dearth of spatially fine-grained analysis of sub-neighbourhood migration flows, with much of the research being at the level of US census tracts¹ or similarly sized areas comprising several thousand residents (see for example, Magi et al., 2016).

With regard to duration dependence, it is likely to be a critical factor in estimating a person's likelihood of moving in any given period (Thomas et al., 2016) because length of stay reflects cumulative personal investment in, and commitment to, local people and place. The appropriate way to model events characterised by duration dependence is to apply "survival" modelling techniques which are designed to capture the relationship between behaviour and duration of stay. Such methods, however, have been under-utilised in the 'white-flight' literature, probably due to a lack of

¹ US census tracts contain between 1,000 – 8,000, (optimally 4,000) US Census Bureau. (2017)

Geographic Terms and Concepts - Census Tract Available at:

https://www.census.gov/geo/reference/gtc/gtc_ct.html.

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3 longitudinal microdata and perhaps also a lack of awareness of the methodological importance of
4 duration dependence (Crowder et al., 2011). With regards to those who live in relatively settled
5 communities, the “hazard rate” of moving has been shown to be non-monotonic (Thomas et al.,
6 2016), which requires the selection of a model that allows for this type of distribution in order to
7 avoid misleading results (Pryce and Gibb, 2006).
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12 The spatial unit of study is also important, as demonstrated by the Festinger et al. (1950), who
13 highlighted the importance of “functional” distance in determining the emergence of social networks
14 in housing projects. More recently Mollenhorst et al. (2014) have shown how stable relationships
15 with neighbours are built up through long-term frequent contacts in terms of practical help and social
16 support. Hipp (2010) also finds that “micro-neighbourhoods” comprising clusters of 10 housing
17 units, have strong effects on neighbourhood (dis)satisfaction which may be missed at US census tract
18 level. This supports our view that social connections and interactions are more likely to occur in close
19 proximity—residents’ awareness of other households is likely to be greatest with respect to those
20 who live the closest. One might therefore expect the effect of in-movers on the moving decisions of
21 existing residents to decay with distance—the impact of changes in close neighbours will likely be
22 much greater than changes a block or two away. Studies measuring population migration or
23 segregation, however, typically use meso-level administrative units such as census tracts which cover
24 comparatively large areas² (Östh et al., 2015; Nordvik and Turner, 2015), and which potentially
25 average-out important variation at smaller spatial scales (Reardon et al., 2008). Greater attention is
26 warranted regarding the dynamics of micro-neighbourhoods that surround individual housing units
27 (Hipp, 2010; Sager, 2011; Schmid et al., 2008).
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41 This leads us to our core research question: controlling for duration dependence, is there native flight
42 in micro-neighbourhoods in Glasgow? Our focus is on the impact of inflows of people from
43 particular name groups on the moving decisions of residents from other name groups. More
44 precisely, we want to know whether the likelihood of homeowners with white-British names selling
45 up and moving on, is affected by the in-migration of ethnically ‘other’ name-group home-buyers into
46 nearby properties?
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52 To the best of our knowledge, no previous study has rigorously analysed the duration dynamics of
53 home-owner migration at the micro-neighbourhood level. We aim to address this gap through the
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58 ² US census tracts contain between 1,000 – 8,000, (optimally 4,000) *ibid*.
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3 novel use of property registration data, which enables us to compute the cumulative number of
4 in-movers from different ethnic name groups within micro-neighbourhoods, defined here using a
5 proxy of the 50 metre radius around the dwelling of interest. This fine-grained analysis is made
6 possible because our data includes the address point location of all recorded property purchases in the
7 owner-occupied sector in Glasgow, on a monthly basis from 2003-2014, and thus affords a high
8 degree of granularity in both space and time.
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14 The paper is organised as follows. Section 2 summarizes the existing literature in the field. Registers
15 of Scotland data are introduced in Section 3 where the meaning and accuracy of the ethnic name-
16 matching process is discussed. Our study methods are outlined in Section 4. In Section 5 we discuss
17 the results and in Section 6 we offer a brief conclusion. Further details of our methods, data and
18 results are provided in Supplementary Material.
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24 25 **2. Existing Literature**

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28 Numerous studies on socio-spatial sorting, particularly in the US literature, have noted the outflow of
29 majority-white residents from areas when ethnic “others” (people of colour) move in; a process that
30 has become known as “white flight” (Galster, 1987). Several explanations for this “ethnic flight”
31 phenomenon have been posited, including “the mobility-related characteristics of native-born
32 [white] individuals” (Crowder et al., 2011). Examples include: young childless singles or couples
33 upscaling from city centre tenement flats to more spacious (family) housing in the suburbs, or older
34 retired empty-nesters moving out of the city centre to quieter areas.
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41 Boustan (2010) notes the potential endogeneity of residential location choice. Environmental blight,
42 such as a new motorway or waste disposal plant, may cause existing nearby residents to migrate out.
43 Meanwhile other groups move in, attracted by the fall in local property prices (Depro et al., 2015).
44 Both of these scenarios entail differences in neighbourhood choice and financial constraints by ethnic
45 group (Ibraimovic and Masiero, 2014).
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51 Concerns about the lower socioeconomic position of in-migrating ethnic others may also be a driving
52 factor that explains the response of existing white residents. Ethnic others with a history of
53 immigration are often socioeconomically disadvantaged and pre-existing residents may fear
54 socioeconomic decline in the local neighbourhood (Boustan, 2010; Crowder et al., 2011). Home-
55 buyers from in-migrating ethnically “other” groups, however, may be constrained in their choice of
56 residential location due to lower incomes associated with their disadvantaged socioeconomic
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3 position, or as a result of discriminatory practices in the housing market (Ibraimovic and Masiero,
4 2014).

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7 Another important potential driver underpinning the decision to move is “homophily”—a preference
8 for living among, and interacting with people socially similar to oneself. Systematic variation in the
9 level of contact by social characteristics such as class, ethnicity, gender, age, education, religion and
10 so on, translates into differential patterns of closeness in social ties, thereby ordering social network
11 distance (McPherson et al., 2001). Ethnicity is a potential source of homophily, intertwined in a
12 complex way with other important dimensions of socio-structural attributes, including education,
13 religion and socioeconomic position (McPherson et al., 2001). Even when homophily is fairly weak,
14 such as the desire to be in the majority among immediate neighbours, very high levels of overall
15 segregation can emerge as a result (Schelling, 1971).

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18 Heterophobia or xenophobia, the fear or dislike of people socially “other” or ‘foreign’ to oneself,
19 may also play a significant role, for example through racist discriminatory behaviour on the basis of
20 observed ethnicity. Names potentially constitute an important aspect of this aversion. Kyriakides et
21 al. (2009) explore the notion of a racialised Scottish nationalism rooted in the white ethnic
22 phenotype. They elicit interviewee responses to a vignette about inmoving neighbours with
23 stereotypically English or Muslim names and find that neighbours are initially racialized and
24 identified negatively (p.295). Worries are expressed about stereotypical ‘foreign’ Muslim
25 ‘extremism’. They also find negative stereotypes of ‘foreign’ Asians linked to overcrowding,
26 loudness and household privacy, held among both Scottish Asian and white interviewees. Although
27 Kyriades *et al.* discover challenges to the whiteness of national Scottish identity once a Scots accent
28 is revealed, this, requires interaction – moving beyond the superficial visual appearance. The ethnic
29 origin of names, therefore, may have an important direct impact as a signal of “otherness”.

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32 Negative attitudes towards ethnic “others” may be rooted in perceived competition for material
33 resources such as jobs, housing, and welfare state benefits (Bowes et al., 1990). The majority
34 population may also perceive a threat to its mainstream culture and societal cohesion from an influx
35 of people with different ethnic, linguistic and religious backgrounds and cultural values. According to
36 social identity theory membership of the “in-group” can be a source of positive self-esteem and status
37 (Ben-Nun Bloom et al., 2015). The majority “indigenous” population displays a marked preference
38 for its own ethnic “in-group” which can lead to favouritism, while perceiving cultural threats from a
39 variety of “out-groups” (Turper et al., 2015). Balibar, cited by Kyriakides et al. (2009) argued that:
40 ‘the ‘new racism’ in the ‘era of decolonisation’ (1991a: 21) presents a ‘need to purify the social body
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3 to preserve ‘‘one’s own’’ or ‘‘our’’ identity from all forms of mixing, interbreeding or invasion’.
4 Such representations are ‘articulated around stigmata of otherness (name, skin colour, religious
5 practices)’ (1991a: 1718).’ p.292.
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9 Thus, residents with white British names in largely white British neighbourhoods may interpret the
10 inflow of movers with names denoting ‘‘otherness’’ as source of threat and potential disruption to
11 their sense of identity and prestige (Schuermans et al., 2015). This in turn may act as a push factor in
12 incumbents’ decisions about whether stay or move. Note, however, that irrespective of ethnicity,
13 outmoves of long-standing neighbours may loosen the sense of neighbourhood-attachment for
14 remaining households – i.e. it may not be the ethnicity of in-movers that matters, but the loss of well-
15 established friendships with those they displace, and the unraveling of shared memories and local
16 relationship networks.
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25 **3. Data and Study Area**

26 **Background to the Study Area**

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28 There is a historically rooted (white) Irish Catholic population in Glasgow, as well as a long tradition
29 of Sectarian division between Protestants and (primarily Irish) Catholics. Although many Asian
30 maritime workers (‘Lascars’) had migrated to work in Glasgow’s ship-building industry in the 18th
31 and 19th centuries (Scottish Government, 2011), (white) Irish Catholics comprised the largest
32 immigrant group to Glasgow in the 19th to early 20th century. Irish migrants came initially for
33 seasonal work, then fleeing the potato famine of 1846-1847 (John Gray Centre, 2014), following
34 which the pace of immigration and anti-Catholic discrimination escalated. There was also substantial
35 economic migration from Europe to Glasgow in the late 19th and early 20th centuries, particularly
36 from Italy, and an influx of migrants from Pakistan following the partition of India in the 1950s.
37 More recently there have been significant increases in the number of overseas students, particularly
38 from China, and a significant inflow of (primarily white) migrants following the accession of eastern
39 European countries such as Poland to the European Union in 2004 and 2007.
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51 By 2011, Glasgow’s population comprised, among others: 4% Pakistani descent, 4% white
52 English/Welsh, 3.9% white other (up from 1.5% in 2001), 2% Chinese, 2% Black African (Kelly and
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3 Ashe, 2014) as well as 2% white Irish. The age profile of white British and Irish people is
4 considerably older. Polish people were youngest on average (Scottish Government, 2014).³
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7 **Registers of Scotland (RoS) Data**

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9 Our data consist of records on private property transactions (sales/purchases) collated by the
10 Registers of Scotland (RoS) for the 2003-2014 period in the Glasgow City council area. RoS data⁴
11 was combined to form a longitudinal database on all property and land transactions, including details
12 of the purchaser and seller. Registration of property transactions with RoS is a legal requirement and
13 so our data represents the most comprehensive source of information on transactions available.
14 Nevertheless, we only have data for those home-owners who have transacted i.e. sold or bought
15 properties during the study period. This excludes home-owners who remained resident and did not
16 buy or sell their properties during the 2003-2014 period.
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24 The presence of full names in the data enabled the imputation of the probable ethnic group of
25 property owners using name-matching software (Onomap, 2010). Further advantages of this dataset
26 is that it is updated regularly and has full address details of properties transacted, thereby permitting a
27 much more up-to-date and fine-grained analysis than is usually feasible in this literature (Rathelot
28 and Safi, 2014).
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33 From 2003-2014 there were 87,187 records located in Glasgow City council area once properties
34 bought and sold by organisations and commercial businesses were filtered out (it was not possible to
35 determine whether these were purchased for residential or business use). For the purposes of our
36 analysis, we assume that the majority of sellers and buyers are, respectively, home-owners and
37 purchasers who live or plan to live in their property, but it's worth noting that we have no way of
38 checking whether an individual owner is actually living in the property, or whether they have let it to
39 private tenants, for example.
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46 **Name Classification by Ethno-Cultural Linguistic Group**

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48 There is a growing literature on combining forenames and surnames to impute ethnicity (Mateos,
49 2014; Lakha et al., 2011). We used Onomap® software which is based on a cultural-ethnic-linguistic
50 classification system to match ethnicity into the dataset (Mateos, 2014). Lakha et al. (2011) found
51 this software performed best with British names (positive predictive value 99%), quite well for
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57 ³ See Supplementary Material for more detail on the study area and its demographic make-up.

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59 ⁴ <https://www.ros.gov.uk/property-data>

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3 Eastern European (Polish) and Chinese names (71%), less well for South Asian names (59%) and
4 poorly for African names (17%). Results for Muslim names were also poorer – see below.
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7 Our own visual inspection of the names also suggested that the Onomap categorisation worked better
8 for some groups than others. For example, those names categorised as Asian Pakistani and Indian
9 looked reasonable based on the authors'⁵ knowledge, but the presence of some white British
10 forenames in the Indian category could indicate intermarriage, mixed ethnic background or personal
11 choice. Further exploration of the Onomap “non-white other” 2001 census category showed this
12 group to consist primarily of names of Islamic origin (almost 79%) - which does not tell us where
13 people are from, but may indicate a middle-eastern (or Black African) appearance in many cases. A
14 further 10.5% were labelled as East Asian e.g. Thai, Korean etc, and 9.5% as Turkish. Further errors
15 are likely to arise for particular groups, such as women who have taken their husband’s name; and
16 Caribbean Black people who may have European plantation owner surnames through a heritage of
17 slavery – many of which are Scots/Celtic in origin (National Records of Scotland, 2016).
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27 Among white British home-owners in Glasgow, over 55% of names were classified as “English”, as
28 opposed to (white) Scottish (21.4%) or “Celtic”(22%), for example.⁶ Having a name of English
29 origin does not, of course, mean that a person perceives themselves to be English – only 4% of
30 Glaswegians self-identified as white English in the 2011 census. So, it’s important not to confuse
31 Onomap classifications with self-reported ethnicity, such as that reported in the Census. Rather, we
32 interpret Onomap classifications as an approximation of the historical origin of *name groups*, which
33 acts as a signal to indigenous homeowners of perceived association with particular racial/ethnic
34 groups (eg Asian/Black) or of speaking a different language (eg Polish). Our interest in this paper is
35 in whether there is evidence of variation in accelerant effects associated with in-movers from different
36 ethnic name groups in terms of the impact on the probability incumbent homeowners from white
37 British name groups moving out. Further discussion of classification accuracy and links between
38 ethnicity and name groups can be found in Mateos (2014) and in Supplementary Material.
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53 ⁵ One of the authors was born and raised in a largely Asian multi-ethnic community in London, and
54 has a long-term interest in ethnicity.
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56 ⁶ A high proportion of traditional Irish-celtic names, such as those beginning with “O’…….”
57 (meaning “son of”), were also found to be classified as (white) Scottish rather than Irish.
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4. Methods

Our primary interest is in modelling the time elapsed between a home-owner purchasing and selling a property. This is the dependent variable in our model. We assume duration of ownership is, on average, a good proxy for duration of residence (stay) in that property. The appropriate way to model duration – or time to a particular “event” -- is to use “survival analysis”. In our case, the “event” occurs when a home-owner sells (date of sale) their property. We assume that when a home-owner sells, they do so in order to move to another neighbourhood, though the reason for moving from a property can in reality be multi-faceted⁷. We estimate an Accelerated Failure Time (AFT) model, where the duration of ownership/residence in the property—known as “survival time” (S_i)—is estimated as a function of covariates (as opposed to *hazard* models which estimate the degree of “risk” or the likelihood of an event occurring). Further details of our choice of model (loglogistic estimation) are set out in the Supplemental Material.

Focus on Deprived Areas

There is considerable evidence of the interaction between poverty/deprivation and ethnic group – particularly among those of Asian Pakistani ethnic origin (Jivraj and Khan, 2013; Finney and Simpson, 2009; Scottish Government, 2011). To avoid incumbering the model with numerous complex interactions between ethnic groups and multiple deprivation (which we found made the model difficult to interpret) we present a model in Table 1 that controls for this interaction by restricting the study to the 40% most deprived output areas of Glasgow City – output areas in quintiles 4 & 5 of the Scottish Index of Multiple Deprivation 2016 (The Scottish Government, 2016).

Core variables used in the models include:

Property-level attributes and Individual buyer/seller variables:

- Ethnic name-group of resident owner-occupier – imputed using name-matching;
- Ethnic name-group of inmoving property purchaser – imputed using name-matching;
- Relative property purchase price = original purchase price as a proportion of all sales in the wider Glasgow postcode area for the financial year in which the purchase was made. In the absence of data on household income and occupational class, we included *relative* property

⁷ Relationship breakdown, job change, stage of life, family connections, financial change of circumstance etc etc

price at the time of purchase as a proxy for socioeconomic position of the home-owner/purchaser. Although the measure does not capture short term fluctuations in income, it may be a better measure of permanent income and the accumulated wealth over the lifecourse.

- Property type (flat versus house/other) – constructed from Register of Scotland address data.

Spatial Units

- Inflows of homeowners are measured at the *micro-neighbourhood* level, defined as the 50 metre radius around each individual property.
- Neighbourhood attribute variables (proportions of different ethnic groups, and proportions in age ranges: 25-34; 35-49; 50-64 & 65+) are included using data from the 2011 Scottish Census at *output area* (OA) level. OAs typically comprise around 105 people in Glasgow City Local Authority, the boundaries of which delineate our overall study area.
- We also include information from the Scottish Index of Multiple Deprivation (Scottish Government, 2016), which is available at the level of *datazone*. Datazones have 500-1,000 people.⁸

Time-varying variables

- *Market buoyancy* – computed as the monthly change in mean property price by council area based of register of Scotland residential property data⁹ (Registers of Scotland, 2016). Each mean was calculated from the previous 12-months data from that specific month in that council area.¹⁰
- *Time-lagged Cumulative in-moves by imputed ethnic name-group* – computed as the number of in-movers who purchased properties at addresses within 50 metres of each owner-occupied property, summed over time (month and year). This variable was lagged for a 12 month period to allow for the fact that any related property sale by the pre-existing home-owner may take time to arrange. Separate cumulative indicators were created for each ethnic name-group, and the proportion of in-movers by ethnic name-group as a proportion of all home-buyers

⁸ <http://www.gov.scot/Publications/2005/02/20697/52626>

⁹ <https://www.ros.gov.uk/property-data/property-statistics/quarterly-house-price-statistics>

¹⁰ Average rolling mean prices could not be estimated for properties bought in 2003 as RoS monthly property price statistics are only available from April 2003 and no substitute was found from 2002-3.

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3 within 50 metres of the incumbent home-owner. We also included squared versions of these
4 variables to take into account the possibility of non-linearity—we are particularly interested
5 in whether the effect of in-movers may have a diminishing or increasing effect as the number
6 of in-movers from a particular ethnic group increases.
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11 There is no indication of landlord status in the RoS data. Therefore in order to try and control for
12 change in tenure from ownership to private-renting following the global recession at the small area
13 level the following two variables were created. As this model could only be run on data up to 2011 it
14 is presented in Supplementary Material.
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19 • Annual change in the *proportion of owner-occupied housing* at output area level was
20 estimated in equal increments from the difference in rates between the 2001 and 2011 census
21 using spatially harmonised units. This was added as a control variable and was found to be
22 positively correlated with the area rates of 25-34 year olds and 50-64 year olds.
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- 28 • The annual *change from owner-occupation to private-rental tenure* at output area level was
29 also estimated for the same period to try and allow for the significant amount of tenurial
30 change that occurred during this period due to changes in housing finance.
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33 **Control Variables**

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35 Different parts of the city will serve different functions and so, even in the absence of
36 homophily/heterophobia, we are likely to see different rates of turnover and average lengths of stay
37 across neighbourhoods. To control for these effects, we include variables to account for (1)
38 geographical variation in market buoyancy (defined above); (2) the affluence of the household which,
39 given the absence of income data, is based on the purchase price of the house relative to average
40 house prices at that time in our study area; and (3) the fact that particular types of dwellings (such as
41 flats) are associated with particular life phases and lifestyles which mean that some dwelling types
42 will tend to have shorter residencies and higher turnover than others. Market buoyancy may be
43 particularly important in determining length of stay as a number of studies have shown that
44 homeowners are less likely to sell when prices have been falling due to loss aversion (Genesove and
45 Mayer 2001) and negative equity (Stein 1995). We also include x and y co-ordinates of all properties
46 in order to attempt to control for unobserved spatial fixed effects (after Wu, 2012). Interactions with
47 x and y coordinates were also tested but were not found to be significant.
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58 **Ethnic Shares at the Output Area Level**

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3 Some studies have suggested that while some people prefer to live among co-nationals of similar
4 ethnicity (e.g. majority white Scot/British neighbourhoods), others may prefer to live in more
5 ethnically diverse neighbourhoods (Finney and Simpson, 2009). We are therefore interested in
6 whether there are different responses to inflows of ethnic “others” by white British owner-occupiers
7 within varying contexts of ethnic diversity. Glasgow does not have a high proportion of diversity
8 with regards to BME communities compared with, say, many North American cities. Only a handful
9 of output areas in Glasgow City have non-white rates of 50% or more. Due to the small sample sizes
10 for separate ethnic groups/communities, separate regressions were run for output areas according to
11 the proportion of (all) non-white residents using the following thresholds: < 1%; 1-5%; 5-10%; 10-
12 20%; > 20% and > 27% non-white population. By running separate models on each of these
13 neighbourhood types, we are able to see whether coefficients vary according to the degree of white
14 predominance.
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27 **5. Results**

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31 Table 1 presents the exponentiated coefficients from all 5 models—we refer to these as “coefficients”
32 in the commentary below. We use exponentiated coefficients because, in Accelerated Failure Time
33 (AFT) models, they can be interpreted as time ratios, which measure the degree to which time to the
34 event is speeded up (accelerated) or slowed down (decelerated) by a particular explanatory variable.
35 Our interest is in the length of stay of property-owners, which we assume comes to an end when the
36 property is sold. Suppose, for example, the exponentiated coefficient for variable X has a value of
37 0.2. This means that a unit increase in X leads to the length of stay being just 20% of what it was
38 before the unit increase in X .
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46 Due to the large number of control variables included in the models, Table 1 does not show results
47 for all of the coefficients from the estimations. Rather, we report those of most interest and those that
48 have consistently significant coefficients across three or more of the models. A complete set of
49 results and commentary are provided in the Supplementary Material, which also includes a “linear”
50 version of the model (i.e. one which omits the squared terms) and a version which includes variables
51 capturing neighbourhood tenure mix.
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Results for Control variables – market buoyancy, relative price, house type

We find that the length of stay in a particular property plays an important role in a home-owner's decision to sell their property. The constant term in Table 1 represents the mean length of home-ownership spell among white British sellers from 2003-2014. The strongest effect of duration of stay for white British Glaswegian property-owners in these more deprived areas is estimated at 395 months for neighbourhoods with the highest proportion of white residents (>99% white; <1% non-white, Model 1), see Table 1. This long-term estimate includes cases where buyers did not sell their property within the study period (right-hand censored). Note that the effect of the intercept can be largely offset once multiplied by the coefficients.

The coefficient on relative purchase price is significantly greater than one in models 2 to 5 suggesting that home-owners remained longer in their properties the higher the price originally paid for the property relative to average prices at the time. This likely reflects greater financial investment – which may be related to age and stage of the life cycle - potentially indicating an intention to remain in the property for longer (e.g. by buying into a more desirable area). It is also possible that higher purchase price reflects investment in larger, multi-roomed properties, which may then be rented out to families or multiple households. Landlords making a profit from the growing private rented sector may own for longer durations. It may also capture the impact of paying over the odds which would heighten the effect of loss aversion (Genesove and Mayer 2001). Note that the coefficient on the squared value of the relative price variable was less than one, indicating that the effect diminishes for higher relative house prices. The coefficient on the market buoyancy variable is always less than one, which suggests that people are more likely to move when prices are rising, which is consistent with the mortgage lock-in (Stein 1995) and loss aversion (Genesove and Mayer 2001) literatures.

The coefficient on flats ranged between 0.8 and 0.92. This suggests that homeowner length of stay in flats tends to be around 80% to 90% of that in houses, regardless of neighbourhood ethnic mix (see Models 1, 3 and 6). Variation in property type across areas is likely to be associated with age and stage of life (younger single people and childless couples purchasing flats versus families with children in houses for example).

Impact of Inmovers from Different Ethnic Name Categories

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3 As discussed above, it should be noted that the ethnic name categorisation is better for some ethnic-
4 cultural-linguistic groups than for others. For the purpose of interpretation it is assumed here that the
5 majority-core name-group classification for the most populous broad categories in Glasgow Central
6 hold good – i.e. white British including Scots, white Irish, white other e.g. European, Indian,
7 Pakistani, Chinese and “non-white other” (primarily Muslim).
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12 In terms of the impact of different ethnic groups on length of stay, it’s worth repeating that we would
13 expect any source of neighbourhood churn – change to the residents due to either in-moves or out-
14 moves – to increase the probability of moving of the remaining residents, other things being equal.
15 In-moves typically displace existing residents, and these outmoves potentially represent the loss of
16 close contact with a longstanding neighbour and loosening of attachment to the neighbourhood. Hipp
17 (2010), for example, found unit turnover at the sub-neighbourhood micro-level to be associated with
18 neighbourhood dissatisfaction. As such, we would expect in-moves from white British name groups
19 to have an accelerant effect even in neighbourhoods that are predominantly white British.
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25 And this is what we find. Inmoves by white British named purchasers are found to be associated with
26 some acceleration of outmoves (coefficient of 0.6-0.75 suggesting a significant reduction in time to
27 sale in models 1 to 5). Some of this “churn” may be associated with the change in tenure from
28 ownership to private-rented tenure to 2011. When we include the rate of ownership at output area
29 level and the rate of change from owned to private-rented tenure to account for this (see Table S4 in
30 Supplementary Material), the coefficient has a similar value (0.62 and 0.73) but is only significant in
31 models 2 and 5.
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41 The most consistent name group effect in Table 1 is with respect to in-movers who have Pakistani
42 names who have a large and statistically significant acceleration effect – shortening the length of stay
43 of incumbent owners with white British names – across all 6 neighbourhood types (Models 1 to 6).
44 However, the coefficient on the squared term is significantly greater than one in Models 1, 2, 4 and 6,
45 which suggests the acceleration effect on white British owners diminishes quite rapidly as more
46 movers with Pakistani names enter the micro-neighbourhood. Inmovers from Indian name-groups
47 also seem to accelerate out-moves from white British owners, but the effect is less pronounced and
48 only statistically significant in models 1, 4 and 6.
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56 A high accelerant coefficient (0.05 * ownership length) was found for the ‘non-white other’ name
57 group, 79% of whom have Muslim names, in areas with low rates (1-5%) of non-white residents.
58 However, these areas were also characterised by high rates of younger people who move more
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frequently, with evidence of change from owner-occupation to the rental sector. The accelerant factor associated with in-movers from non-white other name-groups was far lower in areas with the higher proportions of non-white residents. Note that when we remove quadratic terms to simplify comparison of the overall effect of each variable (Table S6 in Supplementary Material) we find that the in-movers with ‘non-white other’ names tended to have the largest accelerant effect of any ethnic name group (average coefficient across models = 0.46), followed by in-movers with white Irish names (average coefficient across models = 0.57), and Pakistani names (average coefficient across models = 0.62).

6. Conclusion

We have reported results from a survival model of the length of stay of home-owners with names classified as white British in the 40% most deprived output areas in the Glasgow City local authority area. The analysis was based on properties which were transacted (bought or sold) during the study period 2003 to 2014. Our goal was to understand the drivers of ownership duration for owners who had white British (including Scots) names. We included control variables to account for homeowner affluence (using relative original purchase price as a proxy), housing type and market buoyancy. Our primary aim was to estimate the potential impact of buyers from particular ethnic name-groups moving within a 50 metre radius of existing white British home-owners during the previous year. Controlling for housing market variables and area-level tenure, we found the most consistent increase in the propensity of owners with white British names to sell was associated with in-moving purchasers that had names of Pakistani origin. This may indicate negative attitudes to this—primarily Muslim—ethnic group. We also found evidence of non-linearity in this relationship: the acceleration effect of the Pakistani name group on white British/Scottish homeowners diminishes with each additional in-mover from the Pakistani name group. Although less consistent across neighbourhood types, the largest overall accelerant effects¹¹ were associated with in-movers with ‘non-white other’ names, which are again, of mainly Muslim origin.

It should be noted that these findings apply only to *outmigrating* home-owners who *sold* properties during the study period. Homeowners who purchased before 2003 and did not sell until after 2011 are

¹¹ Based on a “linear” version of the model – i.e. with quadratic terms omitted—to simplify estimation of the “overall” effect.

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3 not included in our data. Note also that we have assumed that property owners are owner occupiers.
4 While for the majority of cases this is likely to be true (we excluded properties identified in the data as
5 commercial landlords), it is possible that a minority of transactions reflect landlord sales or
6 purchases.¹² It is conceivable, therefore, that our results are also picking up on the impact of landlord
7 purchases rather than in-moves from owner occupiers. Although the private rental sector in Scotland
8 remains small by international standards, it doubled in relative size during the course of our study
9 period, from 7.6% in 20013 to 14.8% in 2014.¹³ So, it is possible that property purchases by
10 landlords from particular ethnic name groups have an accelerant (decelerant) effect that has caused us
11 to overestimate (underestimate) the impact of *owneroccupiers* from those name groups. Finding ways
12 to isolate landlord effects would therefore be a useful avenue for future work, particularly given the
13 growing importance of the private rented sector.
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23 There are various other ways our research could be extended. Having a more complete picture in
24 every time period of the proportion of owner-occupiers in each neighbourhood and micro-
25 neighbourhood would help contextualise the proportion of those selling within the whole area. Data
26 on the age and stage of life of buyers and sellers would also be valuable in helping to distinguish
27 homophily effects from other factors. Similarly, knowing country of birth of in-movers would help
28 researchers identify whether there is a different effect for first vs second generation migrants. Data
29 permitting, it would be worthwhile extending the analysis to other tenures and income groups. We
30 have focussed on the impact of in-movers on white British homeowners but what about the impact on
31 other homeowners and renters? While Wallace (2016) found that half of all people living in poverty
32 were homeowners, owner occupiers may nevertheless be atypical of those living in deprived
33 neighbourhoods. We would be interested, therefore, in learning how the effects vary across income
34 groups and across different ethnicities. We have focussed on deprived neighbourhoods but what
35 about more affluent areas? And how typical are our results of other cities and time periods? Most of
36 these questions are beyond the scope of our current dataset, and so alternative data solutions would
37 need to be found.
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50 One of the novel contributions of our work has been to develop a dataset that permits estimation of a
51 spatially fine-grained survival model with time-varying covariates. Whilst the data has limitations, it
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55 ¹² This is because of the predominance of small private landlords in Scotland which are less likely to
56 be flagged up in our data as commercial companies.

57 ¹³ <https://www.gov.scot/Topics/Statistics/Browse/Housing-Regeneration/TrendDatat>
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3 potentially opens up many new avenues for further research and methodological innovation that
4 would broaden and enrich our understanding of ethnic mover dynamics. For example, it may be
5 possible to exploit recent innovations in Bayesian estimation to develop a spatial-multilevel survival
6 model of duration of stay (e.g. extending the Bayesian spatial-multilevel modelling approach of Dong
7 *et al.* 2016). This would allow researchers to estimate a survival model that allows both for the
8 hierarchical spatial structure of the data and for spatial correlation within and between areal units. A
9 spatial-multilevel approach could also estimate spatial variation in the relationship between the
10 proportion of neighbouring in-movers around individual households and the output area rate of the
11 same ethnic group. It would also be useful to test the impact on the results of adjusting this threshold,
12 though given the complexity of computing cumulative inflows of different ethnic name groups in
13 each micro-neighbourhood this would not be a trivial task. It might also be possible to use linkage to
14 older house transaction records to estimate the ethnicity of previous occupants, which would allow us
15 to examine the impact of the *change* in ethnicity of the occupier of individual dwellings in the micro
16 neighbourhood. It would also be worthwhile following up a sample of out-migrants to find out where
17 they've moved to—do they move to less diverse neighbourhoods, for example? However, such
18 analysis would only be feasible for those who stayed in Scotland and immediately purchased another
19 property (matches could then be made on the basis of names and dates of sale/purchase).

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33 Unobserved heterogeneity of individual characteristics such as age, gender, country of birth etc is
34 another limitation of the current model. However, our novel dataset offers the possibility of imputing
35 gender for many names using name-matching lists for some, but not all ethnicities. Using ethnically
36 diverse British birth registration data could also be explored. A much wider range of variables could
37 be added through data linkage with Census based data, such as the Scottish Longitudinal Study,
38 which would yield further information about individual and household characteristics. Further
39 research with additional data on individual home-owner age and family type would also be required
40 to identify population replacement and other factors such as “aspirational” moves and the role of
41 other tenures.
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57 compiled by Registers of Scotland. For further information, please contact data@ros.gov.uk.
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Table 1. Survival Model for Homeowners with White British Names in Deprived Neighbourhoods (Quintiles 4 & 5) by 2011 Share of Non-white Population

	0 - 1% non-white	1 - 5% non-white	5 - 10% non-white	10-20% non-white	>20% non- white	>27% non- white
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Variables in the Model:	Time ratio	Time ratio	Time ratio	Time ratio	Time ratio	Time ratio
Market buoyancy	0.62***	0.65***				0.48**
Relative price		1.97***	1.29***	1.68***	1.16***	1.65***
Relative price ²		0.85***		0.88***		0.91***
Flat (ref = house)	0.83***		0.92*			0.8**
Cumulative inmoves:						
Proportion white Brits	0.63***	0.603***	0.63***	0.60***	0.75***	
Prop'n white Irish desc't	0.72**	0.630***	0.56***	0.23***	0.49***	0.5***
Prop'n Indian descent	0.38***			0.42***		4.7**
Prop'n Pakistani descent	0.17**	0.2***	0.58***	0.12***	0.15***	0.16***
Propotion Pakistani ²	5.75*	6.02***		25.6***		5.82***
Prop'n non-white other		0.04***		0.52***	0.50***	0.17***
Prop'n non-white other ²		26.5***				5.4**
2011 OA Share of:						
• white other				0.26**		
• Chinese				4.35*		
Constant term	395***	443***	205***	205***	235***	298***
Model Statistics:						
Constant	1.32***	1.34***	1.37***	1.42***	1.41***	1.40***
Nr of months in model	396366	624987	452979	432978	291338	139571

Nr of Property Sales	1277	2316	1702	1710	1237	603
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