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Immigration and the property market: Evidence from England and Wales

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Abstract:

This paper investigates the link between immigration and property markets in England and Wales. Evidence from fixed effects and shift-share-based instrumental variable regressions suggests that an increase in regional immigration, depending on the specification, either decreases prices at the lower end of the distribution up to the median or leaves them unchanged and has (almost) no effect on mean property prices or prices above the median. The evidence suggests that these findings can be explained through an interaction between the markets for rented and owned properties as well as through changes in the usage of housing space.

Keywords: Immigration; property prices; housing market; England; Wales
JEL Classification: J15; R21; R31

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Introduction

This paper investigates the link between immigration and property prices in England and Wales with a specific focus on the usage of housing space and the interaction of the markets for rented and owned properties. This topic has received a lot of public attention in a range of countries, For example, in the UK the impact of immigration on housing markets (and the availability of properties and their prices more generally) has received considerable attention in the public and the media. Cases in point are the comment made by home secretary Theresa May that a net migration of zero would lead British house prices to fall by 10% over a 20 year period (Johnson, 2012) or the more recent debates surrounding the UK government's "Help to buy" and "NewBuy" schemes introduced in the 2013 budget. I use census data from the 2001 and 2011 UK censuses combined with property price data from the UK Land Registry and account for the endogeneity of immigrants' location choice by using a shift-share-instrument, where current immigration patterns are instrumented using historical immigration pattern. Evidence from fixed effects and instrumental variable regressions suggests that an increase in regional immigration (a) increases the number of available properties, (b) decreases the number of property transactions, (c) depending on the specification either decreases prices at the lower end of the distribution up to the median or leaves them unchanged and (d) has (almost) no effect on mean property prices or prices above the median. I also provide evidence on mechanisms that might help explain these effects: (e) Natives move out of regions as immigration increases, even though migration still leads to population increases, (f) the number of persons per room increases with the share of immigrants, i.e., existing properties become more crowded, (g) immigration decreases the share of owner-occupiers and increases the share of households renting from private landlords, but not the share of households in social housing and (h) there appears to be a shift from larger properties

towards medium-sized ones, which can be a sign that owners split up larger properties such as houses to offer them on the renting market.

Much of the academic discussion on the impact of immigration has focused on wages.¹ In contrast, there is comparatively little evidence on whether and how immigration affects housing markets. Theoretically, an increase in (net) immigration into an area can go both ways: Firstly, immigration might increase the local population, which should increase the demand for housing and consequently property prices. Secondly, immigration might lead to an outflow of natives (see, e.g., Borjas, Freeman and Katz, 1997; Card, 2001; Borjas, 2003; Accetturo et al., 2014). This outflow might be to other areas within the same city and has been explained by immigration having an effect on natives' amenities (Accetturo et al., 2014). If this is the case, immigration into an area might actually decrease the local population, leading potentially to a decrease in the demand for housing, although the impact on the city level is more ambiguous. Thirdly, natives and immigrants might differ in their usage of existing properties (see, e.g., Carter, 2005, for some evidence from Canada). If, for example, immigrants are willing to accept more crowded living conditions, more people can live in the same housing stock, which should mitigate a potential increase in demand. Fourthly, immigrants and natives might differ in their willingness to pay for housing of a certain quality. If, say, recent immigrants care less about the standard of a property, home-owners might be less willing to invest in refurbishments or renovations, which could lower prices through a decrease in the quality of the

¹ See, e.g., the recent symposium in the *Journal of the European Economic Association* (Card, Dustmann and Preston, 2012; Manacorda, Manning and Wadsworth, 2012; Ottaviano and Peri, 2012; Borjas, Grogger and Hanson, 2012; Card, 2012; Dustmann and Preston, 2012).

housing stock. Fifthly, the extent to which an increase in housing demand will affect prices will also depend on the reaction of housing supply: If supply is inelastic, increases in demand will have a stronger effect on property prices than in a situation where the supply of housing is elastic. Finally, the extent to which immigrants are looking to rent rather than buy a property will also have an impact on the demand for rented vs. owned accommodation – although these effects might matter less in the long run.

Answering the question what impact immigration has on housing costs is important as it might represent an additional cost to natives (and earlier immigrants): Firstly, for households owning a property changes in property prices effectively represent changes in wealth, which might influence consumption (e.g., Disney, Gathergood and Hanley, 2010) or households' willingness or ability to borrow and take on debt (e.g., Disney, Bridges and Gathergood, 2010). Secondly, falling house prices might influence labor mobility by adding an additional cost of moving, namely having to sell a property at a comparatively low price or even taking a loss (see, e.g., Battu, Ma and Phimister, 2008, for an analysis of housing tenure and job mobility in the UK). Thirdly, if immigration increases property prices it might have a detrimental impact on prospective first-time buyers, in particular if the housing supply is relatively inelastic.

Empirical evidence on the relationship between immigration and house prices is comparatively sparse and focuses largely on the US: Saiz (2003) looks at Miami after the Mariel Boatlift led to an influx of Cuban immigrants (see Card, 1990, for an analysis of the labor market consequences). His findings indicate an increase in rents,

in particular at the low end of the market, relative to four comparison cities by 8 to 11% in the short run. At the same time, house prices appeared to drop – which he explains by an outflow of natives – and there was a short-run increase in the persons per bedroom. In a later study for US cities (Saiz, 2006), he finds that immigration shocks equal to 1% population growth increase average rents and housing values by approximately 1%. Ottaviano and Peri (2006) find a similar result for rents (and wages) in 160 American cities. Finally, Saiz and Wachter (2011) find evidence for the US that higher immigration into areas within cities leads to lower property prices, partially due to a native preference for segregation, partially due to other channels such as segregation along socio-economic lines. Evidence from Spain (Gonzalez and Ortega, 2013) indicates that an average annual increase in the share of migrants by 1.5% led to an annual increase in housing prices by 2% and to an increase by 1.2 to 1.5% in housing units, i.e., to an increase in housing supply. Accetturo et al. (2014) find evidence that immigration increases prices overall, but that these effects might differ between city quarters. The paper that is most closely related to this one is Sá (2015) who also looks at the UK. She uses annual data at the level of the local authorities for the years 2003 to 2010 and the same methodological approach as this paper. Her analysis focuses on interactions between the housing and the labour market. In particular, her results indicate that house prices dropped, which she attributes primarily to native out-mobility, in particular of individuals placed relatively high in the wage distribution.

In contrast this paper considers another mechanism through which immigration can affect the housing market, specifically differences in the usage of housing space and differences in tenure. I look at differences between the 2001 and 2011 censuses

(aggregated on the level of the 2001 local authorities). Like Sá (2015) I find evidence for native outmigration: An inflow of 100 immigrants into a local authority leads on average to an outflow of 34 natives. Despite the fact that this would still lead to a population increase, the number of property transactions appears to drop, while the number of properties that are available in a local authority increases. Similarly to Sá (2015), I also find a negative effect on property prices, in particular at the lower end of the property price distribution up to the median, although this finding depends to some extent on sample restrictions. Prices above the median appear to be unaffected. While these results appear to be puzzling at a first glance, they can be explained by findings related to property usage: First, an increase in immigration leads to an increase in the share of households living in more crowded conditions, i.e., a change in the number of people living in each available room. Secondly, we also observe a strong shift away from owner-occupiers to households living in (privately) rented properties, while the share of households in social housing remains more or less constant or drops. Finally, an increase in immigration leads to more households living in smaller properties and fewer households living in very large properties, which can be seen as a sign that property owners convert houses into apartments for the renting market. In a nutshell, even though immigration increases the population and consequently leads to more people needing accommodation, it also leads to a drop in the demand for owned properties as more people move into rented accommodation and existing housing is used more densely. As a result the prices for owned properties do not increase as well as the number of property transactions drop.

Data and estimation

I use two main data sources: Property prices are based on data from the Land Registry where every property transaction in England and Wales (including its price) needs to be registered. For 2001, this data is available on the local authority level from <http://neighbourhood.statistics.gov.uk/>. For 2011, the raw data was obtained from the Land Registry at <https://www.gov.uk/government/collections/price-paid-data> and aggregated at the level of the 2001 local authorities using the fact that the land registry data contains the exact address of each property. Data on immigration and housing usage comes from the 2001 and 2011 censuses. As several local authorities changed between 2001 and 2011, the data was obtained on the level of the local layer super-output areas used by the census (which are consistent over time) and then aggregated on the level of the 2001 local authorities.²

In terms of variables, the available data contains the number the 2nd, 25th, 75th and 98th percentile of the property price distribution in each region and year as well as the median and the mean price. Looking beyond the mean price is important in this context for the following reasons: The house price distribution in a certain area, say a local authority, depends on the price per m² of housing space and the way this housing space is distributed across properties. If immigrants change the way housing space is organized into properties, say because houses are converted into flats, you might see the average price per property go down even though the price per m² of housing space goes up. However, in this scenario you might also see an increase at the

² Lower layer super output areas (LSOAs) are spatial units used by the UK census to present data in a consistent way over time, while local authorities are administrative units that are part of the local government structure in the UK and fall between counties and parishes. LSOAs are relatively small spatial units: According to the Small Area Population Estimates by the Office for National Statistics, they have on average 1600 inhabitants. Local authorities are comparatively larger and usually encompass one larger city or larger, more rural areas. In 2001 there were 376 local authorities in England and Wales.

lower end of the property price distribution (as, say, the price for small flats goes up) while the top end of the property price distribution is unaffected.³

I also have information on the number of property transactions in a local authority in each year. The census data provides information on the local (overall, migrants and native) population. The census also contains information on the share of households with 0.5 to 1 and with more than 1 person per room in their property, the share of household living in properties of a certain size, the overall number of properties and information about housing tenure. Table 1 presents descriptive statistics.

(Table 1 about here.)

Estimation is based on the following basic estimation equation

$$y_{it} = \alpha_i + \delta_t + \tau * \text{immigrants}_{it} + \varepsilon_{it}, \quad (1)$$

where i indexes regions, t years, α_i is a local authority fixed effect, δ_t is a dummy for 2011 and τ is identified using the variation in regional immigration from 2001 to 2011. Standard errors are clustered on the local authority level.

In principle, one can think of three potential measures of immigration that might be relevant here: Absolute increases in the number of immigrants in a region or relative increases in immigration, i.e., an increase in the share of immigrants in the total population, where population could be either the current or the 2001 population. All of these measures will have slightly different properties: Using absolute numbers

³ The idea that immigration might have different effects across an outcome distribution was also used by Dustmann, Frattini and Preston (2013). However, the underlying mechanism in this case is very different. In Dustmann, Frattini and Preston (2013) the different effects across the distribution effectively arise from substitution in the labor market, whereas in this paper they (likely) come from property owners splitting up properties in different ways.

allows immigration to have an effect on the property market through an increase in population, but ignores the fact that the same number of immigrants might have very different effects depending on the population size of the local authority. Using the share of immigrants in the current population takes these differences in local authority population size into account, but automatically controls for changes in the overall population. The best measure is probably the number of immigrants relative to the 2001 population as it takes into account base differences in population size between local authorities, while at the same time avoiding to control for the population changes caused by an immigrant inflow between 2001 and 2011. In the following all three measures are used. In practice, the difference matters relatively little for any qualitative result. It is important to be clear that a one-unit increase in the immigration measure represents a fairly significant inflow of immigrants equal to about 1/15 of the existing local immigrant stock when looking at absolute numbers and about 1/9 when using shares.

A major concern with (1) is that the change in immigrants might be correlated with other (unobserved) changes on the regional level, such as economic conditions. This would introduce correlation between $immigrants_{it}$ and ε_{it} and would bias the estimates. The direction of the bias is a priori unknown as immigrants could be attracted to “cheap” regions that experienced negative shocks to property prices (leading to a downward bias in τ) or to economically prosperous regions with increasing property prices (leading to upward bias). In addition to the local authority fixed effects, which take into account time-constant regional factors such as local amenities, I also add government region * year effects to control for wider regional trends in property prices, such as the fact that London has a very different price development than the

rest of the country, and 2001 population decile * year effects to allow for different developments in (initially) more and less populated areas, for example, different trends in urban and rural areas.

Finally, this paper follows Saiz (2006), Ottaviano and Peri (2006), Sá (2015) and Gonzalez and Ortega (2013) in using the shift-share instrument originally introduced by Card (2001). The instrument effectively redistributes the nationwide change in immigrants of a certain nationality according to the initial distribution of immigrants of that nationality across regions, so that a region that is initially home to, say, 5% of all European immigrants would receive 5% of all new European immigrants that enter the country during the observation period. The idea underlying this instrument is that new migrants are more likely to settle in regions with a substantial immigrant population, which leads to a correlation between the initial share of immigrants and changes in the share of immigrants. Immigrant nationalities can be measured consistently between the 2001 and 2011 on a fairly broad level, e.g., Western Europe, Eastern Europe, Northern America, etc.

To give an example on how the instrument is constructed (ignoring nationality for ease of exposition): The number of immigrants in the census data increased from 4,550,799 in 2001 to 7,337,139 in 2011 (or by 2,786,340). A region that housed 1% of the migrants in 2001 (or 45,508) would then receive an additional influx of $0.01 \times 2,786,340$ immigrants over the period 2001 to 2011.⁴ This influx is used to

⁴ A more refined version would preferably use information on nationalities on an even more disaggregated level as in Card (2001), Saiz (2006), Sá (2015) or Gonzalez and Ortega (2013). Unfortunately, disaggregated nationalities beyond broad world regions are not available in the published census data, which rules out this method. Note that not using more detailed information on nationality effectively decreases the variation

construct a predicted number of immigrants – in our example $45,508 + 0.01 \times 2,786,340$ or 73371.4 – that is then used as an instrument for the (actual) number of immigrants (or used to construct a predicted share of immigrants that is then used as an instrument for the actual share).

The key assumption underlying the use of this instrument is that the initial shares are unrelated to any future changes that might affect immigrants' location decisions such as house price trends. This is generally more plausible the more time lies between the point in time when initial shares are measured and the point in time when the outcomes are measured. In this case there is unfortunately no data prior to 2001 available, which is hardly ideal. Using immigrants separated by nationality is helpful in this context though as two cities with the same share of immigrants in 2001 might experience differential trends over time as they differ in their composition of immigrants and might experience different inflows of immigrants due to different national migration inflows from abroad.⁵ Finally, the various fixed effects mentioned earlier might also help to attenuate eventual concerns.

Finally, the use of this instrument presumes that each region is too small to influence national trends. This might be questionable for regions with a fairly high initial share of the immigrant population in the UK. To attenuate these concerns I also present estimates where local authorities that were in the top decile in terms of their 2001 immigrant share are excluded. This change typically does not make a great deal of difference to the results.

in the instrument, which would work against finding a first stage, but would not be expected to cause any bias in the second stage.

⁵ I thank one of the reviewers for making this point.

(Table 2 and figure 1 about here.)

Table 2 presents first stage statistics for these estimates; figure 1 presents the first stage graphically. One can see that past migration patterns are predictive of current migration patterns across all specifications: Focusing on the preferred one that includes the various fixed effects, a 1 percentage point increase in the predicted share leads to a 0.47 to 0.98 percentage point increase in the observed share of migrants, depending on whether the current or the 2001 population is used, while an increase in the predicted number by 1 migrants is associated with a 0.859 increase in the observed number of migrants. The instrument is also fairly strong for the estimates using absolute numbers or immigrants relative to the 2001 population.

An interesting finding from table 2 is that the effects are always smaller when using immigrants as a fraction of the current rather than the 2001 population. To understand this differences it is useful to remember how each of these are defined in detail, while distinguishing between immigrants who entered the country before 2001 (I^E), post-2001 immigrants (I^N) and natives (N). From the perspective of 2011, the share of immigrants in the current population in a specific region can be expressed as

$$(I_{2011}^N + I_{2011}^E) / (I_{2011}^N + I_{2011}^E + N_{2011}) \quad (2)$$

We can rewrite (2) in terms of stocks in 2001 and changes from 2001 to 2011:

$$(I_{2011}^N + I_{2011}^E) / (I_{2011}^N + I_{2001}^E + D.I_{2001/11}^E + N_{2001} + D.N_{2001/11}) \quad (3)$$

If we instead use the 2001 population in the denominator, we get

$$(I_{2011}^N + I_{2011}^E) / (I_{2011}^N + I_{2001}^E + N_{2001}) \quad (4)$$

Comparing equations (3) and (4) reveals that the nominators are identical and any difference must be due to the denominators. The denominators in (3) and (4) differ in

two aspects, namely the change in pre-2001 immigrants from 2001 to 2011, $D.I^E_{2001/11}$, and the change in natives over the same period, $D.N_{2001/11}$. Smaller values for (3) relative to (4) imply that the sum of $D.I^E_{2001/11}$ and $D.N_{2001/11}$ is positive. Previous evidence on changes in the native population in response to immigration has been mixed: Over the same time period and for the same country Sá (2015) finds strong evidence of native outmigration in response to a migration inflow. Other evidence is more mixed: Card (2001) finds no evidence for an impact of native outmigration, Borjas (2006) and Saiz and Wachter (2011) find evidence for increased native outmigration, while Wozniak and Murray (2012) find evidence that, at least for some population groups, the native population increases in response to an inflow of immigrants. I am not aware of any evidence on the reaction of earlier immigrants to later inflows of immigrants. As my data does not contain the year of arrival in the UK for the immigrant population, I also cannot test these implications directly.

Results

Table 3 presents the basic relationship between immigration, the number of property sales and (log) property prices. The results clearly suggest no effect of immigration on property prices below and up to the median. There is some limited evidence for a potential price increase at the 75th percentile. Excluding the local authorities with the largest share of immigrants suggests a generally negative or zero impact on prices. The pattern of results is also relatively similar when looking at the various measures of immigrant inflows even though the magnitudes of these three effects are not directly comparable as the variables of interest differ. Depending on the sample used, this finding is somewhat consistent (although not fully comparable due to different outcomes) with Saiz (2003) who also found stronger effects for housing at the lower

end of the rent distribution. The fact that, if anything, more immigrants seem to lead to lower house prices is also consistent with the findings by Sá (2015) for the UK. More importantly, given the often expressed opinion that immigration is responsible for property price increases in the UK (see, e.g., the quote by Teresa May cited in the introduction), there is very little evidence that this is indeed the case. Furthermore, the results also suggest that the number of property transactions drops when more immigrants move into an area.

(Table 3 about here.)

One potential explanation for this finding that was also considered by Saiz (2003) or Sá (2015) is native outmigration: If natives try to leave the region in response to an increase in the number of immigrants, total population could drop leading to a decrease in the demand for housing. The impact of this decline in the native population might also depend on the economic situation of those leaving, which is essentially the explanation considered by Sá (2015). Another possibility is an increase in the supply of housing, i.e., in the number of available properties that is larger than the increase in demand as found by Gonzalez and Ortega (2013) for Spain.

(Table 4 about here.)

The evidence in table 4 suggests that the earlier result of native outmigration as in Sá (2015) is also found in the census data: An inflow of immigrants always leads to an outflow of natives, but at the same time still leads to an overall growth in the population. A possible caveat to note here is that natives could in principle react to

anticipated immigration inflows, including those based on past immigration patterns, which might invalidate this IV specification. Results for the overall number of properties in a region depend on the specification used but generally suggest either an increase, which might help to explain the price results, or no change in the sample where local authorities with high initial immigrant shares were excluded.

A reason why an immigration-driven increase in the population might not necessarily increase the number of property transactions and ultimately house prices is the existence of rented housing: If immigrants are more likely to rent accommodation instead of immediately buying (see, e.g., Saiz, 2003, for evidence on the impact of immigration on rents for the US), the impact of any increase in immigration might be felt more strongly on the market for rented accommodation than on the property market. In fact it is entirely possible that the observed outflow of natives combined with the aforementioned tenure patterns leads to a decrease in the number of people seeking to buy properties and to an increase in the number of people seeking to rent. One should note, however, that there could well be spillovers between the markets for rented and bought accommodation as property-owners at some point will face the decision whether to live in their property, sell it or rent (parts of) it out.

(Table 5 about here.)

The evidence in table 5 indeed suggests that an inflow of immigrants reduces the share of households living as owner-occupiers and at the same time increases the share of households living in privately rented accommodation. Unfortunately, there does not appear to be data on rents or waiting lists for rented accommodation that

would allow an assessment on how immigration affects the price of rented housing. Some of the point estimates appear to be very large at a first glance. However, one needs to keep in mind that a one unit increase in the respective immigration measure represents a very large increase relative to the respective mean, which puts these effects into perspective. Overall, the evidence above suggests that eventual increases in prices might very well be found in rents rather than house prices. The evidence effectively also suggests that there are not yet positive spillovers from increases in rents to increases in house prices.

Furthermore, there appears to be a drop in the share of households living in social-rented housing. This latter result could, however, simply be due to a (relatively) fixed supply of social housing – meaning that the number of households in social housing remains constant in the face of immigration – coupled with an increase in the population due to immigration. Ultimately, the observed reduction in the share would then be due to a relatively constant numerator (the number of households in social housing) and an increase in the denominator (the overall number of households).

A final possibility is that immigrants and natives differ in the amount of space they demand per person. Clearly, if immigrants are willing to accept more crowded living conditions, the number of people that can be housed in each property will change with an inflow of immigrants – in particular when accompanied by an outflow of natives.

(Table 6 about here.)

Table 6 presents some evidence on these conjectures. The evidence suggests that an inflow of immigrants indeed increases the shares of household living with more persons per room. Across all specifications, an increase in the number of share of immigrants increases the share of households living with 0.5 to 1 persons per room and in some specifications also the share of households with more than 1 person per room. Table 6 also suggests that an inflow of immigrants increases the share of households living in properties with up to 5 rooms at the expense of the share of households living in larger properties. A potential explanation is that property owners might be converting existing larger houses into smaller units that are more easily offered on the renting market.

Taken together, these estimates suggest that an increase in regional immigration has a negative effect on house prices as well as the number of property transactions in that region, even though it leads to population growth. These effects can be explained as, firstly, an increase in immigration leads to an increase in the share of households living in more crowded conditions, i.e., a change in the number of people living in each available room. Secondly, we also observe a strong shift away from owner-occupiers to households living in (privately) rented properties, suggesting that immigration might put pressure on the renting market, but less on the market for owned properties. Finally, an increase in immigration leads to more households living in smaller properties and fewer households living in very large properties, which can be seen as a sign that property owners convert houses into apartments for the renting market. In short, even though immigration increases the population and consequently leads to more people needing accommodation, it also leads to a drop in the demand for owned properties as more people move into rented accommodation and existing

housing is used more densely. As a result the prices for owned properties as well as the number of property transactions drop. It is important to be clear that all of these mechanisms would be expected to increase the supply of housing in the long run. However, there has been a consistent debate in the UK for the last few years about housing supply not reacting sufficiently to increases in demand. The above effects should be seen in this light, i.e., property owners reacting to an increase in demand in a situation where supply only adjusts in a fairly sluggish way.

Conclusion

This paper used census data from the 2001 and 2011 UK censuses combined with property price data from the UK Land Registry to investigate the link between immigration and property prices in England and Wales with a specific focus on the usage of housing space and the interaction of the markets for rented and owned properties. Evidence from fixed effects and instrumental variable regressions suggests that an increase in regional immigration (a) increases the number of available properties, (b) decreases the number of property transactions, (c) depending on the specification either decreases prices at the lower end of the distribution up to the median or leaves them unchanged and (d) has (almost) no effect on mean property prices or prices above the median. I also provide evidence on mechanisms that might help explain these effects: (e) Natives move out of regions as immigration increases, even though migration still leads to population increases, (f) the number of persons per room increases with the share of immigrants, i.e., existing properties become more crowded, (g) immigration decreases the share of owner-occupiers and increases the share of people renting from private landlords, but not the share of people in social housing and (h) there appears to be a shift from larger properties towards

medium-sized ones, which can be a sign that owners split up larger properties such as houses to offer them on the renting market.

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Table 1: Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
Share of migrants (actual, current population)	8.9	9.0	1.1	55.0
Share of migrants (shift-share predicted)	8.6	8.8	1.1	58.9
Share of migrants (actual, 2001 population)	9.2	9.7	1.1	63.3
Share of migrants (shift-share predicted)	8.7	9.3	1.1	64.7
Number of migrants (actual)	15,583	25,114	72	204,640
Number of migrants (predicted)	14,786	24,349	72	222,199
Property price, 2 nd percentile	54,001	31,689	4000	237,999
Property price, lower quartile	105,094	57,267	16,000	485,438
Property price, median	140,821	77,402	33,000	795,000
Property price, upper quartile	199,711	120,324	44,975	1,600,000
Property price, 98 th percentile	491,852	419,177	97,000	5,950,000
Property price, mean	170,701	107,049	36,673	1,340,224
Number of property transactions	2504	1742	16	18,744
Number of properties	62,368	40,954	1093	422,963
Number of natives	125,503	78,341	2070	815,827
Regional population	141,097	93,233	2153	978,987
Share of HHs with 0.5 to 1 person per room	25.7	4.4	17.0	42.9
Share of HHs with more than 1 person per room	1.6	1.6	0.4	16.0
<u>Share of households with (in %):</u>				
1 room	0.7	0.9	0.0	10.1
2 rooms	2.3	1.9	0.6	18.6
3 rooms	8.5	4.0	3.0	31.2
4 rooms	18.8	3.6	12.2	31.9
5 rooms	25.8	4.4	7.8	37.6
6 rooms	20.4	3.4	4.6	33.5
7 rooms	10.4	2.3	2.1	15.3
8 or more rooms	13.2	5.8	1.4	30.7
<u>Share of households in property, which is (in %)</u>				
Owned	68.7	9.7	24.4	88.5
Owned outright	32.1	6.7	7.8	48.0
Owned with mortgage or loan	36.3	6.5	10.0	52.8
Social rented	16.7	7.0	5.3	53.5
Social rented, from council	9.9	7.1	0.4	42.3
Social rented, from other	6.8	4.0	1.2	23.3
Rented from private	12.5	5.5	3.7	40.4
Rent free	1.8	0.8	0.7	9.7
Observations	752			

Notes: Each observation is a local authority. All prices are in £.

Table 2: First stage regressions

	Absolute numbers	As share of current population	As share of 2001 population
Local authority fixed effects and year effects			
Shift-share predicted immigrants	1.116*** (0.084)	0.859*** (0.195)	1.105*** (0.080)
First stage F-value (instrument)	178.197	19.453	188.954
Local authority fixed effects and region*year effects			
Shift-share predicted immigrants	1.041*** (0.133)	0.520** (0.263)	1.065*** (0.132)
First stage F-value (instrument)	60.971	3.906	65.030
Local authority fixed effects, region*year effects and population decile (in 2001)*year effects			
Shift-share predicted immigrants	0.859*** (0.129)	0.471** (0.220)	0.983*** (0.136)
First stage F-value (instrument)	44.145	4.588	52.241
Observations	752	752	752

Notes: Each cell is from a separate regression. ***/**/* denote statistical significance on the 10%, 5% and 1% level respectively. Coefficients, cluster-robust standard errors in parentheses.

Table 3: Immigration and property prices

	Absolute numbers (1000s)		As share of current population (0-100)		As share of 2001 population (0-100)	
	Fixed effects	IV	Fixed effects	IV	Fixed effects	IV
All local authorities						
	Ln property prices, 2 nd percentile					
Immigrants	0.001 (0.002)	0.001 (0.002)	-0.003 (0.005)	-0.006 (0.010)	-0.002 (0.004)	-0.003 (0.005)
	Ln property prices, lower quartile					
Immigrants	0.001 (0.001)	0.001 (0.001)	0.002 (0.002)	-0.005 (0.005)	0.001 (0.002)	-0.001 (0.002)
	Ln property prices, median					
Immigrants	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.002)	-0.002 (0.005)	-0.000 (0.001)	-0.001 (0.002)
	Ln property prices, upper quartile					
Immigrants	0.000 (0.001)	0.001* (0.001)	0.000 (0.001)	0.013* (0.007)	0.000 (0.001)	0.005** (0.002)
	Ln property prices, 98 th percentile					
Immigrants	-0.001 (0.001)	0.002 (0.002)	-0.007** (0.003)	0.000 (0.011)	-0.003 (0.003)	0.005 (0.005)
	Ln property prices, mean					
Immigrants	0.000 (0.001)	0.001 (0.001)	-0.001 (0.001)	-0.001 (0.008)	0.000 (0.001)	0.003 (0.002)
	# property transactions					
Immigrants	-46.213*** (14.215)	-71.386** (35.460)	-47.703*** (13.141)	-68.532 (72.674)	-33.427*** (10.435)	-30.894 (27.371)
Observations	752	752	752	752	752	752
Excluding local authorities with top 10% immigrant shares						
	Ln property prices, 2 nd percentile					
Immigrants	-0.003 (0.003)	-0.013*** (0.004)	-0.005 (0.005)	-0.023* (0.012)	-0.006 (0.004)	-0.020** (0.008)
	Ln property prices, lower quartile					
Immigrants	-0.000 (0.001)	-0.005** (0.002)	-0.000 (0.002)	-0.013** (0.006)	-0.001 (0.002)	-0.008** (0.004)
	Ln property prices, median					
Immigrants	-0.001 (0.001)	-0.004** (0.002)	-0.002 (0.002)	-0.010** (0.005)	-0.001 (0.001)	-0.006** (0.003)
	Ln property prices, upper quartile					
Immigrants	-0.000 (0.001)	-0.001 (0.001)	-0.000 (0.002)	0.002 (0.007)	-0.000 (0.001)	-0.001 (0.002)
	Ln property prices, 98 th percentile					
Immigrants	-0.003 (0.002)	-0.002 (0.003)	-0.007** (0.004)	-0.014 (0.009)	-0.005 (0.003)	-0.005 (0.006)
	Ln property prices, mean					
Immigrants	-0.001 (0.001)	-0.002 (0.002)	-0.002 (0.002)	-0.014* (0.007)	-0.001 (0.001)	-0.005* (0.003)
	# property transactions					
Immigrants	-21.344** (8.696)	-14.778 (10.578)	-23.333** (11.564)	28.919 (35.318)	-20.270** (9.051)	-0.252 (14.831)
Observations	676	676	676	676	676	676

Notes: Each cell is from a separate regression. ***/**/* denote statistical significance on the 10%, 5% and 1% level respectively. Coefficients, cluster-robust standard errors in parentheses. All estimates include a local authority-fixed effects, region*year effects and population decile (in 2001)*year effects.

Table 4: Immigration, regional population and supply of properties

	Absolute numbers		As share of current population		As share of 2001 population	
	Fixed effects	IV	Fixed effects	IV	Fixed effects	IV
All local authorities						
Number of properties (in 1000s)						
Immigrants	0.161*** (0.043)	0.237*** (0.050)	0.150* (0.079)	0.411* (0.226)	0.147** (0.061)	0.319** (0.126)
Regional population (in 1000s)						
Immigrants	0.624*** (0.115)	0.591*** (0.208)	0.889*** (0.225)	-0.490 (1.075)	1.144*** (0.164)	1.455*** (0.252)
Number of natives (in 1000s)						
Immigrants	-0.376*** (0.115)	-0.409** (0.208)	-0.992*** (0.156)	-2.291*** (0.694)	-0.459*** (0.115)	-0.409* (0.231)
Observations	752	752	752	752	752	752
Excluding local authorities with top 10% immigrant shares						
Number of properties (in 1000s)						
Immigrants	0.117*** (0.044)	0.030 (0.055)	0.142*** (0.049)	-0.004 (0.114)	0.099** (0.039)	-0.017 (0.057)
Regional population (in 1000s)						
Immigrants	0.522*** (0.109)	0.606*** (0.136)	0.609*** (0.122)	-0.663 (0.693)	0.716*** (0.089)	0.696*** (0.156)
Number of natives (in 1000s)						
Immigrants	-0.478*** (0.109)	-0.394*** (0.136)	-0.817*** (0.151)	-1.516*** (0.383)	-0.461*** (0.127)	-0.456** (0.229)
Observations	676	676	676	676	676	676

Notes: Each cell is from a separate regression. ***/**/* denote statistical significance on the 10%, 5% and 1% level respectively. Coefficients, cluster-robust standard errors in parentheses. All estimates include a local authority-fixed effects, region*year effects and population decile (in 2001)*year effects.

Table 5: Immigration and property ownership

	Absolute numbers		As share of current population		As share of 2001 population	
	Fixed effects	IV	Fixed effects	IV	Fixed effects	IV
All local authorities						
Share of HHs in owned properties						
Immigrants	-0.138*** (0.034)	-0.110** (0.044)	-0.447*** (0.057)	-0.451** (0.177)	-0.355*** (0.044)	-0.378*** (0.079)
Share of HHs in social rented properties						
Immigrants	-0.036* (0.019)	-0.063*** (0.024)	-0.055 (0.041)	-0.073 (0.150)	-0.067** (0.032)	-0.139** (0.066)
Share of HHs in social rented properties (council-owned)						
Immigrants	-0.058* (0.032)	-0.047 (0.038)	-0.111 (0.070)	0.103 (0.243)	-0.109** (0.053)	-0.082 (0.107)
Share of HHs in social rented properties (other)						
Immigrants	0.022 (0.022)	-0.016 (0.026)	0.055 (0.059)	-0.176 (0.159)	0.042 (0.046)	-0.057 (0.078)
Share of HHs in private rented properties						
Immigrants	0.157*** (0.022)	0.151*** (0.033)	0.450*** (0.051)	0.481** (0.199)	0.372*** (0.038)	0.440*** (0.074)
Share of HHs living rent-free						
Immigrants	0.002 (0.005)	0.003 (0.006)	0.018 (0.020)	0.004 (0.065)	0.020 (0.017)	0.034 (0.031)
Observations	752	752	752	752	752	752
Excluding local authorities with top 10% immigrant shares						
Share of HHs in owned properties						
Immigrants	-0.273*** (0.044)	-0.340*** (0.049)	-0.455*** (0.061)	-0.446*** (0.145)	-0.380*** (0.053)	-0.456*** (0.102)
Share of HHs in social rented properties						
Immigrants	-0.038 (0.023)	0.042 (0.029)	-0.076** (0.038)	0.160 (0.130)	-0.059* (0.030)	0.053 (0.054)
Share of HHs in social rented properties (council-owned)						
Immigrants	-0.072 (0.044)	0.013 (0.065)	-0.121* (0.070)	0.215 (0.223)	-0.100* (0.057)	0.063 (0.102)
Share of HHs in social rented properties (other)						
Immigrants	0.034 (0.037)	0.029 (0.054)	0.045 (0.068)	-0.056 (0.149)	0.041 (0.058)	-0.010 (0.103)
Share of HHs in private rented properties						
Immigrants	0.278*** (0.030)	0.253*** (0.041)	0.468*** (0.054)	0.270* (0.153)	0.379*** (0.048)	0.321*** (0.097)
Share of HHs living rent-free						
Immigrants	0.003 (0.010)	0.018 (0.018)	0.017 (0.025)	-0.006 (0.081)	0.024 (0.023)	0.054 (0.049)
Observations	676	676	676	676	676	676

Notes: Each cell is from a separate regression. ***/**/* denote statistical significance on the 10%, 5% and 1% level respectively. Coefficients, cluster-robust standard errors in parentheses. All estimates include a local authority-fixed effects, region*year effects and population decile (in 2001)*year effects.

Table 6: Immigration and room usage of properties

	Absolute numbers		As share of current population		As share of 2001 population	
	Fixed effects	IV	Fixed effects	IV	Fixed effects	IV
All local authorities						
Share of HHs with 0.5 to 1 persons per room						
Immigrants	0.135*** (0.013)	0.143*** (0.021)	0.356*** (0.036)	0.713*** (0.153)	0.294*** (0.032)	0.462*** (0.060)
Share of HHs with more than 1 person per room						
Immigrants	0.048*** (0.007)	0.015 (0.010)	0.115*** (0.014)	-0.030 (0.074)	0.089*** (0.014)	0.021 (0.029)
Share of HHs living in property up to 3 rooms						
Immigrants	0.029* (0.016)	-0.003 (0.018)	0.124*** (0.030)	-0.171 (0.187)	0.104*** (0.028)	0.017 (0.038)
Share of HHs living in property with 4 rooms						
Immigrants	0.027*** (0.007)	0.034*** (0.010)	0.102*** (0.029)	0.330*** (0.118)	0.074*** (0.021)	0.152*** (0.035)
Share of HHs living in property with 5 rooms						
Immigrants	-0.009 (0.010)	0.013 (0.014)	-0.016 (0.023)	0.321 (0.202)	-0.024 (0.022)	0.072* (0.037)
Share of HHs living in property with 6 rooms						
Immigrants	-0.015 (0.010)	-0.003 (0.014)	-0.080*** (0.025)	-0.023 (0.065)	-0.066*** (0.020)	-0.053* (0.031)
Share of HHs living in property with 7 rooms						
Immigrants	-0.005 (0.004)	-0.018** (0.008)	-0.016 (0.012)	-0.154*** (0.055)	-0.016* (0.009)	-0.079*** (0.024)
Share of HHs living in property with 8 or more rooms						
Immigrants	-0.026*** (0.008)	-0.022** (0.010)	-0.114*** (0.023)	-0.303** (0.125)	-0.072*** (0.021)	-0.109*** (0.030)
Observations	752	752	752	752	752	752
Excluding local authorities with top 10% immigrant shares						
Share of HHs with 0.5 to 1 persons per room						
Immigrants	0.225*** (0.026)	0.309*** (0.040)	0.376*** (0.033)	0.687*** (0.199)	0.304*** (0.037)	0.499*** (0.102)
Share of HHs with more than 1 person per room						
Immigrants	0.051*** (0.007)	0.037*** (0.008)	0.083*** (0.010)	0.060** (0.028)	0.067*** (0.009)	0.057*** (0.013)
Share of HHs living in property up to 3 rooms						
Immigrants	0.098*** (0.019)	0.095*** (0.020)	0.155*** (0.032)	-0.100 (0.210)	0.144*** (0.029)	0.091** (0.046)
Share of HHs living in property with 4 rooms						
Immigrants	0.051** (0.022)	0.092*** (0.026)	0.118*** (0.034)	0.365** (0.165)	0.084*** (0.031)	0.194*** (0.060)
Share of HHs living in property with 5 rooms						
Immigrants	-0.013 (0.020)	0.005 (0.022)	-0.002 (0.026)	0.303 (0.258)	-0.022 (0.025)	0.059 (0.055)
Share of HHs living in property with 6 rooms						
Immigrants	-0.040** (0.019)	-0.085*** (0.022)	-0.091*** (0.029)	-0.136** (0.060)	-0.083*** (0.026)	-0.143*** (0.045)
Share of HHs living in property with 7 rooms						
Immigrants	-0.017** (0.008)	-0.039*** (0.013)	-0.035*** (0.012)	-0.153** (0.070)	-0.025** (0.011)	-0.080** (0.032)
Share of HHs living in property with 8 or more rooms						
Immigrants	-0.079*** (0.017)	-0.068*** (0.017)	-0.144*** (0.028)	-0.278* (0.149)	-0.097*** (0.027)	-0.122** (0.050)
Observations	676	676	676	676	676	676

Notes: Each cell is from a separate regression. ***/**/* denote statistical significance on the 10%, 5% and 1% level respectively. Coefficients, cluster-robust standard errors

in parentheses. All estimates include a local authority-fixed effects, region*year effects and population decile (in 2001)*year effects.

Figure 1: Graphical representation of the first stage

Panel (a): Immigrant share (immigrants per current population)

Panel (b): Immigrant share (immigrants per 2001 population)

Panel (c): Number of immigrants

Notes: Each circle represents one local authority. The dashed line is from a least squares regression. See table 2 for coefficients.