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Immigration and House Prices under various Regional Economic Structures in England and Wales

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Abstract

This article estimates the impact of immigration on local house prices under various local economic structures in England and Wales. Typically, for the nation, newly arriving immigrants add to the overall housing demand; this would in general push up house prices when facing an upward sloping supply curve. However, sorting and native outmigration response to immigration may change the dynamics and impact at the "local" level, depressing house prices through income change. We use data on England and Wales to investigate the local house price effect of immigration when taking into account the local economic structure of the areas, particularly with respect to employment density and average socioeconomic profile of workers. We found that in high density of employment areas but with majority of the occupations in low skill sets, there is a negative house price effect led by immigrant inflows, and this might be due to a type of tenure "downgrade" in the area as immigrants increase the rate of free renting and squatting. Free renters are less likely to participate in the housing market themselves and an increase in the rate of this form of tenure could also reduce their mobility further, hence lead to lower level of housing stock turnover and transaction related renovation; as a result, both housing quality and house price fall. The evidence is in addition to the native flight argument typically found in the literature to explain house price depreciation led by immigration.

Keywords

Housing, Agglomeration/Urbanisation, Demographics, Economic Processes, Migration, Immigration, House Prices

Introduction

Immigrants affect the lives of locals through a variety of ways such as house prices, crime, competition for jobs, and educational and welfare resources; therefore, concerns about their potential negative impacts have become particularly acute during periods of increased migration flows. The article puts its focus on how immigrants impact on local housing markets under various regional economic structures, and several channels are empirically tested. So, how would immigration impact the housing market? Ostensibly, one might expect immigration to increase demand for housing, leading to price rises particularly in an economy with inelastic housing supply. While a positive house price effect might be expected at the macro level (Saiz, 2007; Sá, 2014), there are factors at work at the local level which might mitigate these impacts. The extensive literature on "white flight" (Saiz & Wachter, 2011; Sá, 2014; Braakmann, 2016), for example, suggests that the influx of an outside group into a neighbourhood can cause outflows of indigenous residents. In this case, the value of properties could be reduced by immigrants through a reduction in the area level aggregate income and/or neighbourhood stability (coherence). However, would the effect be prevalent throughout different types of local economies? In other words, would native people always respond to immigrant inflows by out-migration? The article considers the element of local economic structure from the perspective of employment density and the average socioeconomic profile (skill) of workers in that place. Using these two characteristics, four sub-region types are defined: the high density and high skill, the high density and low skill, the low density and high skill and the low density and low skill. Distinguishing areas along these lines may help us observe native and immigrant workers with distinct sets of preferences and behaviours which could potentially lead to alternative interaction – which does not have to be residential sorting or native flight. For areas with high employment density but jobs mainly in low skillsets, we provide some evidence such that immigrants may downgrade the tenure on average by increasing the rate of free-renting and squatting; the phenomenon may depress the general desire of a neighbourhood to demand more housing and contribute to the house price reduction. The existing literature has often focused on the residential sorting made by natives due to a homophily process – a general preference towards residing close to those who share similar ethnic backgrounds (Saiz, 2007; Saiz and Wachter, 2011), alternative processes may also happen such as accommodation sharing among immigrants and natives; in areas with high job density and low skills, mobility could be restricted to the nature of the employment type. House prices could be reduced as the area tends to hoard labours who lack channels to move elsewhere and the overall level of property transactions within the area could be reduced.

Therefore, the current paper seeks to address the gap in the potential economic process behind the immigration-house price link. In Section 2 we review the current literature, establishing the motivation for the actual analysis and for the method employed in the paper, In Section 3, we describe the set of

mechanisms which help shape our hypotheses. In Section 4 we set out the specific modelling strategy. Data description and summary statistics are provided in Section 5 and findings are presented in Section 6. Finally, we conclude in Section 7 with a brief summary of our findings and their implications.

Literature Review

With majority of the literature on immigration impact has focused on labour market outcomes (Card, 2001; Dustmann et al.; 2013), robust empirical estimation on house market effect of immigration has been found on the rise in recent years (Saiz, 2007; Akbari & Aydede, 2012; Gonzalez & Otega, 2013). Given that housing is an important sector in its own right, generating significant employment and trade through construction (Akbari and Aydede, 2012) and transactions-related industries (estate agency, surveying, conveyancing, and mortgage finance). So, the housing impact of immigration is potentially a significant component of the overall economic impact of immigration. Additionally, immigrants tend to cluster spatially due to their shared language, culture and life styles (Meen et al. 2016; Saiz 2006; Munshi 2003); therefore, they may collectively exert a considerably large influence in certain housing submarkets and regions (Saiz, 2007, p5). In the UK, the majority of immigrants concentrate in London boroughs: for example, in 2015, Harrow, Brent, Newham and Westminster all have the share of foreign-borns over 50%; outside London, local authorities such as Leicester, Luton and Slough also have an over 30 % share of immigrants (Source: Labour Force Survey). Overall, immigration in the UK as a fraction of the working population has risen from 8% in the mid-1990s to 16% in 2015. Meanwhile, seasonally adjusted average house prices have increased from £60,000 in 1995 to £215,000 in 2015 (Source: Land Registry Data), raising concerns about the impact of immigration on housing affordability, such as the claim by the Home Secretary that "without the demand caused by mass immigration, house prices could be ten per cent lower over a twenty-year period" (May, 2012). However, even if this claim could be substantiated at the macro level, it would bely a complex geography of varying house price effects at the local level potentially due to different dynamics of local economies. Why is local economic structure of areas important in examining the immigration impact on local house prices? Traditional argument has often indicated a native out-migration phenomenon which is responsible for a local house price reduction (Saiz and Wachter, 2011; Sá, 2014). Both theories and empirical studies show that house price depreciation is considered a premium that natives are willing to pay for segregation. However, the kind of native-immigrant interaction through residential housing market might not be saliently observed when areas are divided into different types of local economies. The article attempts to explore how the effect would vary over different local economic structures. Specifically, the level of employment density and average socioeconomic profile of the working age population are chosen to characterise the areas into different types of local economies. We consider these structures to be relatively fixed when compared to population movements. Therefore, native and

immigrant interaction through both the labour markets and the housing markets can be analysed jointly under the different types of local economies. We assume that individuals would self-select into the areas according to their own distinct set of preferences, motives and behaviours which would eventually lead to differing patterns of interaction; in turn, the influence on local house prices would be different. We are interested in testing these empirical relationships. Closely related work includes Braakmann (2016) who examined the house price impact of immigration at different price quantiles. It was found that house price is depressed only at the lower end of the distribution up to the median, but there is no impact on property prices above the median. His explanation is not limited to native out-mobility, but also the changing usage of housing space. In particular, existing landlords turn owner-occupied properties into flats to accommodate more immigrants. While our paper also used tenure usage of immigrants to explain housing value depreciation, it is a completely different channel; since we follow Sá to control for quality of housing in the model and to use quality adjusted house price index (including housing space, sizes and number of rooms etc.) instead of price paid data from the Land Registry, the possibility that housing values depreciate through a shrinkage of average size of the properties in a neighbourhood is eliminated in our set of explanations.

3. Mechanisms

The mechanism behind reduction in house prices often involves a native-immigrant interaction through the residential housing market. It was found that natives move out of a neighbourhood in response to an inflow of migrants, i.e. native flight (Borjas, Freeman and Katz 1997; Card 2001; Borjas, 2003; Saiz 2006). This is usually attributed to homophily - preference of residing close to those in the same ethnic group and/or socioeconomic group. Crucially, native outflow may alter the total income distribution of a neighbourhood, thereby affecting house prices. For example, if the number of natives who leave the area are greater than the number of migrants moving in, total income in an area would fall, leading to a reduction in housing demand and, given the housing market faces an upward sloping supply curve (Pryce, 1999; Barker, 2004; Bramley, 2008; Ball, Meen & Nygaard, 2010), house prices are reduced through an income effect. Even in the situations where the number of natives moving out are exactly displaced by the number of incoming immigrants, or the number of natives moving out are smaller than the number of immigrants moving in, if the new households tend to have lower income (relative to the more affluent native households), there could still be a reduction in the overall income in the area, leading to a fall in both housing demand and house prices. Beyond the mainstream channel through which house prices are affected by immigration, further research is needed regarding the role that area level job density and socioeconomic profile of the workers play in the immigration-house price link. To examine house price effect under various economic structures, the areas are classified using the skill distribution (socioeconomic profiles) of workers and the employment density of the areas. In this case,

we would have four subgroups, i.e. areas with high employment density and high skill professions, areas with high employment density but low skill professions, areas with low employment density but high skill professions, and lastly areas with low employment density and low skill professions. We investigate the house price impact of immigration in each of these subgroups and analyse why the effect would be different from each other. Three channels are sought to explain the differentials in the house price effect of immigration. The first one is on native out-migration response, the second one is about pressure on native wage and the last is on a kind of tenure and property type "downgrade". Pressure on native wage has been outlined in studies including Sá (2014) and Dustmann et al. (2013) in detail. Specifically, if immigrants reduce income of native people, the overall purchasing power of housing would be reduced therefore leading to a fall in demand in housing. House prices therefore drop. Perhaps, what's more interesting is the area level change in the form of tenure which could potentially explain housing value depreciation. Areas with high job density and less skilled workers tend to observe a higher rate of free renting (or squatting), but a lower rate of owner occupation as the purpose of stay is more likely to be employment focused rather than residence focused. Immigrants in this type of area are likely to cause a shift towards this form of tenure: on one hand, to stick close to their co-ethnic ties through accommodation sharing; on the other hand, to save costs on housing consumption as a result of lower income. When compared to their native counterpart (i.e. less skilled native workers) in high job density areas, their relative fewer ethnic/social ties elsewhere in the UK would limit and discourage mobility to search alternative opportunities; when compared to high skilled migrant workers in high job density areas, whose internal mobility are usually facilitated by employer organisations and educational institutions, their mobility and ability to gain information are also lower. Therefore, the group is unlikely to realise step changes in financial gains in the long run, which would potentially result in a persistently weaker housing demand which is perhaps one of many subsistence needs that has been compromised.

Overall, if immigrants lead to an increase in the rate of inflows of free-renters and social housing dwellers, they are likely to reduce house prices through: 1. overall reduced level of knowledge to participate in the housing market activities, therefore reducing housing demand; 2. overall reduced level of mobility, which in turn decrease the rate of housing stock turnover; therefore, further decreases transaction related housing renovations or upgrade, causing a subsequent drop in housing quality and house prices; Overall, we use data to provide some empirical evidence on residential sorting, wage competition and tenure "downgrade", in order to explain the differing impact of immigration on local house prices in different types of local economies.

Methodology

To examine the role played by area level employment density and skill characteristic in how immigrants affect local house prices and other housing market variables, the local authorities in England and Wales are divided into categories according to these characteristics. Specifically, the level of job density is used to capture employment density and also an index is derived to characterise the average socioeconomic ranking for each area. A base year in 2001 is chosen to mitigate the endogeneity problem as it is outside the study period between year 2003 and year 2010; therefore, these variables are treated as relatively fixed over time compared to other factors inside the model (Appendix P1). The two measures in algebraic form are:

$$A := \left(\frac{J}{Pop}\right)_{i,2001} \qquad (1)$$

The base year job density A is calculated using the number of jobs (J) divided by the local authority population (Pop) in 2001.

$$B := \sum_{i=1}^{8} \frac{S_i}{i} \qquad (2)$$

The skill index B is derived from the socioeconomic variable from NOMIS – Official Labour Market Statistics in 2001. The variable has 8 categories and it includes: higher managerial and professional, lower managerial and professional, intermediate occupations, small employers and own account workers, lower supervisory and technical, semi-routine occupations, routine occupations and never worked and unemployed. The variable is ordinal with the higher managerial and professional being the highest level of socioeconomic status and the never worked and unemployed category being the lowest level of socioeconomic status. So, the skill index is weighted average of the percentage population at each skill level; each level is weighted by its rank, such that the highest socioeconomic status is given the most weight while the lowest socioeconomic status is given the least weight. The index represents the average skill level for the area. In fact, it is also an indication of the average size of the businesses since not all companies would cover the full socioeconomic rank, i.e. many local trades would not have managerial positions. Overall, we first divide the local authorities into low and high employment density areas using the job density variable and then further incorporate the skill index to classify the areas in to high job density and high skill, high job density and low skill, low job density and high skill and lastly low job density and low skill areas. In each of these subgroups, we examine the immigration impact on local house prices and other housing market variables. To model house price impact of immigration, a spatial panel approach is used (Dustmann, Frattini and Glitz, 2008) and it involves a

first differenced two stage least squares (2SLS) specification with a settlement pattern instrumental variable to exogenously predict the immigration variable.

$$\Delta \ln(P_{iqt}) = \beta \frac{\Delta Imm_{iqt}}{Pop_{iqt-1}} + \gamma X_{iqt-1} + \phi_t + (\rho_i) + \Delta \varepsilon_{iqt} \qquad (3)$$

The model follows closely with that in Sá (2014). The regression shows the change in the log of the house price index is a function of the change in the stocks of immigrants as a percentage of local initial population, represented by $\frac{\Delta Imm_{iqt}}{Pop_{iqt-1}}$ and various other controls, represented by X_{iqt-1}. These include: the local unemployment rate, to control for local macroeconomic conditions; the share of the local population claiming state benefits, the crime rate which may affect housing demand; the number of dwellings divided by local population, to capture the level of local housing supply and an index capturing the average quality of housing in each local authority. The controls are lagged by one year to reduce the potential endogeneity between the controls and the immigration. The subscript q represents the subgroup in which the model analyses the effect: the set of results examines the effect in four subgroups using both the employment density and the socioeconomic characteristic. Potential explanations in why there are differing results in subgroups are searched. The model also incorporates time effects to capture the national trends in inflation and other economic variables. The instrument (IV) is formulated based on the past settlement pattern of different immigrant groups in each local authority. It is the dominant methodology in the economic literature on immigration impacts; notable works include Card (2001) and Saiz (2007). Bartel (1989) argued that immigrants in the U.S. tend to settle in areas where immigrant settlement is already strong. Immigrant networks are an important determinant of locational choices of new immigrants as they facilitate job search process and assimilation into a new culture (Munshi, 2003). In particular, the IV is defined as:

$$\frac{\sum_c \lambda_{cit_0} \Delta Imm_{it}}{Pop_{it-1}} \qquad (4)$$

where λ_{cit_0} is the share of individuals born in foreign region c who settle in local authority i in base year t_0; this provides a relative size of the network in each local authority from each ethnic group c with respect to the country as a whole. ΔFB_{it} is the change in the stock of immigrants from ethnic group c in the UK as a whole in year t. Therefore, $\lambda_{cit_0} \Delta Imm_{it}$ is the *predicted* change in the stock of immigrants from ethnic group c in year t that choose to live in local authority i. Summing across all ethnic groups would yield a measure of the expected change in

the total stock of immigrants in local authority i in year t. Specifically, 9 foreign regions are considered: Americas and Caribbean, Africa, India, Republic of Ireland, Other Middle East and Indian Sub-Continent, Asia, Antarctica and Oceania, Europe and other countries.

Data and Descriptive Statistics

We draw on a variety of data sources to estimate our model. The immigrant and native population information are obtained using a special licence version of the UK Quarterly Labour Force Survey (QLFS).

House price data at local authority level were based on Land Registry house price indices, which are seasonally adjusted and also correct for changes in the quality of housing. Socioeconomic controls such as unemployment rate, crime rate, and housing quality are collected from various sources including the QLFS, NOMIS, and Home Office, Department for Communities and Local Government and BHPS. This yielded a combined dataset of 170 local authorities spanning 8 years between 2003 and 2010.

Summary statistics are presented in Table 1, and more details on variable sources and construction are available in the Appendix section:

Table 1: Descriptive Statistics

Variable	Observations	Mean	SD	Min	Max
$\Delta Imm_{it}/Pop_{it-1}$	1190	0.002	0.043	-0.260	0.283
$\Delta N_{it}/Pop_{it-1}$	1190	-0.023	0.081	-0.274	0.536
Unemployment rate	1190	0.059	0.025	0.000	0.176
Δlog house price index	1190	0.035	0.089	-0.176	0.338
$\Delta Dwellingstock_{it}/onspop_{it-1}$	1190	0.004	0.002	-0.008	0.015
Benefits rate	1360	0.149	0.048	0.049	0.309
Crime rate	1360	102.59183	39.294	38.896	408.299
Dwelling stock/population	1360	0.434	0.036	0.114	0.537
Index of housing quality	1336	8.106	0.543	4.000	9.000

1. Results

Main Results – The Role of Employment Density and Socioeconomic Status

Table 2. Local House Price Effects Stratified by Employment Density and Socioeconomic Status

	Low Job Density, High Skill		High Job Density, High Skill	
	OLS	IV	OLS	IV
Change in Share of Immigration	-0.054	-0.215	-0.041	-2.276
	(-0.065)	(-0.507)	(-0.044)	(-1.940)
Observations	301	301	292	292
R_Squared	0.870	0.864	0.873	.
	Low Job Density, Low Skill		High Job Density, Low Skill	
	OLS	IV	OLS	IV
Change in Share of Immigration	0.002	-1.350	**-0.132****	**-0.797*****
	(-0.070)	(-1.364)	**(-0.065)**	**(-0.290)**
Observations	290	290	283	283
R_Squared	0.923	0.665	0.835	0.742

Notes. IV is the instrumental variable based on the historical settlement pattern of different country of origin groups. Both models cluster standard errors at local authority level and they are included in the parentheses. The local authorities are grouped into four categories using two characteristics – employment density captured by the number of jobs over population and a skill index derived from the socioeconomic characteristic of the area. Statistical significance is represented by star symbols where * indicates $p < 0.1$, ** indicates $p < 0.05$, *** indicates $p < 0.01$. The first stage coefficients for the immigration variable from top left to bottom right are 0.900**(4.54), 0.593 (44.33), 1.442 (10.84), 1.817*** (10.45) – First Stage F-statistics are displayed in brackets. The models are run without the set of socioeconomic controls.

When taking both employment density and socioeconomic characteristics into account, areas are divided into four categories: low job density but high skill, high job density and high skill, low job density and low skill and high job density and high skill. The house price effects of immigration are tabulated in Table 2. Specifically, house price reduction only took place in high job density but low skill areas, not in the rest of the types. An increase in the stocks of immigrants had led to a 0.8% decrease in local house prices. There could be several potential explanations behind the house price decrease in this type of areas. We offer three and provide empirical evidence on them.

(1) Native Out-Migration Response to Immigration

When stratifying the areas by employment density and socioeconomic status, the effect of immigration on native out-mobility has disappeared, differing from what's been found in both Sá (2014) and Braakmann (2016). This is not surprising because, when restricting areas by labour market characteristics, the mobility mechanism due to labour market competition is essentially taken out of the model. If in general, the average skill background of an area reflects the skill background of both natives and immigrants, within each labour market type, an

average low skilled native would have a lower likelihood to move out of the area in response to an average low skilled immigrant, perhaps due to their generally lower level of affordability of relocation; an average high skilled native would also have a lower likelihood of moving out in response to an average high skilled immigrant, perhaps due to the fact that natives and immigrants are not substitutes close enough to cause mobility adjustment.

The fundamental cause behind segregation is an ethnicity based and/or socioeconomic-status based sorting process. Now if we control for socioeconomic status of the areas in each cohort and assume it to be a relatively stable over our study period, both natives and immigrants have similar level of socioeconomic profile, and then one does not find robust evidence of native flight. However, this is not to say, ethnic preference does not play a role in segregation but it might be the case that the ethnicity factor is more salient when it is jointly considered with socioeconomic status of the immigrant group, or it might also be the case that if we consider a more micro/neighbourhood level estimation, we could find ethnicity preference to give more explanatory power for residential sorting.

Table 3. Subgroup Immigration Impact on Native Out-Mobility 2003-2010

Dependent Variable: Change in Share of Native Population				
	Low Job Density, High Skill		*High Job Density, High Skill*	
	OLS	IV	OLS	IV
Change in Immigration Share	-0.038	-0.586	0.152	0.063
	(0.103)	(0.603)	(0.180)	(0.317)
Observations	301	301	294	294
R_Squared	(0.125)	(0.010)	0.126	0.123
	Low Job Density, Low Skill		*High Job Density, Low Skill*	
	OLS	IV	OLS	IV
Change in Immigration Share	-0.310***	-1.913	-0.149	-0.683
	(0.102)	(1.740)	(0.137)	(0.457)
Observations	299	299	294	294
R_Squared	0.081	-	0.124	0.066

Notes. IV is the instrumental variable based on the historical settlement pattern of different country of origin groups. Both models cluster standard errors at local authority level and they are included in the parentheses. The local authorities are grouped into four categories using two characteristics – employment density captured by the number of jobs over population and a skill index derived from the socioeconomic characteristic of the area. Statistical significance is represented by star symbols where * indicates $p < 0.1$, ** indicates $p < 0.05$, *** indicates $p < 0.01$. The first stage coefficients from top left to bottom right are: 0.472* (1.64), 0.808* (5.05), 0.784 (1.32) and 1.550** (4.54). The models are run without the set of socioeconomic controls.

*Another IV specification is also used for robustness check which uses the gravity pull measure introduced by Saiz and Wachter in their 2011 paper. The IV is constructed based on the idea that future immigrant communities are more likely to be formed close to existing immigrant communities. Therefore, we can predict future immigrant inflows from the immigration level from the surrounding areas. However, this "proximity" instrument did not work as well as the settlement pattern IV hence we deem their results inconclusive. One reason we provide is that the size of area is very large that the immigration level in neighboring local authorities cannot be used to predict that of each incumbent local authority. Settlement decisions of residents may not take place at local authority level.

(2) Pressure on Native Wage

Robust evidence on the native wage argument in the context of UK could be found in Dustmann (2013). It is shown that natives at the lower end of the wage distribution often face competition against incoming migrant workers and these workers depress the wage of the local people by providing an extra supply to the existing labour force. Lower wage means lower overall income in an area therefore leads to lower demand for housing. House prices reduce through an income effect.

When searching for potential pressure on native wage in any of the density-skill subgroups, no robust evidence is found and it does not seem to help explain the house price reduction in high job density but low skill areas either.

Table 4. Subgroup Immigration Impact on Local Native Wage, 2003-2010

Dep. Var.: Change in log Median Native Wage				
	Low Job Density, High Skill		High Job Density, High Skill	
	OLS	IV	OLS	IV
Change in Share of Immigration	0.045	-0.067	-0.216	0.222
	(0.123)	(0.557)	(0.272)	(0.760)
Observations	301	301	294	294
R_Squared	0.044	0.041	0.110	0.058
	Low Job Density, Low Skill		High Job Density, Low Skill	
	OLS	IV	OLS	IV
Change in Share of Immigration	0.073	2.306	0.191	-0.368
	(0.129)	(2.103)	(0.121)	(0.605)
Observations	299	299	294	294
R_Squared	0.094	.	0.076	.

Notes. IV is the instrumental variable based on the historical settlement pattern of different country of origin groups. Both models cluster standard errors at local authority level and they are included in the parentheses. The local authorities are grouped into four categories using two characteristics – employment density captured by the number of jobs over population and a skill index derived from the socioeconomic characteristic of the area. Statistical significance is represented by star symbols where * indicates $p < 0.1$, ** indicates $p < 0.05$, *** indicates $p < 0.01$. The first stage coefficients from top left to bottom right are: 0.472* (1.64), 0.808* (5.05), 0.784 (1.32) and 1.550** (4.54). The models are run without the set of socioeconomic controls.

However, one may not rule out completely a negative impact on total income explanation. It is possible that the wage of existing immigrants is lowered by new immigrants. Since those who are at the charge of relatively abundant capital would divide up the existing job units and let the immigrants share the job but receiving a lower wage; the low-skilled new migrant workers become a strain upon joining the local businesses because those at the managerial level need to accommodate them but could not do so efficiently; the overall income could still decrease due to lower immigrant income, generating weaker demand for housing. The small counts of wage data on immigrants from the Labour Force Survey however makes it directly untestable: either on the impact of existing migrants income or on the "downgrade" of jobs.

(3) Tenure "Downgrade"

A more robust piece of evidence comes from the tenure "downgrade". When examining the impact of immigration on the percentage change in different forms of tenure, the results are tabulated as follows.

Table 5. Impact of Immigration on Local Growth of Different Forms of Tenure, 2003-2010

	Low Job Density, High Skill		High Job Density, High Skill	
	OLS	IV	OLS	IV
Owner-Occupied Tenure	0.814***	-0.490	0.465***	0.466
	(0.125)	(1.510)	(0.148)	(0.342)
R_Squared	0.311	.	0.199	0.199
Rent Tenure	0.523***	1.923	0.848***	0.799**
	(0.147)	(1.252)	(0.109)	(0.383)
R_Squared	0.230	.	0.450	0.449
Rent Free Tenure*	0.033**	-0.074	0.017	-0.075
	(0.012)	(0.098)	(0.017)	(0.085)
R_Squared	0.230	.	0.450	0.449
Observations	289	289	289	289
	Low Job Density, Low Skill		High Job Density, Low Skill	
	OLS	IV	OLS	IV
Owner-Occupied Tenure	0.493***	-2.245	0.575***	-0.179
	(0.175)	(3.015)	(0.157)	(0.647)
R_Squared	0.137	.	0.195	0.134
Rent Tenure	0.440***	0.529	0.608***	0.539*
	(0.115)	(0.960)	(0.142)	(0.319)
R_Squared	0.120	0.118	0.171	0.170
Rent Free Tenure*	-0.020	-0.003	0.007	0.094*
	(0.014)	(0.086)	(0.027)	(0.052)
R_Squared	0.075	0.072	0.072	.
Observations	251	251	252	252

Notes. IV is the instrumental variable based on the historical settlement pattern of different country of origin groups. Both models cluster standard errors at local authority level and they are included in the parentheses. The local authorities are grouped into four categories using two characteristics – employment density captured by the number of jobs over population and a skill index derived from the socioeconomic characteristic of the area. Statistical significance is represented by star symbols where * indicates $p < 0.1$, ** indicates $p < 0.05$, *** indicates $p < 0.01$. The first stage coefficients from top left to bottom right are: 0.900** (4.54), 0.593 (44.33), 1.442 (10.84) and 1.817*** (10.45). The models are run with the set of socioeconomic controls.*Rent free tenure also includes squatting.

Specifically, an increase in the level of immigration does not affect the level of owner-occupied tenure in any of the four areas. However, regardless of the skill level, the high job density areas see renting rise with around 0.8% increase in high skill areas and 0.5% increase in low skill areas. The differentiating feature lies in the form of rent free tenure (which also includes squatting). In low skill areas, a 1% increase in the stocks of immigrants led to around 0.1% rise in the form of rent free tenure, and this is not seen in high skill areas. Despite of its small magnitude, this could potentially be responsible for the house price reduction in this type of areas. This group of population stands a higher chance of being inactive, or working below a wage that could not afford them in the private rental sector. Not only they themselves have a very low demand for housing, but also it may reduce the incentive for those in contact with them to demand more housing, perhaps due to peer pressure. For instance, if your employee

has lived off freely from someone's place, it brings down your desire to demand more housing even it is financially viable for you. However, this is not empirically tested in this paper.

Conclusion

In conclusion, there is evidence of an around 0.8% decrease in house price in high job density areas with majority of the occupations in low skillsets. What's more, both native out-migration response and native wage depression could not explain the house price decrease. What's more, both native out-migration response and native wage depression could not explain the house price decrease. The authors attempted to seek alternative explanation and discovered that the reduction might be due to an average tenure "downgrade" led by inflows of immigrants. Immigrants are found to have a higher chance of renting freely from existing landlord or squatting. In particular, an increase in immigrant stocks equal to 1% of the local initial population has led to 0.1% increase in free renting and squatting in the high density and low skill areas; 0.5% and 0.8% increase in renting in low skill and high skill areas respectively. Their presence not only prices themselves out in the rental and owner-occupied sector, but also depresses the desire of other people to demand more housing in the area. The authors believe this is one of the causes for house price reduction in this type of area. In fact, if the native flight evidence was not found when stratifying areas according to employment density and socioeconomic profile of workers, it might suggest that segregation is more likely to take place along socioeconomic lines rather than ethnic lines, as the native flight effect disappears after we control for the socioeconomic ranking of the areas. Analogous findings were found in Saiz and Wachter (2011) indicating black and white residential segregation is more of a result of socioeconomic divide rather than a racial divide.

At a first glance, the division of areas along the lines of employment density and socioeconomic profile is rather crude. Even within each subgroup, area could still possess distinct urban structures which lead to further difference in native-immigrant interactions and migration patterns. Therefore, the empirical results found only provide support for some general mechanism that could be at work.

Another point worth noting is that the analysis is done under the framework of native and immigrant interaction. In fact, the two do not have to be treated as mutually exclusive groups,

i.e. impacts do not need to be only measured on natives' economic outcomes. If this were relaxed, one could speculate that native migrant workers from the bottom of the income distribution could also densify the area hence bring down the overall demand for housing. Of course, this should be subject to empirical test too.

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Appendix

A1. Relative Stability of Area Level Economic Structure

To illustrate the relative stability of the area level economic structure with respect to working age population change, we have plotted the average population growth, native and immigrant growths as well as socioeconomic and employment density over the study period 2004-2010. Although the measures are not directly comparable over magnitude, one can still see that immigrant labour growth exhibits much larger variation when compared to that of the area level socioeconomic profile and employment density. However, native population growth shows little variation over the years.

Average Population Change and Economic Structure between 2004 and 2010
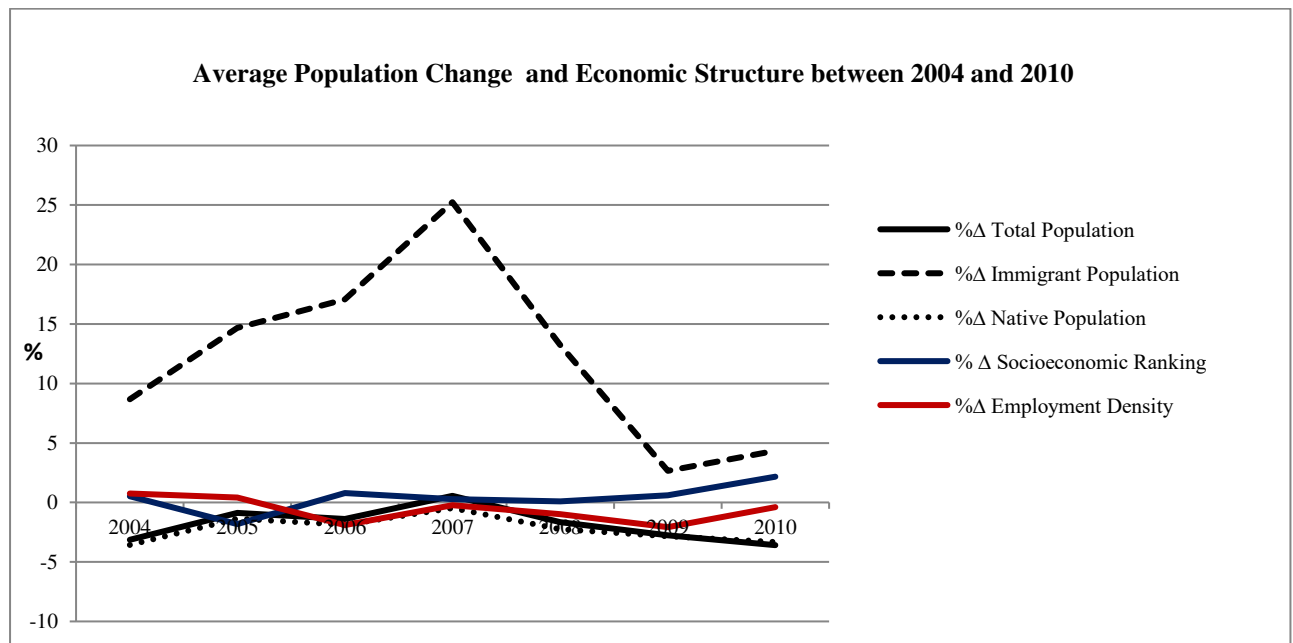
A2. The Validity of the Instrumental Variable

The instrument is formulated based on the past settlement pattern of different immigrant groups in each local authority. It is the dominant methodology in the economic literature on immigration impacts; notable works include Card (2001) and Saiz (2007). Bartel (1989) has argued that immigrants in the US tend to settle in areas where immigrant settlement is already strong. Immigrant networks are an important determinant of locational choices of new immigrants as they facilitate job search process and assimilation into a new culture (Munshi, 2003).

As mentioned before, for the instrument to be valid, it has to satisfy several identifying assumptions. First of all, the instrument should be uncorrelated with the error term in the model. After first differencing, the error term only includes the time effect (ϕ_t) and the random error (ε_{it}). The base year share, which captures the historical settlement pattern of immigrants, should be uncorrelated the current economic performance of each individual geographic area as well as the current level in national economic trends. This is a reasonable assumption

provided that the base year chosen is sufficiently "historical" as some shocks can be fairly persistent. Similarly, the annual change in the national stocks of immigrants should be exogenous to these two terms too, this is also a reasonable assumption as the total number of immigrants legally allowed in the UK is subject to strict level of immigration controls, despite the fact that there is a tendency for immigrants to come to the UK if the UK economic conditions become better. Secondly, the predicted change in the immigrant share should not have a direct effect on house price changes. It can only affect the dependent variable through the actual change in the stocks of immigrants (i.e. exclusion restriction). Although this is not directly testable, it is regarded as a sensible assumption as the base year is set to be 2001, which is 2 years before the start period of the analysis - 2003; therefore, it is unlikely to influence current house price change from 2003 onwards.

A3. Data Sources and Description

The dataset for analysis is a merge of datasets from various sources. Below, we describe each one more fully:

- *Population information*

The information on immigrants is gathered from the UK Quarterly Labour Force Survey (QLFS). The QLFS is a household survey which provides a unique source of information on employment, unemployment, occupation, training and other personal characteristics. The analysis looks only at yearly variation therefore all quarters of each year are pooled together. In order to examine the effect at the local authority level, an agreement is reached with the ONS to access the special licence version of the QLFS which the data contain local authority identifiers. The data for analysis will start from the first quarter of 2003.

In addition, the classification of immigrants is based on each person's country of birth. This is possible as the QLFS has self-reported country of birth question. Anyone who claims themselves to be born in England/Wales/Scotland/Northern Ireland/Other Parts of Britain not otherwise specified is classified as a native; otherwise he/she will be classified as an immigrant. The design of the country of birth question in QLFS is in line with the recommended output classification of ethnic groups for National Statistics data sources so that it is consistent with the one on the Census form.

- *House Prices*

House prices data at local authority level are from the Land Registry. The data include information on all residential property sales in England and Wales that are sold for full market value since January 1995, whether with cash or with mortgage. Throughout the sample period, i.e. from 1995 to the present day, there are already over 18.5 million sales recorded. From these sales data, an index is constructed using repeated sales regression. This index is seasonally adjusted and corrects for changes in the quality of housing. In this paper, it runs from the first quarter of 2003 to the last quarter of 2010. Details of the construction methodology could be found in Lim and Pavlou (2007) and the paper also discusses its limitation.

Seasonally adjusted standardised (corrected for quality) average house prices can also be constructed across local authorities from the index. It's calculated by taking the geometric mean price for each area in April 2000 and using the seasonally adjusted price index to compute average prices back to 1995 and forward to the present day.

- *Socioeconomic Controls*

The socio-economic controls (X_{it-1}) are placed in the equation to control for local authority level characteristics and they are lagged by a year to avoid endogeneity (potential correlation with immigration). Details of each individual control variable are explained in each subsection.

- *Unemployment Rate*

The unemployment rate controls the local macroeconomic condition and it is derived from the Quarterly Labour Force Survey. The unemployment rate is the share of the unemployed (using the ILO definition) as a percentage of the total working age population who are economically active.

- *Benefit Rate*

The benefit rate is the share of the local population claiming state benefits. The data come from NOMIS – service run by the ONS, providing official labour market statistics. The benefit rate is derived by dividing the number of claimants receiving any type of state benefits by the resident population aged 16-64 in each local authority. The state benefits include: carers allowance, disability living allowance, incapacity benefit, income support, pension credit, job seekers allowance, severe disablement allowance and widows benefits. The variable is derived from figures in May of each year.

- *Crime Rate*

The crime rate is the total number of offences per 1000 population; this variable is used as a control because it may affect the local housing demand. The crime data come from the Home Office and the population data come from the ONS. The figures are reported based on the financial year hence for example, year 2003 means the 12 months ending in 31st March 2013. There is no further disaggregation based on the offence type.

- *Dwelling Stock / Population*

The dwelling stock over population is used to capture the local housing supply. The data for dwelling stock in England are provided by the Department for Communities and Local Government. The dwelling stock estimates for Welsh local authorities are provided by StatsWales.

- *Index of Housing Quality*

The index ranges from 0 (indicating the lowest quality) to 9 (indicating the highest quality). It is constructed by adding up 9 indicator variables for housing quality attributes, including shortage of space, street noise, noise from neighbours, light, heating, dampness, condensation, leaky roofs as well as rot in windows/floors/doors. These variables come from the British Household Panel Survey (BHPS) which runs from 1991 to 2009.