The Effect of Immigration on UK House Prices

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This Dissertation is presented in part fulfilment of the requirement for the completion of an undergraduate degree in the School of Economics, University of Nottingham. The work is the sole responsibility of the candidate.

Abstract

This paper studies the relationship between immigration and UK house prices in the post financial crisis environment. The analysis utilises 80 local authorities across England and Wales from 2010 to 2016 to uncover how immigration influences another channel through which real income and wealth can change. Thus this paper contributes to our understanding of the effect recent immigration flows have had on the UK economy, exploiting a relatively novel methodological approach as well as the traditional approach within the literature to challenge the validity of estimates. IV estimates indicate that immigration has a negative effect on house prices and this study presents evidence that native out-migration in response to immigration flows is a crucial factor driving this result. Results are robust to the exclusion of London from the sample but System GMM estimation is only found to weakly support findings. Immigration is also found to have a limited effect on the housing supply yet interestingly reduces crime within a local authority. Thus this paper concludes that although immigration negatively impacted natives through house prices in the years after the financial crisis, with net migration expected to fall when the UK leaves the EU, UK homeowners could experience a positive wealth effect in subsequent years.

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1. Introduction

Immigration is a tremendously contentious topic in the UK which many believe significantly influenced the result of the Brexit Referendum in 2016. Yet what effect does it impose on a market responsible for consumption, debt holding and labour mobility – the housing market. Average house prices across England and Wales grew by 33% and 15% respectively from 2010-2016, whilst London saw the biggest increase across regions as average house prices heightened by 69% (UKHPI, 2018). Over the same period, net migration was also rapidly increasing in the UK reaching figures as high as 334,000 in 2015 as compared to 256,000 in 2010 (ONS, 2018). Graphs 1.0 and 1.1 depict the positive relationship between average house prices and net migration for England and Wales respectively.

Graphs 1.0 and 1.1 go about here

Nevertheless, is what appears a conspicuous relationship really as obvious as it seems? As past literature suggests otherwise, assuming a positive causation would be premature. Thus with immigration patterns likely to change post Brexit, providing an insight into the effect on house prices is not only intriguing but also extremely informative in times of uncertainty.

Therefore this paper investigates the effect that increasing immigration had on UK house prices in the post financial crisis environment, employing established techniques within the literature but also contributing with a relatively novel methodological approach. Firstly this entails estimating the relationship for 80 local authorities in England and Wales, assembling data from various sources to enable a study at such a disaggregated level. Well-accepted IV estimates are then obtained, instrumenting for the geographic distribution of immigrants based on historical settlement patterns. Despite this, traditional techniques are extended, exploiting System GMM estimation to challenge the validity of original estimates. Intriguing channels through which the effect may travel are then explored, observing unexpected and compelling results. Finally I examine the robustness of results, excluding London from the sample due to extreme observations of both house prices and immigration found in such a unique capital city.

With the exception of few estimates, this paper strongly supports Sá's (2015) findings of a negative relationship between immigration and UK house prices, with the main cause suggesting native displacement. This has alarming real income and wealth effects for homeowners in the UK, and potential gains from the expected fall in immigration due to Brexit in the following years to come.

The remainder of the paper is structured as follows. Section 2 reviews theories and existing literature on this relationship; Section 3 presents the empirical methodology and description of the data and statistics whilst Section 4 continues with the obtained results and discussions. In the penultimate Section 5, mechanisms are explored and robustness checks are carried out followed by Section 6 which concludes and provides potential implications of this study.

2. Review of Theories and Existing Literature

2.1 Theories of Immigration and House prices

Surprisingly the impact of immigration on house prices is ambiguous and thus compelling. One would expect that an increasing stock of immigrants increases the demand for housing and when combined with an upward sloping, inelastic supply (short-run) this would increase house prices (Saiz, 2007). Yet subsequent models go beyond unambiguously positive effects, introducing native preferences for immigrants and income effects in the demand for housing (Sá, 2015) to allow for a potentially negative effect.

This is because additional components to models allow for an offsetting native out-migration, which could occur for a variety of reasons. To begin with, natives might have negative attitudes towards immigrants due to a preference for cultural homogeneity (Accetturo *et al*., 2012). Moreover natives may anticipate changes in the quality of local public goods in response to increasing immigration, for example a lower standard of education (Saiz and Watcher, 2011). The labour market is also very influential on native mobility due to perceived wage effects. If natives believe that immigrants are substitutes for them in the production process, then those areas where immigrants settle become less attractive for natives due to additional competition (Kalantaryan, 2013). On the other hand, this effect

could work in the opposite direction, if natives and immigrants are complementary in the labour market areas of settlement become more attractive.

Nevertheless native out-migration is pivotal for the house price relationship because of said income effects in the demand for housing. It's argued important because those likely to leave an area are high wage earners and thus face less constraints to move (Sá, 2015). In turn this creates a negative income effect on the demand for housing and a consequential fall in house prices.

Interestingly whilst exploring immigration and house prices it becomes evident the relationship is characterised by spatial dependence (Mussa *et al*., 2007). Saiz (2007) indicates one of the facts which distinguishes immigration inflows from the general population growth is that immigrants are much more spatially concentrated than natives, likely due to immigration networks. Furthermore, spatial correlation is observed among house prices which is argued to arise due to shared local amenities (Basu and Thibodeau, 1998) - for instance the quality of police departments. This leads to prices of nearby local authorities being either relatively higher or lower depending on the region. As a result, panel data is most appropriate in this context, even more so when utilising local authority level data.

It's also necessary to consider that the choice of location where immigrants settle is affected by house prices, immigrants are not randomly allocated. This draws attention to the prominent endogeneity and reverse causality issue within the question, which the literature tends to solve through instrumenting for immigration. Immigrants may look for affordable housing where house prices are not growing as fast (Saiz and Watcher, 2011) or alternatively locate in prosperous areas with faster house price growth.

Lastly in theory, timing is an influential concept on relative housing values. Sá (2015) makes an intricate point that the response of house prices to immigration is smaller in cities where the supply of housing is more elastic. Additionally, Akbari and Aydede (2012) suggest immigrants typically buy housing after a period of residency whereas recent immigrants tend to rent. Correspondingly long differences are incorporated to study the timing of effect.

2.2. Review of Existing Literature

Research investigating the immigration and house price relationship has grown in stature yet failed to reach a general consensus; with various papers obtaining a positive, negative or even no effect. This research differs from the main body of literature surrounding immigration; the labour market impact. Results tend to be extremely difficult to generalise across country given the dissimilarities in conditions and different attitudes towards immigrants in the recipient country (Accetturo *et al.*, 2012).

Saiz (2003) led early research into specifically immigration and the US housing market taking advantage of the Mariel Boatlift as a natural experiment in line with Card's (1990) study, which focused on labour market outcomes. This entailed a mass emigration of Cubans to the United States consequently adding an extra 9% to Miami's renter population in 1980. Utilising a difference in differences approach, Saiz (2003) found that this unanticipated shock led to an increase in rents from 8% to 11% more in Miami than in the comparison groups between 1979 and 1981, also finding that during the same period relative housing prices went the opposite direction. This importantly illustrates the complexities of the housing market, caused by the interactions between the rental and buying market.

However this approach faces many difficulties. Firstly, it relies on suitable control groups because if not, different trends in the control group can generate spurious results. Secondly, it focuses on a largely unexpected shock to a particular housing market at a specific point in time, it's not generalisable. Therefore in search of generalisable results, subsequent advancements in methodologies have been made.

Saiz (2007) uses instrumental variable estimation based on a shift-share of national levels of immigration into metropolitan areas to cope with the endogeneity surrounding the question. Instruments used in successive literature are very similar, based on Bartel's (1989) notion that immigrants tend to locate near previous immigrants of the same country of origin. Consequently this also forms the basis for the instrumental variable I use. Findings of Saiz (2007) suggest a 1% inflow of immigrants to a city's population corresponds to a 3.4% increase in US housing values, where the positive relationship

is very robust across specifications. What's crucial to understand from this is immigration is said to create a larger impact on the housing market than the labour market, showing why it's paramount we understand such an effect. Nonetheless, this notably was a broad region study which do tend to find a positive effect.

Increasingly complex techniques are applied in Mussa *et al.* (2017) study to confirm this positive relationship in the US at the metropolitan area level (MSA).[1] They estimated the US housing market in a spatial econometrics context, using a Spatial Durbin Model to capture the direct and indirect (spillover) effects of immigration (captures the effect on prices of surrounding MSA's). A SDM is an advancement in spatial econometrics due to the way it can attribute marginal effects. Results point towards a positive direct yet even greater indirect effect of immigration, suggesting immigrants raise prices in surrounding MSA's. However since techniques for addressing causality are still underdeveloped in this context (Gibbons and Overman, 2012), this is a considerable limitation given that causality is key for the question.

A similar relationship is depicted in the European housing market. Estimating the relationship for 50 Spanish provinces from 2000 to 2010, Gonzalez and Ortega (2013) discovered a dramatically positive effect of immigration on the housing market. They enriched prior research, analysing housing construction as an avenue through which the positive effect travels. Over the decade, immigration flows were uncovered to account for half of the construction activity and responsible for a quarter of the increase in house prices. Although, interpretations should follow a cautious approach, since the sample includes the housing bust which likely caused extreme variation and negative net foreign migration.[2]

Nevertheless, Kalantaryan (2013) also found a positive effect within Europe, uniquely exploiting a different methodological approach for the Italian housing market. Difference and System GMM techniques were adopted to address concerns over the reliability of estimates obtained by first difference estimation. Lagged values of immigration are proposed as instruments to manage the potential endogeneity, which confirm the positive effect obtained by original estimation. Alternatively to existing

[1] 282 MSA's were used from 2002-2012.
[2] Though results do hold for the 2000-2008 period.

literature, a non-linear relationship was also observed, suggesting increasing the concentration of immigrants in the Italian provinces has a positive but declining effect on housing values. This is argued to follow a similar relationship to what is observed in the Italian labour market revealing a contrasting interaction to before. Though it's important to note self-reported house prices from 1996-2007 were used, a data limitation since it trusts the occupier to have perfect knowledge of the dwelling value.

Conversely the positive relationship is not supported by the whole literature, a small or negative effect is realised in alternative studies. For instance, Akbari and Aydede (2012) provided an insight into the rapid increase in house prices in Canada before the financial crisis, considering immigration as an alternative to the low interest rate argument. They conducted a comprehensive econometric analysis based on panel data of 258 provincially legislated census divisions obtained from the 1996, 2001 and 2006 population censuses. Utilising a within fixed-effect model and a between-effect model they conclude a positive but limited impact of immigration on Canadian house prices – implying it's only those who came more than 10 years ago that have a significant impact on prices. Notably this study uses census data. Measuring a change over such a long time period allows for the housing supply to react to changes in demand as it is more elastic in the long-run. Thus it is examining long-run effects and expected that immigration would have a smaller effect on housing values.

Similarly, Braakmann (2016) uses 2001 and 2011 census data to investigate the immigration and property price relationship in the UK. He specifically focused on housing usage and the interaction between the markets for rented and owned properties. Fixed effects and IV estimation suggests increased immigration decreases property prices at the lower end of the price distribution but leaves them unchanged otherwise. It's said that increases in the share of immigrants lead to increases in the number of persons per room, decreases in the share of owner occupiers (more people renting) and a shift from larger properties to medium sized ones (splitting up houses to offer them for renting). What's unsurprising is to find a nullified effect on prices, due to the reaction of the housing supply from 2001 to 2011.

Therefore a decisive factor is the type of data used. Moreover the level at which the data is disaggregated appears to influence the sign of the relationship. Greater disaggregation allows for the substantial movement of the population at the lower level and an inconspicuous negative relationship.

Saiz and Watcher (2011) first detected a negative association between immigration and changes in US housing values whilst exploring within metropolitan areas. First difference and IV estimates both coincide to find a negative, significant relationship. This is consistent with the causal interpretation that areas with a growing immigration density face a slower housing value appreciation. They supported claims through identifying mechanisms through which the negative effect travels. Evidence implies native mobility and white flight, changes in the socio-economic composition of a neighbourhood and changes in the quality of amenities were leading causes. Accetturo *et al*. (2012) agree with the latter point. They find immigration inflows reduce house price growth within an Italian district compared to the city as it changes perceptions about the quality of their local amenities. In turn, native flight follows.

In line with Saiz and Watcher (2011), Sá (2015) also reports a negative relationship between immigration and house prices but for the UK, which is not unexpected since both employ data at the local level. With the exception of Bell at al. (2013) who examined the relationship between immigration and crime, prior UK studies had not examined immigration at such a disaggregated level which allowed her to uncover a deeper effect. Her conclusions appear to mirror those above; the negative effect is driven by a negative income effect on housing demand as immigrants cause native flight. However she also adds that the natives who leave first are at the top end of the wage distribution and results are mainly driven in local areas where immigrant education is low. Therefore in general there is no consensus over the main relationship, it appears contingent on the methodology, whilst the type of data is seemingly important.

3. Methodology and Data

3.1 Empirical Methodology

Through this paper, I first investigate the causal effect of immigration on UK house prices undertaking multiple estimation techniques. The ideal is that the different estimation techniques reinforce each other

to consolidate findings. Subsequently, I analyse the imperative mechanisms driving these startling effects.

The regressions analysis utilises balanced panel data, examining 80 local authorities over the period 2010-2016.[3] This is most appropriate whilst uncovering the effects of immigration on house prices given the spatial dependence as posited by theory.

The following model used to estimate the effect of immigration on house prices is:

$$\Delta \ln(HPI_{it}) = \beta \frac{\Delta immigrants_{it}}{population_{it-1}} + \gamma X_{it} + \phi_t + \rho_i + \varepsilon_{it}, \quad (1)$$

where the dependent variable $\Delta \ln(HPI_{it})$ is the change in the log of the house price index in local authority *i* between year *t-1* and *t*. The focal independent variable is the annual change in the stock of immigrants divided by the initial population. β captures the percentage change in house prices due to an annual increase in the immigrant stock equal to 1% of the initial population. The expected relationship between immigration and house prices is ambiguous as hypothesised by the theory.

In continuation, X_{it} is a set of socio-economic local authority variables which are influential on house prices. In alignment with Saiz and Wachter (2011), changes in socio-economic characteristics of the local authorities are not controlled for as they are endogenous to immigration, instead they're included as lagged levels. Routes through which the effect of immigration on housing values may travel are discussed at a later stage.

Thus X_{it} contains one year lags of the succeeding variables. The unemployment rate corresponding to each local authority is controlled for to capture the disparity in house prices due to contrasting macroeconomic conditions between areas (Kalantaryan, 2013). Additionally, the number of benefit claimants as a proportion of the local population is included alongside the local crime rate to account for housing demand components. To control for housing supply, the ratio of the number of dwellings to each local authority population is incorporated. Interestingly, the UK planning system significantly differs to those abroad through its tight restrictions on the supply of land (Cheshire *et al.*, 2014).

[3] Appendix 1.0 reports the randomly selected local authorities used by each region.

Consequently this not only makes for an intriguing control but also highlights the difficulties faced in generalising findings across countries. Lastly, an index of local housing quality is used to capture the general standard of housing in each local authority. From an ex-ante viewpoint, excluding housing quality, it's expected that increases in the socio-economic variables above all decrease house prices in the corresponding local authority. Graphs 2.0-2.4 show the individual relationships each control variable in X_{it} has with the house price index.

Graphs 2.0-2.4 go about here

Alongside these control variables are year dummies; used to capture trends in national inflation and other macroeconomic variables. Inclusion is necessary in order to greatly increase the explanatory power of the model, as seen in Kalantaryan (2013).

Observing the model is written in first-differences, time-invariant, area specific factors that could simultaneously affect house prices are differenced out. Moreover local authority dummies are required since the heterogeneity among local authorities is unlikely to be random yet likely correlated with independent variables (Akbari and Aydede, 2012).[4] Their inclusion in the model captures the different trends in house prices at the local authority level.

Finally, ε_{it} is the idiosyncratic error term. Standard errors are adjusted; they are heteroscedasticity-robust and clustered variance estimators are used to account for correlation within groups, although we assume independence across clusters (Akbari and Aydede, 2012).[5]

Before moving onto a description of the data and relevant statistics, potential problems of the topic are discussed followed by solutions. Interpreting apparent correlations as causal effects in this context is not straightforward. Given the spatial dependence across local authorities, the main two variables are likely to be correlated even in the absence of actual immigration effects. For instance due to the shared local amenities and other common fixed influences. Thus following the housing literature, the model is

[4] Hausman test p-value: 0.0155 – reject the null that the difference in coefficients is not systematic.
[5] Breusch-Pagan / Cook-Weisberg test for heteroscedasticity p-value: 0.0000 - reject the null hypothesis of homoscedasticity. Wooldridge test for autocorrelation in panel data p-value: 0.0000 – reject the null of no first-order autocorrelation.

estimated with the dependent variable in first differences eliminating the time-invariant, unique factors to each local authority that affect both immigration and house prices.

Escalating difficulties is that the direction of causality between immigration and house prices is unclear and the change in immigration might be correlated with other unobserved economic factors. Ultimately this is because the location decisions of immigrants is not random; itself is influenced by house prices. The direction of the bias is *a priori* unknown (Braakmann, 2016). On the one hand immigrants might locate in flourishing local authorities where house prices are growing quicker. On the contrary it's plausible that, controlling for economic conditions, immigrants choose cheaper locations where prices are growing slower.

Therefore to address this concern, in line with the literature I construct a 'shift-share' instrument for the distribution of immigrants based on historical settlement patterns and conduct two-stage least squares. Bartel's (1989) findings support this instrument suggesting that immigrants tend to locate near previous immigrants of the same country of origin. Crucial to success is the existence of networks, since they facilitate the job search, assist in obtaining credit, and generally ease the relocation to a foreign culture (Bauer *et al.*, 2002).

Explicitly, the instrument for the annual change in the stock of immigrants in a local authority over the initial population is specified as:

$$\frac{\sum_c \lambda_{cito}\, \Delta Imm_{ct}}{Pop_{it-1}}, \tag{2}$$

where λ_{cito} is the proportion of individuals born in foreign region *c* that live in local authority *i* in the base year t_0. This provides a representation of the network size from each foreign region in the local authorities. Furthermore ΔImm_{ct} represents the change in the immigrant stock born in foreign region c at the national level. This demonstrates why the instrument is intuitive; it generates variation at the local level through exploiting variation at the national level, which debatably is less endogenous to local conditions (Jaeger *et al.*, 2018). Combining the two terms $\lambda_{cito}\, \Delta Imm_{ct}$ generates the predicted change in the stock of immigrants from each foreign region in local authority *i* in year *t*. Once summed over all

foreign regions, a measure of the predicted change in the total stock of immigrants in the corresponding local authority in year *t* is obtained.[6]

The validity of the instrument relies on the vital assumption that the historical settlement pattern of immigrants is uncorrelated to any future changes that might affect immigrants' location decisions such as house price trends (Braakmann, 2016). This has more plausibility the greater the length of time between the initial shares and current outcomes. Therefore confidence in the instrument increases given that data to construct the instrument is from the 2001 Census. Taking this into account, past values of immigrant stocks are only indirectly correlated with changes in house prices through their relation with the present changes in the immigrant stock. Lastly, the exogeneity of the changes in the stock of immigrants at the national level to the economic conditions of immigrant cities is assumed – this is also conceivable since the overall number of legal immigrants should depend on political and administrative decisions (Sá, 2015).

However Jaeger *et al.* (2018) suggest that it's unlikely to identify the true short-run causal effect from the instrument if the spatial distribution of immigrant inflows is stable over time. This is since the instrument and ongoing responses to previous supply shocks are likely correlated. For this reason, as well as the fact that only using one instrument allows only exact identification, I'll also consider a different estimation technique.

Thereupon in line with Kalantaryan (2013), GMM estimation is utilised allowed by the approach developed by Arellano and Bond (1991), Arellano and Bover (1995)/ Blundell and Bond (1998). These dynamic panel estimators are general estimators developed for the subsequent situations. Firstly it requires that the panel has a 'small' T and 'large' N, the model is linear in parameters and that some regressors are endogenous. Furthermore the approach allows the existence of fixed individual effects as well as heteroscedasticity and autocorrelation within but not across individuals (Roodman, 2006). It endeavours to solve the potential issues of the question; specifically the unobserved local authority

[6] 11 foreign regions of origin are considered: EU, Other Europe, North Africa, Sub-Saharan Africa, Middle East, East Asia, South Asia, South East Asia, North America, Central and Southern America and Oceania – in accordance to new country groupings.

heterogeneity through the use of first differences and the endogeneity of variables utilising lagged values as instruments.

One could also follow the multiple instrumentation procedure proposed by Jaeger *et al.* (2018). This isolates the spatial variation arising from changes in the country of origin composition at the national level to separately estimate short-run and long-run effects. However due to substantial demands on the data, it is not used in this study but proposed as an avenue for future research.

Certain caveats of the question also need to be considered which are difficult to successfully manage. The nature of the dataset may result in measurement error as it does not include illegal immigrants who potentially have different distribution patterns across the UK. Moreover the omitted variable problem persists which could also undermine the reliability of estimates. For example, housing price dynamics may be influenced by unobserved factors, such as expected future amenities in a local authority improving which in turn increases house prices today (Kalantaryan, 2013).

3.2 Data and Descriptive Statistics

In the analysis, house price data is from the UK House Price Index (UKHPI) which is calculated using a hedonic regression and mix-adjustment. A hedonic regression considers a set of house prices and by considering their individual characteristics it calculates the underlying market price for each unit of characteristic (Lim and Pavlou, 2007). The UKHPI is calculated using Land Registry price paid data, it is reported monthly but I have averaged the index for each year. It is the only source of information on all property sales in England and Wales at the local authority level, consisting of more than 24 million definitive records since January 1995 (HM Land Registry, 2018).

Furthermore, immigration flows at the local level are sourced from the Office for National Statistics (ONS) who collect, analyse and disseminate statistics about the UK's economy, society and population (ONS, 2018). Specifically it exploits data from the UK LFS, a household survey covering all aspects of the labour market and providing a wide range of statistics. This survey compiles data on 100,000 individuals residing in the UK every quarter of the year, replacing 20% of the sample every quarter. As for the immigration instrument, the 2001 Census is used to obtain the historic geographical distribution

of immigrants. More information on the set of socio-economic local authority controls and their sources is reported in Table 1.0.

Table 1.0 and 1.1 go about here

Detailed descriptive statistics of the main variables used in the analysis are displayed in Table 1.1. On average, house prices in England and Wales increased 4.2% and 1.4% respectively per year over the period 2010 to 2016. However exploring results at a more disaggregated level finds significant variation across regions and through time. Unsurprisingly, among the regions, the largest yearly increase was recorded in London in 2014 where house prices rose by 14.5%. In contrast, the greatest decrease in house prices was recorded in 2010 in the North East, where in the recovery of the financial crisis prices fell by 4.4% (UKHPI, 2018).

Switching focus to immigration, the main variable of interest, the average yearly change in the immigrant stock across the local authorities equals 0.5% of the initial population respectively. London remains a key driver of results within the sample, as for the randomly chosen local authorities in London, the 2016 immigrant share of the population had increased on average by 15% respective to the 2010 share. The above highlights two thought-provoking points. Firstly, the correlation between house prices and immigration would indicate a clear, positive relationship ex ante. Secondly, it warrants the removal of London from the sample to examine the robustness of results. This is since evidence suggests London is driving much of the variation in the sample.

4. Results

4.1 Immigration and House Prices

Table 2.0 summarises the results of estimating equation (1). The dependent variable is the change in the log of the UK house price index and the explanatory variable of interest is the annual change in the stock of immigrants relative to the initial population. Given that the model is estimated in first differences, time-invariant, area specific factors that could simultaneously affect house prices are differenced out. As explained by the methodology, standard errors are cluster-robust. Furthermore, the

regressions include local authority and year fixed effects throughout specifications as stated necessary before.

Table 2.0 goes about here

Observing the OLS coefficients reported in columns (1) and (3) in Table 2.0, we perceive that the immediate effect of immigration on house prices is negative and statistically significant. However due to reasons presented previously, these coefficients cannot be inferred to be causal since immigration is believed to be determined within the model. To circumvent this issue, I've used historical settlement patterns to predict the distribution of immigrants in each period utilising the 2001 Census and subsequent foreign region flows.

As a result, the first stage regresses the change in the stock of immigrants in a local authority over the initial population on the predicted change in the immigrant stock over the initial population alongside other controls. Through examining the first stage of the main specification (4), the coefficient is 0.933 and is significant at the 1% level, which implies a strong correlation between actual immigrant flows and predicted flows from historical patterns.

Columns (2) and (4) of Table 2.0 report the instrumental variable results. The negative sign and greater magnitude (as compared to OLS) of the main independent variable appears robust to the inclusion of lagged levels of local socio-economic variables. Estimates suggest that an increase in the stock of immigrants equal to 1% of a local authority's initial population leads to a 3.8% reduction in UK housing values - significant at the 1% level. The upward bias of OLS (results are more negative under IV estimation) indicates a tendency amongst immigrants to locate in economically prosperous areas with increasing house prices (Braakmann, 2016).

Unfortunately an impediment of using only one variable for the believed endogenous immigration is that it allows only exact identification, excluding for the possibility of performing a Hansen overidentification test. Consequently we are limited in evaluating the validity of the overidentifying restrictions and thus the instrument as a whole. Nevertheless given the criteria available, the instrument

performs well appearing relevant throughout the respective specifications.[7] Moreover it is certainly correlated with immigration as the F-statistic is greater than 10 throughout indicating instrument strength (Staiger and Stock, 1997).[8]

It's also intuitive to consider that the full effect on house prices may not be instantaneous, it may magnify or erode in response to immigration over time. In line with Sá (2015), a lag of the change in the immigrant stock relative to the initial period is included as an additional independent variable. Results reported in column (5) imply the lagged variable has a negative and significant effect on house prices. The coefficient also suggests house prices do not completely adjust instantly in response to immigrant flows since the lagged effect is substantially larger in magnitude than the instant effect. Through testing the significance of the sum of the coefficients ($\beta_1 + \beta_2$) on the main variables of interest, we reject the null hypothesis that the sum equals to zero at the 5% level, revealing joint significance of the instant and lagged change in the immigrant stock relative to the initial population.

Alternatively an approach proposed by Saiz (2003) to investigate the timing effect that immigration imposes on housing values is to estimate the model utilising long differences (of both house prices and the immigrant stock) because otherwise, we may be underestimating the effect. Consequently socio-economic control variables are lagged accordingly. Columns (6) and (7) describe our long run effect where the dependent variable is the log of the UK house price index between years *t* and *t – 3* and the main explanatory variable is the change in the stock of immigrants between years *t* and *t – 3* relative to the population in year *t – 3*.

OLS results indicate only a slightly greater effect on house prices from immigration under long differences than short differences. More interestingly are the IV estimation results. The instrument is calculated utilising the same resources as before but now longer differences, instead of short, are taken of the predicted immigrant stock. IV estimates state that a change in the stock of immigrants equal to 1% of the local population during a three year period causes a 4.4% fall in house prices in the same

[7] Underidentification test p-value: 0.0043 – reject the null of underidentification.
[8] Kleibergen-Paap rk Wald F-statistic for main specification is 35.2 – F-statistic for robust options.

three year period. Compared to OLS, this is a much greater reduction in house prices over the period, albeit this magnified effect is in line with previous findings of Saiz (2003) and Sá (2015).

4.2 System GMM Estimation

Furthermore an additional estimation technique is used. GMM estimation is implemented in this context due to the validity of the historical settlement pattern immigrant distribution (IV) not confirmed by all tests.

Table 2.1 goes about here

To execute using lagged values as instruments discussed previously, it requires no autocorrelation in the error but some form of autocorrelation in the endogenous variables through time. The Arellano-Bond test, shown in columns (1) and (2) in Table 2.1, tests the absence of serial correlation. Serial correlation of order 1 is detected but we fail to reject the null of no serial correlation of order 2 which implies the set of instruments are only restricted to lags 2 and longer. If this were not the case, due to the estimated model not comprising of a lagged dependent variable as an explanatory variable, the set of instruments would require longer lags to be used.

As a consequence of the potential weak instrument problem 'Difference GMM' possesses under certain circumstances, meaning that untransformed lags are inadequate instruments for the transformed variables, Blundell and Bond (1998) propose a different 'System GMM' strategy. This solves the problem described directly above and further improves the efficiency of estimators which motivates the implementation of this strategy. This is important since GMM estimation is used in this context due to potential weaknesses of my original instrument. The validity of these additional moment conditions relies on the conditional stationarity of the endogenous variables and no serial correlation in ε_{it} (Kalantaryan, 2013).

Therefore the relationship between house prices and immigration is estimated applying System GMM, with findings also reported in Table 2.1. Columns (1) and (2) differ from the one-step to two-step approach, where two-step estimation weights the matrix obtained from the first part and is more asymptotically efficient. Both specifications find a negative effect of immigration on house prices but

it is only significant in the one-step approach at the 10% level. Consequentially System GMM estimation only supports prior findings to a limited extent, the negative effect found through OLS and IV estimation is not fully robust to all types of estimation techniques.

5. Mechanisms and Robustness Checks

5.1 Immigration and Native Population Growth

Nevertheless, exploring channels through which this negative effect could disperse, it's insightful to examine population growth. Although the UK-born have low emigration-rates and at the national level each additional immigrant adds approximately one to the overall population (Sá, 2015), at the local level there are considerable movements of natives that could potentially offset immigrant inflows.

Card (2001, 2007) estimated the hypothesised relationship for US cities, testing whether new immigrant flows significantly changes the native population. His latter study looked at changes in the total stock of immigrants, which is where subsequent estimation is focused. Slightly modifying Card's method to incorporate panel data, I estimate the following model:

$$\frac{\Delta Pop_{it}}{Pop_{it-1}} = \beta \frac{\Delta Imm_{it}}{Pop_{it-1}} + \phi_t + \rho_i + \varepsilon_{it}, \qquad (3)$$

The model is estimated for the existing panel using OLS and IV estimation (same instrument as before) since the equivalent endogeneity problem applies here; $\beta < 1$ is evidence of native displacement.

Table 3.0 goes about here

Results are recorded in columns (1) and (2) in Table 3.0. Highlighting the fact that both estimations return $\beta < 1$ and are statistically significant at the 1% is evidence in favour of native displacement. Peri and Sparber (2011) confirm Card's methodology produces consistently correct estimates, although suggest that it could be improved upon analysing equation (2) under a new dependent variable $\Delta Natives_{it}/Pop_{it-1}$ since this is a more direct test for displacement.

Thus the following model is estimated to check sensitivity of prior findings:

$$\frac{\Delta Natives_{it}}{Pop_{it-1}} = \beta \frac{\Delta Imm_{it}}{Pop_{it-1}} + \phi_t + \rho_i + \varepsilon_{it}, \quad (4)$$

Again, IV estimation is adopted as well as OLS, with results reported in columns (3) and (4) in Table 3.0. Observing results, OLS reports a coefficient of -0.168 suggesting that an increase of ten immigrants into a local authority creates a displacement of 2 natives, significant at the 10% level. However it is likely OLS produces an upwards bias, and findings cannot be interpreted as causal due to the determination of immigration within the model. Therefore in this sense IV estimates are superior, which finds a negative yet insignificant coefficient leading to inconclusive evidence of native displacement.

Emerging research in the UK is exploring this kind of 'white-flight' argument. This entails the white British population 'fleeing' cities following an influx of ethnic minorities. Saiz and Watcher (2011) find evidence of this in the US, suggesting natives pay a premium for living in predominantly native areas, although initial evidence of white flight in the UK is negligible (Understanding Society, 2018). Despite this, it certainly cannot be ruled out as a potential avenue as to why housing demand falls in response to increasing immigrant shares, especially when accounting for some evidence of native displacement above. Consequently this is a likely route the effect travels, increasingly so if the natives leaving high immigration areas are at the top end of the wage distribution as suggested by Sá (2015).

5.2 Immigration and Crime

Additional mechanisms also warrant exploration, one of particular interest is the effect of immigration on crime, since this could be an indirect channel through which the downward pressure travels. Slightly adapting Bell *et al*. (2013) model, which studied the possible crime effects following large immigration flows into the UK, I explore the following relationship for the same panel as before:

$$\Delta(Crime/Pop)_{it} = \beta \frac{\Delta Imm_{it}}{Pop_{it-1}} + \gamma \Delta X_{it} + \phi_t + \varepsilon_{it}, \quad (5)$$

where $(Crime/Pop)$ is the number of reported offenses divided by the local authority population and the main independent variable is as before. The model includes a set of local authority control variables,

time dummies and an idiosyncratic-error term.[9] Successively crime is divided into property and violent crime to observe a potentially varying effect. Since the model is estimated utilising first differences, area specific time trends are again controlled for. Due to the persistent endogeneity problem in which the location choice of immigrants could respond to unobserved factors that are themselves correlated with crime (Bianchi *et al*., 2012), the historical settlement pattern instrument is selected.

Table 3.1 goes about here

Table 3.1 provides us with the corresponding results, OLS and IV estimation results are reported in columns (1) and (2) for total crime in a local authority, (3) and (4) for property crime and (5) and (6) for violent crime. Surprisingly, OLS and IV estimates both suggest that an increase in the stock of immigrants actually reduces the (overall) crime rate within a local authority, significant at the 5% level. This negative relationship appears throughout specifications, mainly driven through the effect on property crime, although the significance of results doesn't hold when crime is disaggregated specifically into property and violent crime. This is similar to the conclusions of Butcher and Piehl (1997) who suggest immigrants are less likely to commit crimes than natives. Consequently we can perceive that house prices actually fell in spite of the reduced crime rate, indicating that other routes are of greater importance in driving the effect.

5.3 Immigration and Housing Supply

Following Gonzalez and Ortega (2013), I extend investigations beyond house prices analysing the impact immigration has on the dwellings stock. Equation (1) is adapted in the following way:

$$\frac{\Delta Dstock_{it}}{population_{it-1}} = \beta \frac{\Delta Imm_{it}}{Pop_{it-1}} + \gamma X_{it} + \phi_t + \rho_i + \varepsilon_{it}, \qquad (6)$$

The dependent variable is the change in the dwellings stock between years *t – 1* and *t* in local authority *i*, divided by total population in the last year to control for different area sizes. The explanatory side of

[9] Local authority control variables include log of the population, benefits rate, unemployment rate and the share of young adult population (16-39).

the model is as before, where X_{it} includes lagged levels of the socio-economic characteristics respective to each local authority. The same sample is used again.

Table 3.2 goes about here

The results, shown in Table 3.2, imply an insignificant effect of immigration on the dwelling stock, true across all specifications. These findings do not change when the log of the UK house price index is included as a lagged level. For results to be empirically robust we would expect that immigration would lead to fewer dwellings constructed. This is because immigration inflows create an outflow of the native population resulting in reduced local housing demand, reducing both construction and house prices (Sá, 2015).

Nevertheless, the housing supply is similar to house prices in the sense that it may take longer than one year to adjust to immigration so it is appropriate to estimate using long differences as before. Columns (5) and (6) show the estimates of the model in long differences. It's expected that the smaller sample will generate less accurate estimates but it's still important to envisage regardless. As with short differences, results remain insignificant so that we can infer that beyond the financial crisis, immigrants are not a telling factor on the construction of dwellings.

However we cannot ignore that increasing immigration may still effect housing usage. Braakmann (2016) examined changes in the usage of housing space to conclude that existing properties become more crowded following increasing immigration. This explains why housing demand may not rise as expected and is also a potential reason why we see a negative effect on house prices.

5.4 Exclusion of London

As mentioned earlier, it's intriguing to see whether prior findings are robust to the exclusion of London from the sample since it's expected such a prominent capital city renowned for extremely high house prices and a large immigrant stock will heavily influence results. Therefore equation (1) is estimated separating the main sample into two sub-samples, local authorities excluding London and London local authorities.

Table 3.3 goes about here

OLS coefficients, found in columns (1) and (3) of Table 3.3, become insignificant for the two samples so results are not robust in that sense.

IV estimation, found in columns (2) and (4), produces negative and significant coefficients across both samples, although results should be interpreted cautiously due to the instrument based on historical settlement patterns performing inadequately for the London sample. Here, predicted immigration flows do not appear to be correlated with actual immigration flows so the instrument appears weak. This is also prevalent in Sá's London sample, which is explained to be caused by the extensive public transport network in London creating easier travel links between immigrants from the same country of birth. In turn, this weakens the network effects which the instrument profoundly relies upon.

6. Conclusion

Research investigating the effect of immigration on house prices has considerably grown over the past decade. Understanding the economic impact of immigration in the UK is extremely important due to its controversial nature and the effect on the housing market remains a crucial aspect of this. Therefore this paper enhances our understanding of the effect of immigration by estimating the recent relationship between immigration and UK house prices utilising multiple techniques and further exploring the mechanisms driving results.

Summarising the results, immigration is found to have a significant, negative impact on UK house prices. Using data for 80 local authorities in England and Wales, results suggest that an increase in the stock of immigrants equal to 1% of the local population leads to a 3.8% reduction in house prices, confirming previous findings of a negative relationship for the UK. System GMM estimates weakly supports results but more importantly highlights steps taken to find alternative solutions for the endogeneity persistent throughout. Future literature should explore this method further or alternatively consider the multiple instrumentation procedure as a solution.

Exploring the mechanisms of the effect uncovers intriguing findings. Results on native population growth suggest native displacement is one explanation for the negative effect and fits the 'white-flight'

argument in the UK. Consequently future research should extend this, the relationship could be estimated separating natives into different cohorts; for instance into different skill levels to envisage where the effect is most prominent.

Unlike past literature, immigration is found not to be a telling factor on the construction of dwellings. However interestingly, immigration is found to reduce crime within a local authority drawing the conclusion that immigration induces a downward pressure on house prices in spite of lower crime rates. Therefore we can perceive from this study that immigrants are making natives worse off. Yet with net migration expected to fall when the UK leaves the EU, this could suggest UK homeowners experience a positive wealth effect in subsequent years.

Markedly, a caveat of this study but more so in the literature as a whole is the lack of exogenous variation in the models. Immigrant distribution patterns are believed to be influenced by house prices and also change the socio-economic neighbourhood variables highlighting the endogeneity issues which require solutions. If not solved for, the validity of estimates are weakened. Ultimately this supports the claim for future research to continuously explore and improve solutions where possible.

Finally it is necessary to take into account that the negative effect is found for the UK and it's difficult to generalise results across country. This is due to different conditions in the recipient countries but also the type of immigrant each country attracts may vary in a number of dimensions – for example in income or education. Consequently exploring different types of immigration is another important avenue for extension.

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8. Tables and Graphs

8.1 Descriptive Tables

Table 1.0: Socio-Economic Local Authority Control Variables

Variable	Source	Description	Hypothesised Impact on House Prices
Unemployment rate	Nomis, ONS	% of local authority population aged 16-64 that are unemployed. This helps to capture the macroeconomic conditions and uncertainty.	Negative – increasing unemployment rates will lower demand for houses
Benefits rate	Nomis, ONS	Number of claimants receiving any type of state benefit, as a proportion of local authority population aged 16–64. Alongside the crime rate, this affects housing demand.	Negative – the higher the proportion of population receiving benefits the lower the housing demand in the area
Crime rate	ONS	Total number of offences per 1000 population in each local authority.	Negative – the higher the crime in the local authority the lower the house price
Dwelling stock/population	Department for Communities and Local Government	Ratio of the number of dwellings to local authority population. This is included to capture the change in housing supply.	Negative – if this ratio increased, one would expect lower house prices
Index of housing quality	UK Data Service	The index varies between 0 (low quality) and 9 (high quality). It's comprised of quality attributes including space, energy efficiency, dampness, heating and attractiveness.	Positive – the higher the quality of a housing area the higher the prices

Table 1.1: Descriptive Statistics

Variable	Observations	Mean	SD	Min	Max
Δlog house price index	560	0.037	0.045	-0.055	0.191
$\Delta Imm_{it}/Pop_{it-1}$	560	0.005	0.007	-0.014	0.046
$\Delta Pop_{it}/Pop_{it-1}$	560	0.008	0.007	-0.021	0.039
$\Delta Natives_{it}/Pop_{it-1}$	560	0.003	0.005	-0.021	0.021
$\Delta(Total\ crime/Pop)_{it}$	560	-0.001	0.080	-0.039	0.025
$\Delta(Property\ crime/Pop)_{it}$	560	0.001	0.003	-0.007	0.017
$\Delta(Violent\ crime/Pop)_{it}$	560	-0.002	0.005	-0.033	0.042
$\Delta Dwelling\ stock_{it}/Pop_{it-1}$	560	0.003	0.002	-0.001	0.010
Unemployment rate	640	0.073	0.026	0.021	0.146
Benefits rate	640	0.143	0.045	0.059	0.271
Crime rate (number of offences per 1,000 population)	640	79.148	32.271	27.921	302.202
Dwelling stock/population	640	0.439	0.033	0.359	0.555
Index of housing quality	640	5.938	0.293	5.288	7.460

8.2 Results Tables

Table 2.0: Immigration and House Prices

	$\Delta \ln HPI_t$					$lnHPI_t - lnHPI_{t-3}$	
	OLS	IV	OLS	IV	OLS	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\Delta Imm_{it}/Pop_{it-1}$ (β_1)	-2.052**	-3.899***	-1.726**	-3.835***	-0.266		
	(1.012)	(1.120)	(0.791)	(1.141)	(0.735)		
$\Delta Imm_{it-1}/Pop_{it-2}$ (β_2)					-2.851***		
					(0.782)		
$(Imm_{it} - Imm_{it-3})/Pop_{it-3}$						-2.283***	-4.385***
						(0.721)	(1.174)
Socio-economic local authority controls in initial period (t – 1 or t – 3)	No	No	Yes	Yes	Yes	Yes	Yes
Coefficient of IV in first stage regression		1.086***		0.933***			1.199***
		(0.205)		(0.158)			(0.341)
Significance level for test $\beta_1 + \beta_2 = 0$					0.024		
Significance level for underidentification test		0.0267		0.0043			0.0198
Kleibergen-Paap rk Wald F statistic		28.2		35.2			12.4
Observations	560	560	560	560	480	400	400
R-squared	0.773	0.763	0.781	0.771	0.824	0.926	0.915

Notes. The dependent variable is the change in the log of the house price index in local authority *i* between year *t* and *t-1* (or *t-3)*, Δ indicates first difference. The main independent variable is the annual change in the stock of immigrants (or the change between *t* and *t-3*) divided by the initial population. The socio-economic control variables and their sources are described in Table 1.0. Regressions include year and local authority fixed effects. Standard errors that are heteroscedasticity-robust and clustered by local authority are in parentheses. The IV columns instrument the geographic distribution of immigrants using historical settlement patterns and subsequent foreign national flows.
***Significant at 1%, **significant at 5%, *significant at 10%.

Table 2.1: System GMM Estimation

	$\Delta \ln HPI_t$	
	One-step	Two-step
	(1)	(2)
$\Delta Imm_{it}/Pop_{it-1}$	-2.021*	-0.887
	(1.142)	(1.407)
Local authority socio-economic controls used	Yes	Yes
Observations	560	560
Number of Local Authorities	80	80
Hansen J	20.82	20.82
	[0.143]	[0.143]
Arellano-Bond test AR(1)	-4.37	-4.13
	[0.000]	[0.000]
Arellano-Bond test AR(2)	0.31	0.44
	[0.758]	[0.658]
Arellano-Bond test AR(3)	0.37	0.43
	[0.711]	[0.666]
Number of Instruments	28	28

Notes. The dependent variable is the change in the log of the house price index in local authority *i* between year *t* and *t-1*. The main independent variable is the annual change in the stock of immigrants divided by the initial population. Socio-economic control variables used are described in Table 1.0 and time dummies are incorporated. Standard errors are reported in round parenthesis whereas P-values are reported in square parenthesis.

***Significant at 1%, **significant at 5%, *significant at 10%.

Table 3.0: Immigration and Native Population Growth

	$\Delta Pop_{it}/Pop_{it-1}$		$\Delta Natives_{it}/Pop_{it-1}$	
	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)
$\Delta Imm_{it}/Pop_{it-1}$	0.832***	0.906***	-0.168*	-0.0942
	(0.0991)	(0.227)	(0.0991)	(0.227)
Observations	560	560	560	560
R-squared	0.801	0.800	0.628	0.627

Notes. Δ indicates first difference. Regressions include year and local authority fixed effects. Cluster-robust standard errors are reported in round parentheses. The IV columns instrument the geographic distribution of immigrants using historical settlement patterns and subsequent foreign national flows.
***Significant at 1%, **significant at 5%, *significant at 10%.

Table 3.1: Immigration and Crime

	$\Delta(TCrime/Pop)_{it}$		$\Delta(PCrime/Pop)_{it}$		$\Delta(VCrime/Pop)_{it}$	
	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Imm_{it}/Pop_{it-1}$	-0.180**	-0.173**	-0.113**	-0.0521	-0.0223	-0.0308
	(0.0689)	(0.0861)	(0.0538)	(0.0666)	(0.0233)	(0.0436)
Local Authority Control Variables Used	Yes	Yes	Yes	Yes	Yes	Yes
Observations	560	560	560	560	560	560
R-squared	0.435	0.435	0.246	0.243	0.493	0.493

Notes. The dependent variable is the number of reported offenses divided by the local authority population. Crime is then divided into property crime (PCrime) and violent crime (VCrime), Δ indicates first difference. The local authority control variables used are listed in footnote 6. Time dummies are incorporated and cluster-robust standard errors are reported in round parentheses. The IV columns instrument the geographic distribution of immigrants using historical settlement patterns and subsequent foreign national flows.
***Significant at 1%, **significant at 5%, *significant at 10%.

Table 3.2: Immigration and Housing Supply

	$\Delta Dstock_{it}/Pop_{it-1}$				$(Dstock_{it} - Dstock_{it-3})/Pop_{it-3}$	
	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Imm_{it}/Pop_{it-1}$ (β_1)	0.00207	0.0712	-0.00649	0.0722		
	(0.0492)	(0.0847)	(0.0479)	(0.100)		
$(Imm_{it} - Imm_{it-3})/Pop_{it-3}$					-0.0265	0.0638
					(0.0727)	(0.0954)
Log house price index in initial period	No	No	Yes	Yes	Yes	Yes
Observations	560	560	560	560	400	400
R-squared	0.533	0.522	0.534	0.522	0.803	0.792

Notes. The dependent variable is the change in the dwelling stock in local authority *i* between year *t* and *t-1* (or *t-3)* as a proportion of the initial population, Δ indicates first difference. The main independent variable is the annual change in the stock of immigrants (or the change between *t* and *t-3*) divided by the initial population. Regressions include year and local authority dummies and local authority controls in the initial period (*t – 1* or *t – 3*). Robust standard errors clustered by local authority are in round parentheses. The IV columns instrument the geographic distribution of immigrants using historical settlement patterns and subsequent foreign national flows.
***Significant at 1%, **significant at 5%, *significant at 10%.

Table 3.3: Exclusion of London

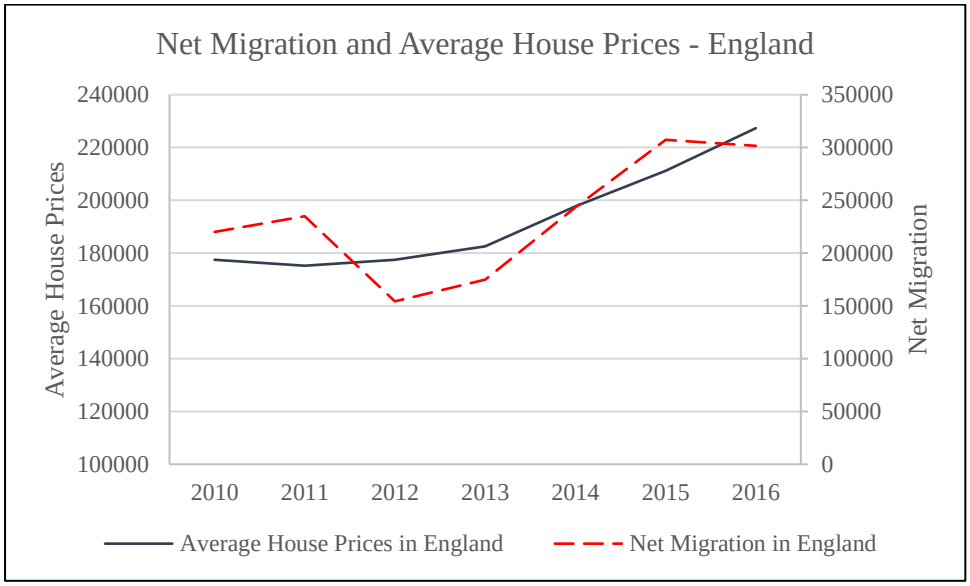
	$\Delta \ln HPI_t$			
	LA's excluding London		London	
	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)
$\Delta Imm_{it}/Pop_{it-1}$	0.529	-2.734**	-0.886	-11.47***
	(0.631)	(1.279)	(1.533)	(4.100)
Socio-economic local authority controls at t – 1	Yes	Yes	Yes	Yes
Coefficient of IV in first stage regression		0.785***		0.572**
		(0.205)		(0.323)
Significance level for underidentification test		0.0043		0.0382
Kleibergen-Paap rk Wald F statistic		14.8		3.15
Observations	504	504	56	56
R-squared	0.839	0.826	0.730	0.179

Notes. The dependent variable is the change in the log of the house price index in local authority *i* between year *t* and *t-1*, Δ indicates first difference. The main independent variable is the annual change in the stock of immigrants divided by the initial population. The socio-economic control variables and their sources are described in Table 1.0. Regressions include year and local authority dummies. Standard errors that are heteroscedasticity-robust and clustered by local authority are in round parentheses. The IV columns instrument the geographic distribution of immigrants using historical settlement patterns and subsequent foreign national flows.

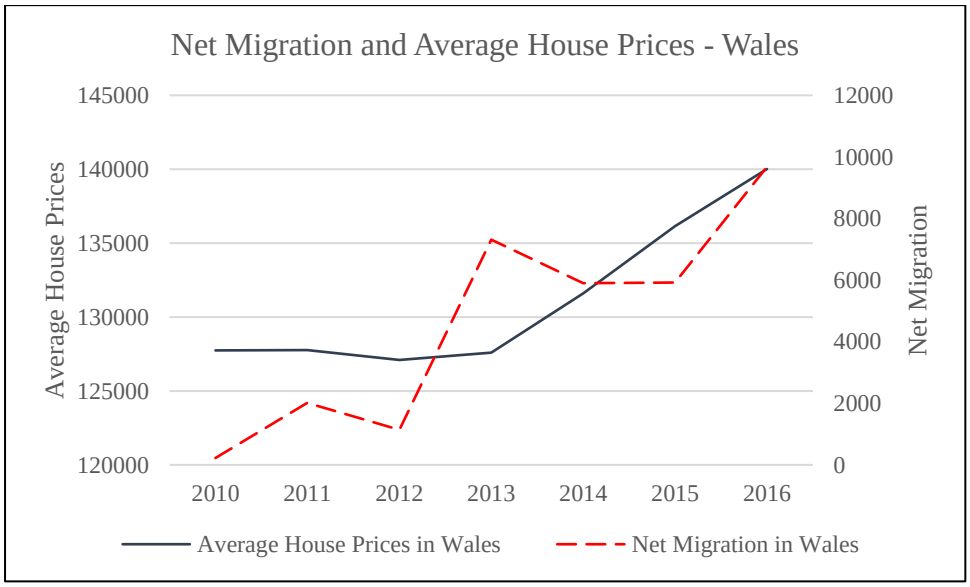
***Significant at 1%, **significant at 5%, *significant at 10%.

8.3 Graphs

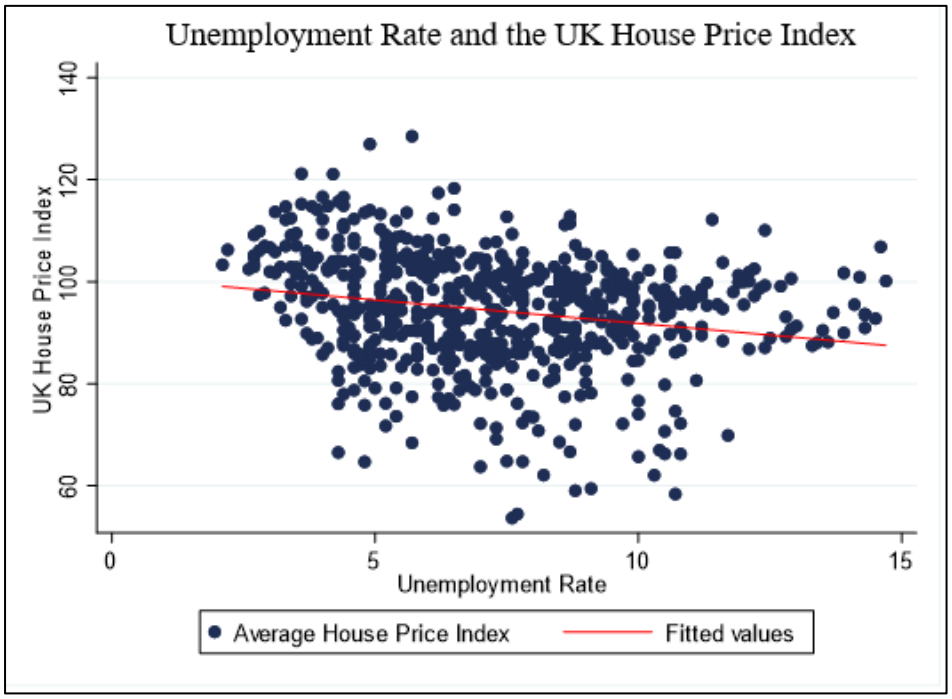
Graph 1.0: Net Migration and Average House Prices – England



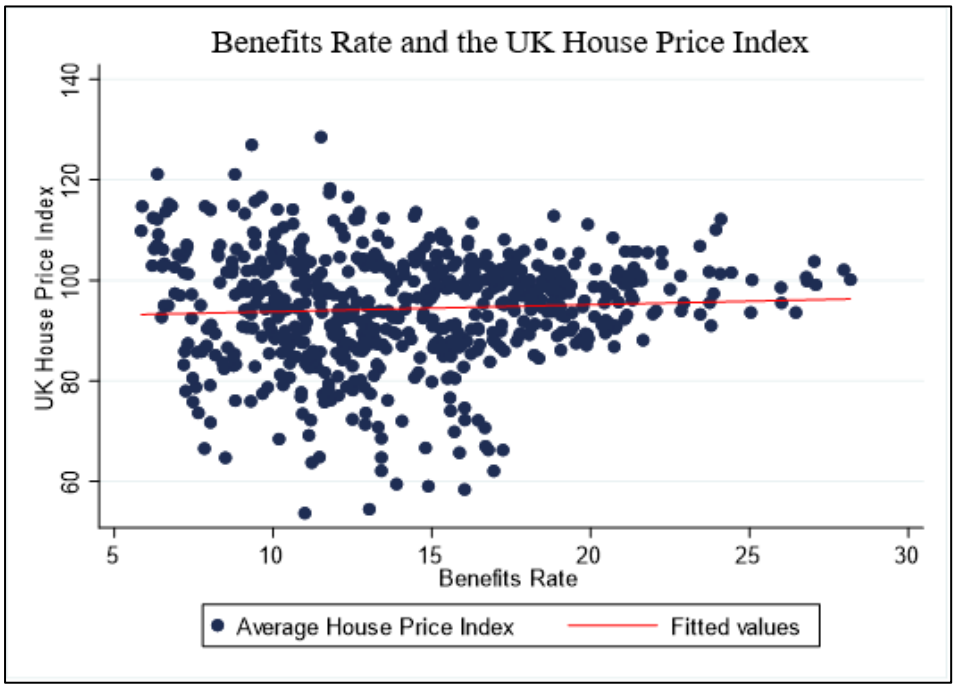
Graph 1.1: Net Migration and Average House Prices – Wales



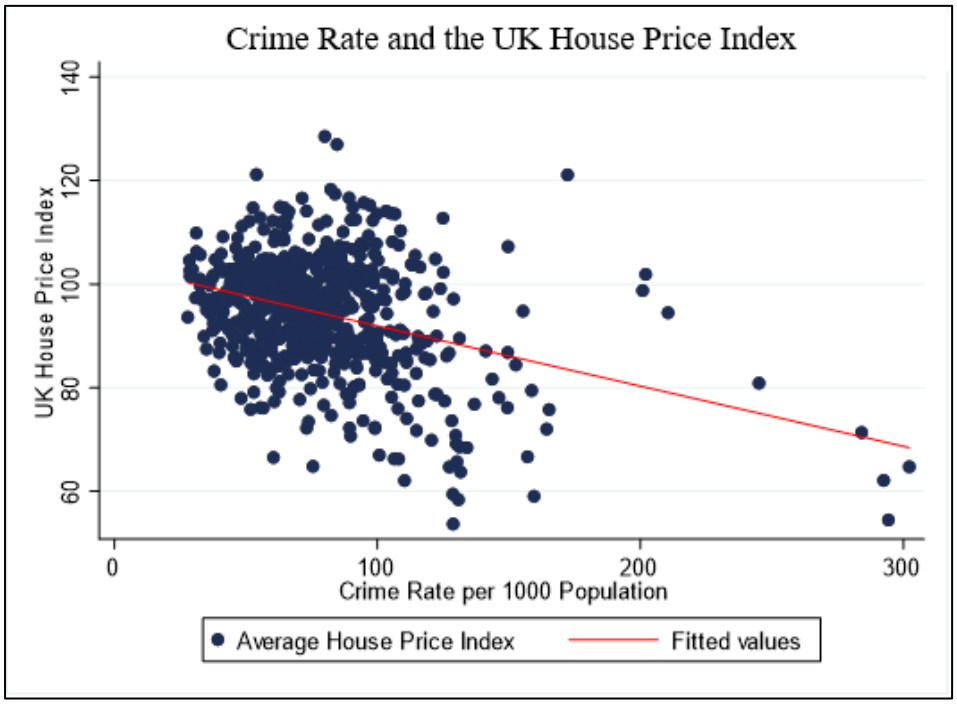
Graph 2.0: Unemployment Rate and the UK House Price Index



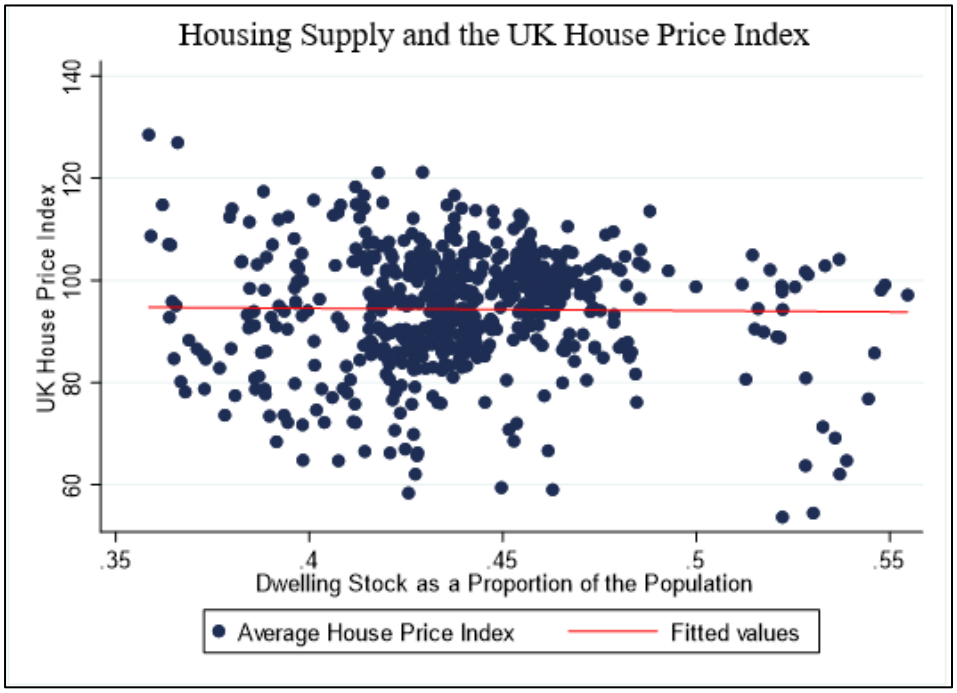
Graph 2.1: Benefits Rate and the UK House Price Index



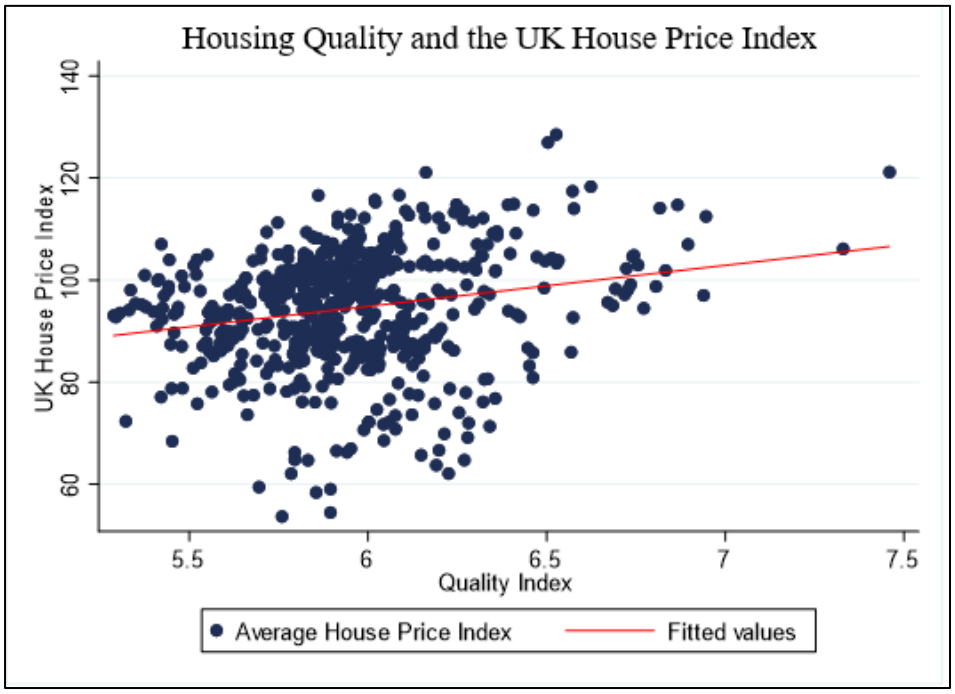
Graph 2.2: Crime Rate and the UK House Price Index



Graph 2.3: Housing Supply and the UK House Price Index



Graph 2.4: Housing Quality and the UK House Price Index



9. Appendix

Appendix 1.0

Local authorities used by each region:

East of England:
Brentwood, Cambridge, Fenland, Great Yarmouth, Ipswich, Luton, Peterborough and St Albans.

East Midlands:
Ashfield, Boston, Corby, Daventry, Gedling, Kettering, Leicester and Nottingham.

London:
Barnet, Camden, Greenwich, Hammersmith and Fulham, Kensington and Chelsea, Lewisham, Southwark and Westminster.

North East:
County Durham, Darlington, Gateshead, Hartlepool, Newcastle Upon Tyne, Northumberland, Redcar and Cleveland and Sunderland.

North West:
Bolton, Burnley, Copeland, Knowsley, Liverpool, Manchester, Rochdale and Warrington.

South East:
Arun, Canterbury, Crawley, Dartford, Fareham, Maidstone, Oxford and Slough.

South West:
Bournemouth, Christchurch, Exeter, North Devon, Plymouth, South Hams, Swindon, Weymouth and Portland.

Wales:
Blaenau Gwent, Caerphilly, Cardiff, Ceredigion, Denbighshire, Monmouthshire, Newport and Swansea.

West Midlands:
Birmingham, Coventry, Lichfield, North Warwickshire, Rugby, Solihull, Stafford and Warwick.

Yorkshire and the Humber:
Barnsley, Bradford, Doncaster, Harrogate, Leeds, Richmondshire, Scarborough and Sheffield.