Essays on International Migration

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Abstract

Immigration has become an increasingly salient issue across Europe in recent years. However, much of the existing economics literature focuses on the impact of immigration on labour markets. In order to gain a more complete understanding of the impact of immigration on a host country, it is important to take a broader perspective. In this thesis we investigate some of the wider effects of immigration on host countries and their native citizens. The thesis contains three self-contained chapters, each of which tries to establish the causal effects of immigration on a separate socio-economic aspect of the host country.

Chapter 2 investigates the causal link between migration and trade flows. We exploit the large, exogenous increase in migrants to the UK as a result of the 2004 EU enlargement. In contrast to the standard gravity model approach, we use a difference-in-differences estimation strategy, which enables us to compare changes in UK trade flows with accession countries to changes in UK trade flows with other central and eastern European countries. At the product level, separating goods according to their informational content using the classification put forward by Rauch (1999), we find evidence that UK imports from accession countries increased, and that this was driven by differentiated goods.

In Chapter 3 we investigate whether the proportion of migrants in a local area affects the success of an anti-immigration political party. Using Swedish municipality-level data, we focus on the impact of large inflows of migrants, many of whom were refugees, from non-OECD countries in the 1980s and 1990s. In order to address concerns over the endogeneity of migrant location, we exploit a refugee placement policy which aimed to disperse refugees across

the country. Initial OLS estimates suggest that a one percentage point increase in the migrant share is associated with a 0.28 percentage point increase in the New Democracy vote share. However, we do not find evidence of a positive relationship between the arrival of refugees and the New Democracy vote share in our 2SLS estimation. Further analysis suggests that our OLS results are driven by municipalities surrounding the three major urban areas of Stockholm, Gothenburg and Malmö. In addition, we find no evidence that natives responded to an influx of migrants by relocating to another area.

In Chapter 4 we examine the relationship between immigration and house prices. Focusing on the case of England and Wales, we exploit variation in migrant inflows across local authority districts to identify the effects of migration on changes in house prices. We build on existing papers by conducting the analysis at the local authority district level which enables us to better account for unobserved local level characteristics. In addition, we then exploit data on the postcode of each individual housing transaction in an attempt to better control for housing quality. In our OLS specifications we find no conclusive evidence of any relationship between migrant inflows and changes in house prices. We then address endogeneity concerns by using an instrument based on historical settlement patterns. Although our 2SLS estimates suggest that a 1% increase in the migrant share is associated with a 2.4% fall in house prices, we show that this effect is driven by local authorities in London, and that our instrument based on historical migrant settlement patterns is weak and fails to fulfil the relevance requirement for local authorities outside of London. These findings cast doubt over the suitability of the shift-share instrument for addressing endogeneity concerns in this setting.

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Chapter 1

Introduction

Since the 1990s, a rich literature studying the effects of immigration on host countries has emerged. The purpose of this literature is to understand how immigration affects the resident population in these host countries. The vast majority of these papers have focused on the labour market, both in terms of wages and employment, although more recent contributions have begun to explore other areas such as the fiscal effects of immigration. Similarly, while initial contributions focused almost exclusively on the United States as a host country, a large body of more recent work centres on European countries.

Immigration has become an increasingly salient issue across Europe in recent years, particularly with the arrival of large numbers of migrants and refugees as a result of conflicts in Syria and other parts of the Middle East, in what is often referred to in the media as the "European migrant crisis". In the UK, opinion surveys consistently indicate immigration as one of the five most important issues facing the country (Blinder and Allen, 2016). The increasing salience of and public attitudes towards immigration can influence policy making, and therefore have important implications for future immigration policy.

Despite the undoubted importance of the existing focus on the relationship between immigration and labour markets, in order to gain a more complete understanding of the effects of immigration on host countries, it is important to take a broader perspective. Therefore, in this thesis, we investigate some of the wider effects of migration on host countries and their native citizens. This thesis contains three distinct, self-contained chapters each of which focuses on the impact of immigration on a different socio-economic outcome of the host country and its citizens. In Chapter 2 we examine the link between migration and trade flows. Chapter 3 looks at the relationship between immigration and the success of an anti-immigration political party. In Chapter 4 we investigate the effect of immigration on house prices. Despite the self-contained nature of the chapters, all three try to address the issue of endogenous migrant location, in order to identify the causal effects of immigration.

Chapter 2 investigates the causal link between migration and trade flows. We may expect migration to be positively related to trade flows for three reasons. First, migrants may have preferences for goods produced back in their home countries and demand them while in the host country. Second, migrants may help to reduce trade costs and informational frictions between their home and host countries due to market specific knowledge and language skills. Finally, migrants could affect trade flows through the creation of networks, enabling them to build up trust and to facilitate negotiations. While existing papers have found a positive correlation between migration and trade flows, concerns over potential reverse causality mean that these papers have not conclusively established the existence of a causal relationship of migration on trade flows.

To address this, in this chapter we exploit the large, exogenous inflow of migrants to the UK as a result of the 2004 EU enlargement to see whether this

increased migration led to larger trade flows between the UK and the accession countries. In contrast to the standard gravity model approach in this literature, we use a novel difference-in-differences estimation strategy, which enables us to compare changes in UK trade flows with accession countries to changes in UK trade flows with the rest of the world. In addition to our baseline model which focuses on aggregate trade, we also conduct the analysis using product level data which enables us to separate goods according to their informational content using the classification proposed by Rauch (1999). Our baseline results show that UK imports from the accession countries increased relative to UK imports from the rest of the world, but there was no effect for exports. At the product level, separating goods according to the Rauch classification, we find that this increase is driven by differentiated import goods.

In Chapter 3 we study the relationship between immigration and the success of a far-right political party with an anti-immigration stance. More specifically, we use a spatial correlations approach to investigate whether the proportion of migrants in a local area affects the success of an anti-immigration party in that area. Using Swedish municipality-level data, we focus on the impact of large inflows of migrants, many of whom were refugees, from non-OECD countries in the 1980s and 1990s. We exploit within municipality variation in the migrant share to identify the effects on the success of the anti-immigration New Democracy party.

In order to address concerns over the endogeneity of migrant location, we exploit a refugee placement policy which aimed to disperse refugees across the country. Initial OLS estimates suggest that a one percentage point increase in the migrant share is associated with a 0.28 percentage point increase in the New Democracy vote share. However, despite the strong aggregate relationship in the time-series pattern of refugee arrivals and the New Democracy vote

share, we do not find evidence of a positive relationship between the arrival of refugees and the New Democracy vote share in our 2SLS estimation. Further analysis suggests that our OLS results are driven by municipalities surrounding the three major urban areas of Stockholm, Gothenburg and Malmö. In addition, we find no evidence that natives responded to an influx of migrants by relocating to another area.

In Chapter 4 we explore the relationship between immigration and house prices. We focus on the case of England and Wales which have seen large rises in both house prices and migrants since 2004. A priori the relationship between migration and house prices at the local level is uncertain. On the one hand, migration is likely to increase the demand for housing which would push up house prices. On the other hand, migration may lead to compositional changes such as native displacement, as well as increased levels of crime or a fall in the quality of housing. In order to investigate this relationship, we exploit variation in migrant inflows across local authority districts to identify the effects of migration on changes in house prices. We then address the endogeneity of the migrant share by using an instrument based on historical settlement patterns.

This chapter contributes to the existing literature in three ways. First, we use data at a more disaggregated level, in order to better account for unobserved local level characteristics. Second, we examine the suitability of the commonly used shift-share instrumental variable based on historical settlement patterns in the case of the UK. Third, we exploit data on the postcode of each individual housing transaction in an attempt to better control for housing quality. In our benchmark OLS specification we find no evidence of any relationship between the inflow of migrants into a local area and changes in house prices. In contrast, our 2SLS results suggest that a migrant inflow

equivalent to 1% of the population is associated with a fall in house prices of 2.4%. Further examination reveals that this effect is driven by local authorities in London, and that our instrument based on historical migrant settlement patterns is weak and fails to fulfil the relevance requirement for local authorities outside of London. These findings cast doubt over the suitability of the shift-share instrument for addressing endogeneity concerns in this setting.

Chapter 5 summarises the main results and contributions of this thesis and looks ahead to ideas for future research.

Chapter 2

The Impact of Immigration on UK Trade Flows: a comparison before and after the 2004 EU enlargement

2.1 Introduction

[1]On 1st May 2004, the European Union underwent its largest expansion to date, growing from fifteen to twenty five members, with the accession of ten new countries. Of the ten new members, eight were central or eastern European countries (CEEC): Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia (A8), plus Cyprus and Malta. Prior to this enlargement, there was already free trade between existing EU member states and the CEECs, thanks to Association Agreements which were signed in the 1990s. Boeri and Brucker (2001) argue that prior to 2004, the conditions of trade between existing EU countries and the CEECs already resembled those between existing EU members. Consequently, they predicted that the EU enlargement would have little direct impact on trade flows.

In contrast, there was widespread apprehension among existing EU members about the potential effects of one of the key provisions of the EU treaty, the free movement of people. Existing EU member states expressed fears that there would be an excessive influx of migrants from central and eastern Europe as a result of the EU enlargement, creating pressure on labour markets, as well as placing an additional burden on public services and housing markets. Consequently, the majority of existing EU countries imposed restrictions to the free movement of labour for A8 citizens.[2] In contrast, in the UK,

[1]This chapter is an extensively revised version of the dissertation I submitted for my MSc in Economics and International Economics at University of Nottingham during the 2012-2013 academic year. The major changes occur in the empirical strategy and results sections. The benchmark methodological approach remains similar, but the analysis has been greatly extended to include product level analysis, alternative control groups and additional robustness checks.

[2]Finland, Greece, Italy, Portugal and Spain abolished restrictions in 2006. By 2009, restrictions had also been abolished in Belgium, France, Luxembourg, Netherlands and Denmark. Austria and Germany maintained restrictions for the maximum 7 year period until 2011 (Silke, 2011)

the Blair administration was less fearful about the potential consequences of EU expansion, anticipating that migration from the A8 countries would be moderate. In a 2003 Home Office Report, Dustmann et al. (2003) predicted annual net inflows of between 5,000-13,000 A8 migrants to the UK under the assumption that none of the EU15 countries would implement restrictions to the free movement of labour.In reality, the UK was one of only three countries not to impose any restrictions, which led to the UK experiencing a large increase in A8 migrants. Sumption and Somerville (2010) estimate that the UK experienced a migration inflow of 1.5 million A8 citizens between May 2004 and September 2009 alone.[3] Bauere et al. (2007) describe this as the "largest single wave of foreign in-movement ever experienced by the UK"; the inflow was certainly much larger than had been anticipated.

There exists a sizeable literature examining whether migration leads to increased trade flows. We might expect migration to be positively related to trade for at least three reasons. First, migrants may have preferences for goods from their home country. Second, migrants may possess knowledge of their home country markets which could help to reduce trade costs between the home and host countries. Third, migrants could affect trade flows through the creation of networks. Following the seminal work by Gould (1994), numerous papers have documented the positive correlation between migration and trade flows. However, the problems of reverse causality and omitted variable bias often arise in these papers and the literature has so far failed to conclusively establish that the direction of causality does run from migration to trade.

The aim of this chapter is therefore to provide evidence on the causal

[3]This estimate is based on the number of approved Worker Registration Scheme applications and is adjusted to account for non-registration. It does not take account of migrants who have subsequently left the UK, which the authors calculated to be just over half of this figure by the third quarter of 2009.

link between migration and trade flows. Our identification strategy relies on the assumption that due to the pre-existing free trade agreements between the UK and A8 countries, the only thing that changed after 2004 which may affect trade flows, was the huge increase in migrants that came to the UK from these countries as a result of the enlargement. Importantly, we argue that this change in the migrant stock was exogenous with respect to trade flows, and can therefore use this to identify the causal relationship between this increase in migration and UK-A8 trade flows. In contrast to the traditional gravity model approach, our first contribution is to estimate a difference-in-differences model which enables us to study the change in UK-A8 trade flows before and after the enlargement, compared to the change in UK trade flows with a group of 135 countries acting as a control group. The main advantage of this method is that, unlike the gravity model, it enables us to clearly separate out the effects before and after a discrete endogenous event that suddenly increased migrant stocks.

In addition to our baseline model which focuses on aggregate trade, our second contribution is to investigate the effect of migration on product level trade flows. We classify goods according to their informational content using the Rauch classification (Rauch, 1999), which enables us to separate the accession effects on different types of goods. A positive effect for differentiated goods, but not for reference priced or homogeneous goods would provide further evidence of a migration effect on trade flows because migrants are more likely to be able to provide valuable information about these goods as they are more unique. In addition, migrants are only likely to want to import these more unique goods which are unavailable in their host country. In order to address concerns over the suitability of UK trade with these 135 rest of the world countries as a control group, we also use two alternative control groups

as a robustness check: UK trade with central and eastern European countries who did not join the EU in 2004, and other EU15 countries who imposed restrictions to the free movement of labour, and their trade flows with the A8 countries.

Our baseline results show that UK imports from the A8 countries increased relative to UK imports from the rest of the world. We find similar results using both of our alternative control groups, strengthening our baseline findings. Moving from aggregate to product level, we find that the effect for imports is driven by differentiated import goods, suggesting that migrants increase imports of more unique goods only. We find no effect for UK exports. The lack of a migration effect on exports can be explained by the issue of timing because networks and informational channels require time to develop. In contrast, the preference channel through which migrants can affect imports can adjust much more quickly to changing tastes.

The remainder of the chapter is structured as follows. Section 2.2 reviews the existing literature, while Section 2.3 presents a brief overview of events leading up the the 2004 EU enlargement. Section 2.4 provides summary statistics which document the large increase in A8 migrants present in the UK post 2004, as well as increased UK-A8 trade flows. Section 2.5 discusses our empirical strategy, while Section 2.6 presents the results. Finally, Section 2.7 concludes.

2.2 Literature Review

Neoclassical trade models such as the Heckscher-Ohlin model, with differences in factor endowments, consider trade and migration to be substitutes (Mundell,

1957). In this two country, two sector, two factor model, trade leads to factor price equalisation[4], so there is no incentive for factors to move from one country to another. An increase in the endowment of the scarce factor of production, say labour as a result of migration, will lead to a decrease in the production in the capital intensive exporting sector, reducing trade, and an increase in the production of the import competing sector. Thus trade and migration are substitutes in this model.

On the other hand, both Ricardian models and New Trade Theory models which incorporate increasing returns to scale and monopolistic competition suggest that trade and migration are complements (Markusen, 1983). In the Ricardian model based on differences in technology, if a country has absolute advantage in a good, then the relative price of goods is determined purely by technology. When the global demand for a good exceeds the labour capacity of the country which has absolute advantage in producing it, then this leads to an inflow of migrants. The subsequent increase in production of the good for the export market means that migration and trade are complements in this model. In the standard two country, two sector, one factor New Trade Theory model, one sector has constant returns to scale and the other has increasing returns to scale. The larger country will be the net exporter of the monopolistically competitive good, the return to labour will be higher in this larger economy and labour will therefore move to the larger country. This greater inequality in factor endowments further increases trade between the two countries, so trade and migration are complements.

While trade theory has no conclusive answer, when this relationship has been tested empirically, trade and migration have been found to be comple-

[4]This result also requires additional assumptions such as no factor intensity reversals and that endowments are within the cone of diversification.

ments. In fact, a sizeable empirical literature attempts to assess the impact of immigration on bilateral trade flows. The seminal work in this field was carried out by Gould (1994). The starting point for Gould's study is that traditional economic theory considers immigrants solely as additional members of the labour force, with no differentiation between native and migrant workers. In reality, the situation is more complex due to immigrants having links to their country of birth. The remainder of this section will begin by explaining the channels through which migrants can affect trade, before looking at the standard methodological approach and the econometric challenges that it poses. Finally, we will discuss the key findings in the literature.

2.2.1 Theoretical Mechanisms

In the existing literature, two main mechanisms through which immigrants may affect bilateral trade flows have been identified. First Gould (1994) identifies the preference channel, which states that immigrants have certain tastes which may increase the demand for goods produced in their home country. Consequently, Gould expects this channel to affect imports into the host country. Genc et al. (2012) argue that over time these preferences may be adopted by natives as well, as these goods become normalised into the host country's society. They demonstrate this effect with the example of ethnic restaurants. White (2007) argues that this preference effect will be stronger the more dissimilar the home and host countries are, because if the countries are different, many goods and similar alternatives are likely to be unavailable in the host country, and therefore will be sought from the home country.

The second channel is identified as the information channel: immigrants possess certain characteristics and specific knowledge which can lead to a re-

duction in trade costs between the host and the home countries. For instance, White and Tadesse (2008) note that immigrants are likely to be more familiar with the tastes of consumers in their home country. Consequently, they may be able to aid exporters in terms of advising on modifications to products when trying to export to that particular market. In addition to being familiar with tastes, they are also likely to have a greater understanding of local customs and practices. Wagner et al. (2002) suggest that immigrants can help to reduce communication barriers caused by language problems, while Herander and Saavedra (2005) note that migrants can help overcome various institutional framework issues. More specifically, they can provide information on various legal and judicial matters such as how to enforce contracts, patents and property rights. As the information that immigrants are able to provide about their home countries' markets helps to reduce the transaction costs associated with trade, Gould (1994) predicts that this immigrant link, or information channel will lead to an increase in both imports and exports.

In addition to these main channels, a further mechanism through which migrants can affect trade flows is through the creation of networks. Girma and Yu (2002) stress the importance of migrants' business contacts. As well as immigrants being more familiar with the culture, preferences and local business practices of their home country, they can play a key role in creating networks, generating trust and facilitating negotiations. In their theoretical paper on international informational barriers, Rauch and Casella (2003) argue that networks can play a crucial role in resolving informational difficulties when there are large informal trade barriers. They state that there is often a matching problem, as producers lack the information on how to distribute their goods in a foreign country. The existence of networks through which information that local companies possess can be shared to assist foreign firms

can help resolve these informational asymmetry problems.

Furthermore, Rauch (2001) discusses the importance of reputation in the network context. There is considerable risk and uncertainty when branching out into a new market, but by dealing with a network, this risk is reduced. Reputation is a key factor in networks, as members of a network gain knowledge of each other by trading more frequently. Moreover, the fear of being ostracised by the network deters reneging on contracts. This view is supported by Rauch and Trindade (2002) who study the impact Chinese ethnic networks have on trade and in particular the effect that they can have on contract enforcement.

2.2.2 Methodology

Augmented Gravity Models

The standard approach to analyse the impact of migration on trade flows is to use an augmented gravity model. The gravity model was first used in economics by Tinbergen (1962) and its theoretical foundations have since been established by Anderson (1979), Bergstrand (1985), Bergstrand (1989) and Anderson and van Wincoop (2003) . The theoretical gravity model as derived by Anderson and van Wincoop (2003) can be described by the equation:

$$X_{ij} = \frac{Y_i Y_j}{Y_w} \left(\frac{\tau_{ij}}{\Pi_i P_j} \right)^{(1-\sigma)} \varepsilon_{ij} \tag{2.2.1}$$

It states that trade flows between countries i and j, X_{ij}, are a function of the relative size of the two countries as measured by their GDP relative to world

GDP (Y_iY_j/Y_w) and the trade costs between the two countries, τ_{ij}. In addition to the importance of absolute trade costs, Anderson and van Wincoop (2003) show that it is essential to account for multilateral resistance terms, or put more simply, relative trade costs between country i and the rest of the world, and between country j and the rest of the world. Π_i and P_j are measures of how hard it is to export and import respectively.

It is important to note that in reality these multilateral resistance terms can be time varying, although equation 2.2.1 only presents a cross-sectional version of the gravity equation. A country has high outward multilateral resistance (Π_i) when its key export markets are far away and when they face a low cost of importing goods from other sources. Similarly, a country has high inward multilateral resistance (P_j) when its key import markets are far away and when they face a low cost of exporting to alternative destinations, as trade with other destinations is a cheaper alternative. These multilateral resistance terms are unobserved, but since Π_i and P_j themselves depend on trade costs, omitting them leads to omitted variable bias. While Anderson and van Wincoop (2003) solve for Π_i and P_j in terms of observable determinants of barriers to trade in their cross-sectional study, this is arguably not feasible with a panel dataset with a large number of trading partners and years. Several studies, such as Ghatak et al. (2009) use a remoteness variable as a proxy for these unobserved multilateral resistance terms. However, Anderson and van Wincoop (2003) argue that this has no theoretical grounding and that remoteness, although related to distance, fails to capture other trade barriers. They therefore consider remoteness to be an inadequate proxy for multilateral resistance terms. In cross-sectional studies, multilateral resistance terms are typically accounted for with the inclusion of importer and exporter fixed effects. In panel data studies, it is common to include time varying country

pair fixed effects instead.

The multiplicative nature of the gravity model means that it is typically log-linearised and estimated using OLS:

$$\ln(X_{ij}) = k + \ln(Y_i) + \ln(Y_j) + (1-\sigma)\tau_{ij} - (1-\sigma)\Pi_i - (1-\sigma)P_j + \ln(\varepsilon_{ij}) \quad (2.2.2)$$

Equation 2.2.2 shows the gravity equation in log linear form, where $k = -\ln(Y_w)$, world GDP, is a constant, Y_i and Y_j are the GDPs of i and j respectively, τ_{ij} represents direct trade costs and Π_i and P_j are the multilateral resistance terms. τ_{ij} represents the true cost of trading between countries i and j, which can be proxied by a series of variables which affect trade costs between countries i and j, such as: distance, contiguity, language, colonial links and whether a country is landlocked. In the migrant-trade link literature, the standard gravity model is augmented with the log of the migrant stock from partner j residing in country i, M_{ij}:

$$\ln(X_{ij}) = k + \ln(Y_i) + \ln(Y_j) + \ln(M_{ij}) + (1-\sigma)\tau_{ij} - (1-\sigma)\Pi_i - (1-\sigma)P_j + \ln(\varepsilon_{ij}) \quad (2.2.3)$$

Augmenting the gravity model with the log of the migrant stock assumes that migrants have a constant elasticity effect on trade flows, implying that a certain percentage increase in the migrant stock has a constant impact on trade, irrespective of how many migrants are present in the country. Girma

and Yu (2002) justify this approach by arguing that in their study, migration flows from any one country to the UK are sufficiently small that the effects are unlikely to be exhausted. Furthermore, White (2007) argues that the effect is only likely to diminish over a long period of time, so it is reasonable to assume a constant elasticity impact in the short term.

On the other hand, Gould (1994) assumes a decreasing marginal effect, arguing that migrants entering the country at a later date will have fewer opportunities to create trade, as these opportunities will have already been exploited. Both Wagner et al. (2002) and Egger et al. (2012) choose a specification allowing for a decreasing marginal returns approach, and their findings support those of Gould, suggesting that there is a point at which the usefulness of the information provided by migrants is exhausted. This seems intuitive when thinking about migrants filling a knowledge gap. Arguably, once they have provided the information, their usefulness might be expected to decline. Furthermore, we might expect any migration effect to diminish with time as migrants links to their home country become weaker. However, in terms of contract enforcement, the role of the migrant and the network is likely to remain important throughout time. The difference-in-differences estimation strategy used in this chapter assumes a constant elasticity effect. We believe this is justified due to the potential ongoing role of migrants in a network. Furthermore, as White (2007) argues, as we only consider a relatively short period of time after the enlargement, 2005-2012, any migrant effect is unlikely to be exhausted in such a short space of time.

Estimation Strategies

In Section 2.2.2, we noted that the gravity model is typically estimated in log linear form using OLS. However, this method has two major limitations. First, Silva and Tenreyro (2006) have shown that the assumption of homoskedastic errors is often violated in trade data, or indeed in any constant elasticity model. Typically, heteroskedasticity leads to consistent estimators, but biased estimates of the standard errors of coefficients. However, in this case, the problem arises because of the log linear form of the gravity model. Jensen's inequality tells us that $E\ln(X) \neq \ln E(X)$, the expected value of a logarithm is not the same as the logarithm of the expected value. In this case, in the presence of heteroskedasticity, not only will the standard errors be biased, but OLS estimators will be inconsistent too. Second, log linearisation does not adequately deal with zero trade flows, as they are simply dropped from the analysis. If recorded zero flows are random then this does not create a problem; however, trade flows are often recorded as zero because they do not reach a minimum threshold. Alternatively, missing values can be recorded as zero flows in error. Both of these scenarios are more likely to occur between small, distant countries, meaning that the probability of observing zero flows is not random and therefore this can lead to inconsistent estimators and selection bias when zero trade flows are dropped during log linearisation. The most common method of dealing with zero trade flows has been simply to restrict analysis to observations which have strictly positive trade flows. However, Helpman et al. (2008) find that by disregarding zero flows or unilateral flows, they lose half of the observations from their sample, observations which contain valuable information about trading patterns.

Several solutions to these problems have been proposed in the literature.

Helpman et al. (2008) use a two-stage estimation method. Their method is primarily focused on separating the effects of trade barriers on the intensive and extensive margins, but it also overcomes the selection problem posed by zero trade flows. The first stage of the estimation uses a Probit model to estimate the probability that one country exports to another. Using the result from the first stage to correct for selection bias and unobserved firm-level heterogeneity bias, the second stage then estimates a gravity equation. In order to use this method, it is necessary to have at least one variable in the Probit equation which can be omitted from the gravity equation. This requires the existence of a variable which affects the fixed costs of trade, but does not affect the variable costs of trade. Put differently, the variable must affect the likelihood of trade occurring, but have no impact on the volume of trade. Helpman et al. (2008) choose regulation costs of firm entry and also religion as excluded variables for the second stage.

The main drawback of using this method is the difficulty of finding an appropriate excluded variable. It is hard to find a variable that affects the probability of trade occurring, but has absolutely no impact on the level of trade. It seems likely that the majority of variables that are traditionally included in gravity models will impact both. Furthermore, Silva and Tenreyro (2015) argue that using religion or regulation costs will lead to bias because these variables only have a fairly minor impact in the first stage Probit regression and thus they liken the problem to that of having weak instruments. In addition, they find that this two stage method relies heavily on the assumption of homoskedasticity. This is problematic because, as previously discussed, the assumption of homoskedastic errors is often violated in trade data.

Another commonly used method to deal with zero trade flows has been simply to add one to all trade flows. Head and Mayer (2014) criticise this

approach because coefficients can no longer be interpreted as elasticities; they depend on units of measurement. Eaton and Tamura (1994) and Eaton and Kortum (2001) use Tobit estimation to overcome the problem of zero trade flows. However, in the presence of heteroskedasticity, the estimates will remain biased.

Silva and Tenreyro (2006) focus primarily on finding a solution to the heteroskedasticity bias in the log linear model. After conducting Monte Carlo simulations on various methods, their preferred solution is to estimate the gravity model in its original multiplicative form using a Poisson pseudo maximum likelihood estimator (PPML), a method commonly used on count data. The data are not required to have a Poisson distribution; they only need to be non-negative and have the correct specification of the conditional mean of the dependent variable, in order for the PPML estimator to be consistent. Silva and Tenreyro (2006) find that when they use the PPML on their data, it produces considerably different coefficients compared to OLS. For example, the coefficient on the log of distance was substantially less negative under PPML (-0.784) than with OLS (-1.166). As the PPML estimates are similar when conducted on the whole sample including zero trade flows and when conducted on the sub-sample of positive trade flows, the authors argue that this shows a clear bias in the OLS results due to heteroskedasticity rather than due to any sample selection effect.

Martin and Pham (2008) argue that the PPML estimator is not robust to large numbers of zero values in the dependent variable because Silva and Tenreyro (2006) only had 25% zero trade flows, much lower than is typically observed in the data. Furthermore, these zeros were statistical rather than structural, meaning that the zero trade flows were assumed to be due to measurement error, rather than due to the absence of trade. However, Silva and

Tenreyro (2015) incorporate structural zeroes and greatly increase the proportion of these zeroes. They find that while PPML is not always optimal, it is well behaved both in large and small samples, in contrast to the OLS and Eaton and Tamura (1994) Tobit approaches, which produce biased, inconsistent results.

Endogeneity and Reverse Causality

One of the main criticisms of this literature has been the failure to conclusively establish that migration has a causal effect on trade flows. With regards to equation 2.2.3, the literature has failed to convincingly establish that the causal relationship runs from M_{ij} to X_{ij} and not from X_{ij} to M_{ij}. Early studies consistently found a correlation between migration and trade flows. However, since many of the factors which cause an increase in trade also cause an increase in immigration, more recent work has attempted to establish the causal link between immigration and trade. Initially, Gould (1994) argued that his immigration variable was exogenous due to strict immigration flow quotas that were in place in the US. In addition, he conducted Granger Causality tests and found that immigration took place before trade in 22 of the trading partners, while causality could not be determined for a further 14 of the countries.

More recent papers have used more formal methods to account for endogeneity problems. Wagner et al. (2002) argue that failure to account for all factors that affect migration and trade leads to omitted variable bias and biases estimates of the migration effect upwards. Referring back to equation 2.2.3, failing to account for all factors that affect trade means that part of τ_{ij} will instead be present in the error term ϵ_{ij}, which causes the coefficient on M_{ij} to be overestimated. They address this problem by using country

fixed effects, but provincial level trade data. Omitted variables are likely to be factors that occur at the country level, such as differences in legal systems, cultures and language. Including country fixed effects allows the authors to abstract away from these country specific differences, while using provincial level trade data ensures that the data retains the informational content provided by cross-sectional variation.

Most recently, two approaches have been used in an attempt to establish that the direction of causality runs from migration to trade: instrumental variables (IV) and natural experiments. Combes et al. (2005) introduce an instrumental variable, the migrant stock in 1978, fifteen years prior to their study, as an instrument for the 1993 migrant stock. As they find very similar results using both OLS and Two Stage Least Squares (2SLS), they conclude that endogeneity is not a serious problem. Peri and Requena-Silvente (2010) and Bratti et al. (2014) conduct an IV approach based on immigrant enclaves for Spanish and Italian provinces respectively. This IV approach stems from the migration literature emphasising the importance of the role of migrant networks. For example, Bartel (1989) finds the percentage of the migrant's ethnic group residing in an area to be the most important determinant of migrant location. Consequently, past migrant stock can be used as an instrument for current migrant stock. Sangita (2013) uses an alternative IV approach, using the variation in the number of years of residency needed in order to gain citizenship in the destination country as an IV, arguing that these citizenship laws are exogenous to trade flows. These papers consistently find a pro-trade effect, which strengthens the argument that the direction of causality runs from migration to trade. However, as is common with IV studies, the validity of the instruments remains a concern.

Parsons and Vézina (2017) were the first to exploit a natural experiment in

order to identify a causal relationship between migration and exports. They study the large influx of the Vietnamese Boat People into the US after the Fall of Saigon and the subsequent removal of the trade embargo. The authors regress the average share of US States' exports which go to Vietnam over the period 1995-2010 on the stock of Vietnamese migrants present in each state in 1995. They find a positive migration effect on export flows. These findings further strengthen the argument that the direction of causality runs from migration to trade.

2.2.3 Key Findings

Gould (1994) studies US trade flows with 47 partner countries between 1970-1986. He considers trade in three types of goods: aggregate, consumer and producer goods. The immigrant information coefficient is found to be significant for all types of goods except producer imports, while the magnitudes are larger for exports than for imports. Furthermore, he finds larger effects on consumer goods than producer goods, and attributes this finding to the fact that consumer goods tend to be more differentiated than more homogeneous producer goods, suggesting that there is a greater benefit to having country specific information in the consumer goods market. Dunlevy and Hutchinson (1999) extend this goods level analysis by examining 78 commodities split into 5 groups: crude foodstuffs, processed foodstuffs, crude materials, semi-manufactures and manufactures for consumption. Reinforcing Gould's findings, they find larger migrant effects for processed foodstuffs and manufactures for consumption, and insignificant effects for crude goods. Furthermore, when each commodity is studied separately, they find a positive migrant effect for 61 of the commodities.

Several papers report that the existence of a pro-trade effect depends on the migrant's country of origin. Girma and Yu (2002) find no pro-trade effect for migrants coming to the UK from Commonwealth countries, but they do present significant results for migrants from non-Commonwealth countries, suggesting that the level of similarity between home and host countries plays an important role as to whether we observe a pro-trade effect. This finding is supported by White (2007) who show that migrants coming from low income countries had a greater pro-trade effect than those from middle to high income countries. Along similar lines, Dunlevy (2006) finds a larger pro-trade effect the more corrupt the trading partner country is. His findings highlight the important role that migrant networks play in the enforcement of contracts.

Two papers have addressed the topic of the 2004 EU enlargement, although in contrast to this study, they both focus on the pre-accession period. Parsons (2005) studies the impact of immigration from fifteen potential accession countries, including the A8, on their trade flows with the EU15 countries. He uses a panel dataset of bilateral trade flows between these 225 pairings for the pre-accession period 1994-2001. He finds pro-trade elasticities of 0.12 and 0.14 for exports and imports respectively. Similarly, Ghatak et al. (2009) analyse UK bilateral trade flows with several of the central and eastern European countries who joined the EU in 2004. Using a panel dataset of UK trade flows with Czech Republic, Hungary, Poland, Slovakia, Bulgaria and Romania between 1996-2003, they find evidence that migrants lead to an increase in exports.

Turning now to the magnitude of the migration effect, Genc et al. (2012) conduct a meta analysis of 48 studies and find a positive, significant relationship between migration and trade in 30 of the studies, with a further 14 having no significant effect, and only 4 having a statistically significant negative effect. They find that on average, a 10% increase in the migrant stock leads to a 1.5%

increase in the trade flow. They report similar findings for both imports and exports, but do note the considerable heterogeneity among the studies they analysed. Just over half of the papers they looked at found a stronger migrant effect for imports than for exports. Interestingly, these findings are reversed when they account for publication bias.[5]

A direct comparison of the results of various studies is difficult due to the differing methodological approaches and specifications used. However, results from a selection of studies are presented in Table 2.1. The seminal work by Gould (1994) did not report elasticities, but Wagner et al. (2002) calculated them to be 0.01 and 0.02 for imports and exports respectively. It is noticeable that these estimates are somewhat lower than those who used a pooled OLS approach shown in Table 2.1. Wagner et al. (2002) attribute this to the country fixed effects approach adopted by Gould, but since they are also much smaller than the studies that use fixed effects in Table 2.1, it seems more likely that this is as a result of the decreasing returns to migration approach implemented by Gould. The majority of the trade elasticities shown in Table 2.1 lie between 0.1 and 0.3. Despite the considerable heterogeneity in the magnitude of the migrant effect, the papers in this literature consistently find a positive correlation between migration and trade flows.

[5]The authors study a selection of both published and unpublished works. Publication bias arises when a result is not statistically significant and is therefore less likely to be published. Consequently, results in published papers can differ substantially from those in unpublished papers.

Table 2.1: A Summary of Findings in the Literature

Authors	Sample	Estimation Strategy	Import Elasticity	Export Elasticity
Head and Ries (1998)	Canada & 136 countries 1980-1992	Pooled OLS	0.31	0.10
Dunlevy and Hutchinson (1999) (2001)	US and 17 countries 1870-1910	Pooled OLS	0.29	0.08
Girma and Yu (2002)	UK and 48 countries 1981-1993	Pooled OLS	0.10	0.16
Rauch and Trindade (2002)	63 countries and Chinese Ethnic Networks 1980,1990	Pooled OLS	0.47	0.47
Wagner et al. (2002)	5 Canadian provinces and 160 countries 1992-1995	Pooled OLS with country FE	0.27	0.09
Combes et al. (2005)	94 French departements 1993	Importer and exporter FE	0.14	0.25
Parsons (2005)	EU-15 and 15 EU expansion countries 1994-2001	Panel OLS with country FE	0.14	0.12
White (2007)	US and 73 countries 1980-2001	Pooled OLS	0.30	0.13
Peri and Requena-Silvente (2010)	50 Spanish provinces and 77 countries 1995-2008	Panel OLS with partner-pair and country-year FE	-	0.11
		2SLS	-	0.05
Bratti et al. (2014)	107 Italian provinces and 210 countries 2002-2009	2SLS	0.59	0.13

In addition to these more macroeconomic studies, several more recent papers have attempted to better identify how migrants affect trade by exploiting firm level data. Hatzigeorgiou and Lodefalk (2016) use matched employer-employee data for 12,000 Swedish manufacturing firms to study the impact of migrants on firm level trade. They find that an additional migrant worker is associated with a 1% rise in exports for small firms only, but that there is no effect for imports. In further analysis, they show that high skilled, more recent migrants are likely to have the strongest pro-trade effect. Similarly, using Danish matched employer-employee data, Hiller (2013) also finds evidence that employing migrant workers increases a firm's export sales.

We contribute to the discussion on how to overcome the problem of endogeneity by exploiting a quasi-natural experiment. Methodologically we use a difference-in-differences approach rather than the standard gravity model approach discussed in Section 2.5.1. In fact, in simplified terms, we can think of the difference-in-differences method as essentially a two period gravity model in which migration is zero between the UK and all countries in period one, $M_{ij} = 0$, but where migration is positive between the UK and the treatment group, A8 countries, in period 2 $M_{ij} > 0$, while remaining zero between the UK and countries in the control group. We argue that the huge increase in A8 migrants coming to the UK was exogenous; it occurred as a result of policy change to the free movement of labour when these countries joined the EU in 2004, and because of the restrictions put in place by other EU15 countries. Consequently, we argue that the increase in A8 migrants to the UK provides us with a plausibly more exogenous setting than the standard gravity model approach with many countries and time periods commonly used in the existing literature, which therefore enables us to establish a causal relationship between migration and subsequent UK-A8 trade flows.

2.3 Historical Background

This section briefly discusses how the 2004 EU enlargement differed from previous enlargements, before looking at the history of the CEECs and how their accession to the EU came about. Finally, we discuss what is meant by the free movement of labour and how labour market restrictions were implemented differently by various EU countries.

2.3.1 European Union Enlargement

Table 2.2: A Timeline of EU Enlargement

Year	Country
1957	Belgium, France, Germany, Italy, Luxembourg, Netherlands (Foundation of European Common Market)
1973	Denmark, Ireland, United Kingdom
1981	Greece
1986	Portugal, Spain
1995	Austria, Finland, Sweden
2004	Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia
2007	Bulgaria, Romania
2013	Croatia

Table 2.2 shows the seven rounds of EU enlargements which have taken place. The 2004 round was somewhat different from previous ones for three reasons: the scale of the enlargement, how much poorer the acceding countries were, and thirdly, the fact that the EU allowed individual countries to impose migration restrictions. Dustmann et al. (2003) recognise that there are some parallels between the 2004 accession and when Greece, Portugal and Spain became members, because these countries were also relatively poor compared to the older members. Initially, in 1981 when Greece joined the European

Community and in 1986 with the addition of Spain and Portugal, there were fears about how migration from these countries may impact on existing member's labour markets. As a result, restrictions on migration were put in place.[6] However, as Dustmann et al. (2003) point out, the levels of GDP and GDP per capita in purchasing power parity terms were much lower for the 2004 accession countries than for the acceding countries in any of the previous EU enlargements, making this enlargement unique.

Table 2.3: Selection of Socio-economic Indicators for A10 Countries in 2000

Country	Population (millions)	Unemployment (%)	GDPpc PPP as % of UK's	Average annual GDP growth rate (%) 1997-2003
Czech Rep.	10.3	8.8	59.1	2.0
Estonia	1.4	13.1	36.8	6.9
Hungary	10.2	6.4	45.1	3.8
Latvia	2.4	14.2	30.6	6.6
Lithuania	3.5	15.9	32.7	5.9
Poland	38.3	16.1	40.1	3.9
Slovakia	5.4	18.8	41.8	3.3
Slovenia	2.0	6.9	66.6	4.0
Cyprus	0.9	5	73.8	3.6
Malta	0.4	6.3	72.2	3.3
UK	58.9	5.5	100	3.4

A selection of socio-economic characteristics for the CEECs are presented in Table 2.3. Both policy makers and ordinary citizens had grave concerns over the possibility of mass migration and the potential flooding of their countries' domestic labour markets. In purchasing power parity GDP per capita terms, none of the A8 countries reached more than 67% of that of the UK. In fact, the largest of the accession countries, Poland, only reached 40% of the UK's GDP per capita. Furthermore, Table 2.3 also highlights the high unemployment

[6]These restrictions only applied to those migrants seeking work. Migrants who were not seeking work were still permitted to move freely throughout the EU. In addition, many Spanish and Portuguese migrants were able to continue working in other member states as long as they had the appropriate permit. (Dustmann et al., 2003)

rates of the A8 countries. Five of the eight countries had an unemployment rate of at least 13%, significantly higher than the 5% seen in the UK at that time. In addition, much of the EU budget was spent on supporting poorer regions and there were fears that existing recipients of these funds would lose out, with the addition of ten poorer countries.

2.3.2 Central and Eastern Europe

Following the breakdown of Communism in 1989, many central and eastern European countries wanted to begin building links with the European Community, with a view to eventually joining the EU. They were met with ambivalence from existing EU members (Baldwin and Wyplosz, 2009). One of the reasons for this ambivalence was that many politicians and members of the public in western European countries had grave concerns over the potential for mass migration and its consequences. Baldwin and Wyplosz (2009) argue that the primary reason for these concerns was due to the fact that the CEECs were much poorer than the EU15 countries and their economies were heavily dependent on agriculture. Approximately 80% of the EU budget is spent on agriculture and poor regions, so the existing recipients of these funds were understandably wary of the CEECs joining the EU.

In response to the CEECs' keenness to build ties with the EU15, the PHARE (Poland Hungary Aid for Economic Reconstruction) programme was established in 1990 and initially provided the countries with assistance in the following areas: training, food aid, environmental measures, help with privatisation and restructuring of businesses (Senior Nello, 2009). The programme was subsequently extended to other CEECs and eventually became one of the key instruments in the Accession Agreements that helped the countries prepare

for EU membership. Furthermore, the European Bank for Reconstruction and Development (EBRD) was established, with the primary task of encouraging investment in the CEECs.

Between 1991 and 1996, each CEEC signed an Association Agreement with the European Community. These agreements came into force in 1992 for the Czech Republic, Hungary, Poland and Slovakia, in 1995 for Estonia, Latvia and Lithuania, and finally in 1997 for Slovenia. Malta and Cyprus had already signed agreements in 1970 and 1972 respectively (Baldwin and Wyplosz, 2009). Although these agreements incorporated political and legal considerations, they were essentially bilateral trade agreements. They were seen as an important step in the transition from planned to market economies, and towards the CEECs′ eventual aim of becoming part of the EU. In particular, the adoption of EU laws and rules enabled this to happen in a relatively short time frame. As part of these agreements, both the EU and the CEECs gradually removed tariffs and quantitative restrictions, but in an asymmetric manner, with faster liberalisation by the EU. These barriers to trade were reduced for most categories of goods, although restrictions did remain in place for agricultural goods, as well as certain industrial products such as coal and steel goods and some textiles. While all of the agreements sought to establish free trade between the EU and each CEEC, the implementation periods varied from country to country, with a maximum ten year transition period.[7]

In addition to these bilateral agreements with the European Community, the Central European Free Trade Agreement (CEFTA) was signed in 1991 between Czechoslovakia, Hungary and Poland in order for the CEECs to es-

[7]Poland, Hungary, Czech Republic and Slovakia had the maximum 10 year transition period, Slovenia and Lithuania had 6 years, Latvia had 4 years, and Estonia implemented free trade immediately.

tablish closer trading ties amongst themselves. This was later extended to Slovenia, Bulgaria and Romania. Similarly, the Baltic Free Trade Agreement (BAFTA) was signed in 1994 between Estonia, Latvia and Lithuania. The European Community signed trade agreements with both CEFTA and BAFTA.

At the Copenhagen Summit in June 1993, the European Council laid out the criteria that the ten prospective EU countries were required to meet in order to be granted EU membership. They involved both important political and economic considerations, with more emphasis placed on meeting the political conditions. With regards to the political considerations, countries were required to guarantee democracy and human rights, ensure the stability of their institutions, and to adhere to political union. There were three economic pre-requisites: a functioning market economy, the ability for the economy to cope with market forces within the European Community and finally, to stick to the aim of creating and maintaining a successful monetary union (Senior Nello, 2009).

Once the main criteria had been established, pre-accession strategies were agreed by the Essen European Council in 1994, and in 1998, and an enhanced pre-accession strategy was put in place, laying out the framework for each of the countries, with the aim of reinforcing cooperation between existing EU members and the applicant countries (Senior Nello, 2009). Between 1994-1996, the eight CEECs formally applied to become members of the EU, Malta and Cyprus having already applied previously. In 1997, at the Luxembourg Summit, accession negotiations began with Cyprus, Czech Republic, Estonia, Hungary, Poland and Slovenia, while in 2000, negotiations were started with Latvia, Lithuania, Malta and Slovakia. On 9th October 2002, accession negotiations with the ten countries were concluded and they became EU Member

States on 1st May 2004.

2.3.3 Free Movement of Labour within the EU

Article 45 of the Treaty of the Functioning of the European Union states that EU citizens are entitled to live and work in another member state, without the need for a work permit or visa. Furthermore, they are to be treated in the same manner as citizens of that country, with regards to employment opportunities and working conditions (European Commission, 2013). These rights for workers, in some form, have existed since the beginning of the European Economic Community with the signing of the Treaty of Rome in 1957.[8]

Due to the widespread fears over the potential for a large influx of migrants from central and eastern Europe in 2004, existing EU members were permitted to implement restrictions to the free movement of labour. Each existing EU member state was able to restrict A8 migration during a maximum seven year transitional period, with an initial 2+3 years scheme, followed by an option to extend the restrictions for a further 2 years if requested. During the initial two year period, each member state was allowed to follow their own national guidelines regarding how many A8 migrants to admit, although they were not permitted to reduce numbers below their 2004 level. No restrictions were placed on citizens from Malta or Cyprus. In the following three year phase, countries were allowed to extend this period of restrictions if they applied to do so. Finally, if they were able to demonstrate severe disturbances to their

[8]Article 39 of the Treaty of Rome enabled workers to move freely within the EC and to accept jobs and consequently reside in other member states. This merely considered individuals as economic agents. In 1968, Council Regulation 1612/68 banned employment discrimination due to nationality. Furthermore, it extended the right of free movement to family members and gave workers the same rights as nationals with regards to tax and accessing services such as housing. Directive 68/360 reduced bureaucracy by removing the need to present a visa in order to move to another member state for work.

labour market, they were able to extend the restrictions for a further two years, after which point, all restrictions had to be removed (European Commission, 2006).

The UK, along with Ireland and Sweden, were the only countries not to impose any restrictions on worker mobility. Migrants entering the UK were simply required to declare themselves by signing up to the Workers Registration Scheme.[9] In contrast, other large EU15 countries, such as Germany, implemented the free movement of labour restrictions for the maximum permitted length of time. In Germany these restrictions were only removed in 2011. The different approaches taken by various countries may have a lasting impact on migrant settlement patterns, as migrants settle in particular countries, building up communities and networks.

2.4 Descriptive Statistics

2.4.1 Migration Trends

Table 2.4 documents the large post accession rise in migrants from the ten countries who joined the EU in 2004. The first thing to note is the remarkably large number of migrants from both Cyprus and Malta prior to 2004, given the small size of these countries. It is also clear that the pattern of migration from these two countries is somewhat different from that of the CEECs. Neither country shows a discernible change in the level of migrant stock pre and post

[9] A8 migrants were legally required to register with the Workers Registration Scheme within one month of starting a new job. The registration fee was £50 and they were required to register again if they obtained a new job, although they were only required to pay the fee once. Self-employed workers were not required to register and once a person had been working in the UK for 12 months, they were no longer required to register. The registration fee is likely to have acted as a deterrent to register themselves and consequently, WRS figures are likely to underestimate the number of A8 migrants who came to the UK.

accession, and in fact, the number of Maltese migrants in the UK has actually decreased since 2004. There are several potential explanations for this trend. Firstly, Cyprus and Malta are both former UK colonies, so traditionally, the UK has had much stronger ties with them than with the CEECs. As members of the Commonwealth, migrants from Cyprus and Malta faced no restrictions to entering the UK until the 1960s.[10] In addition, as other EU15 countries did not impose restrictions on citizens from Cyprus or Malta, they had no particular reason to move to the UK after 2004. Furthermore, Table 2.3 shows that they both have much higher levels of GDP per capita, which negates one of the primary motives for moving to the UK. As such, they will be excluded from further analysis.

Table 2.4: A10 Migrant Stocks pre and post Accession

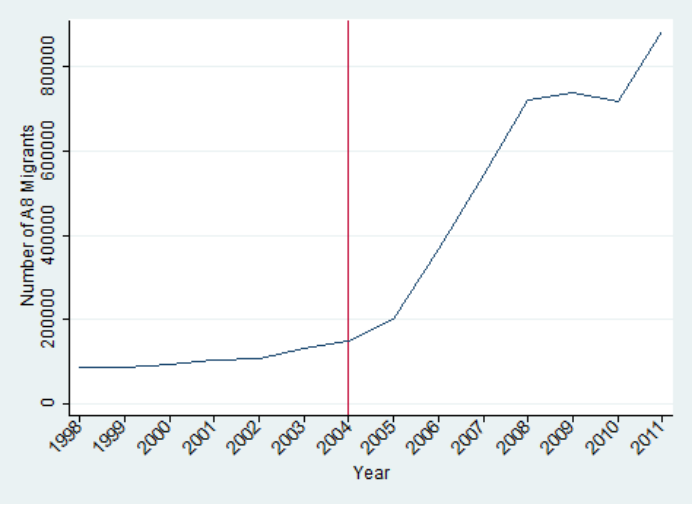
Country	Average annual migrant stock 1998-2003	Average annual migrant stock 2005-2010	% increase pre and post accession
Slovakia	4,766	41,203	765
Poland	58,795	378,004	543
Lithuania	9,169	56,578	517
Latvia	5,432	20,717	281
Estonia	1,651	5,447	230
Czech Republic	7,342	23,069	214
Slovenia	746	1,301	74
Hungary	15,214	22,127	45
Cyprus	73,111	75,035	3
Malta	28,584	25,980	-9
A8 (excl. Cypus & Malta)	103,114	548,444	432

Source UK Quarterly Labour Force Survey, Jan-March 1998-2010 (ONS, 2011). There are very few entries for migrants from Estonia and Slovenia in certain years, so we report the average number of migrants annually for the six years prior to and after the 2004 EU enlargement.

[10]The Commonwealth Immigration Act (1968) enabled the government to enforce much stricter controls for those Commonwealth migrants who were not UK citizens and did not have a parent or grandparent who was born in the UK

Secondly, prior to the accession, there was already a large stock of Polish migrants of almost 59,000. Hungarian migrants also had a significant presence, with approximately 15,000 migrants, but the numbers of migrants from the other countries were significantly smaller. These figures demonstrate that there were already significant numbers of central and eastern Europeans living in the UK before 2004. However, before 2004, these migrants required visas to be able to live and work in the UK legally. Many were employed in schemes such as the Seasonal Agricultural Workers Scheme which permitted citizens from outside of the European Economic Area to fill labour shortages in the UK agricultural sector, usually for a short period of time. The final column of Table 2.4 shows how the proportion of migrants from each country changed post 2004. Slovakia, Poland and Lithuania both saw increases of over 500%, while the Czech Republic, Estonia and Latvia all saw large increases of 200-300%. Hungary and Slovenia had more modest, but still substantial rises.

Figure 2.1: A8 Migrants present in the UK 1998-2011



Source UK Quarterly Labour Force Survey,1998-2011.

Figure 2.1 shows the substantial increase in the number of A8 migrants resident in the UK after the 2004 EU enlargement. While there was a moderate initial increase between 2004 and 2005, there was a substantial increase

between 2005 and 2006. The number of A8 migrants continued to increase sharply until 2008, then numbers remained fairly constant until a further rise between 2010 and 2011 to over 800,000. This slight delay in observing an increase in migrants is unsurprising, as the enlargement occurred mid way through 2004.

Table 2.5: A8 Migrant Occupation by Year of Arrival

Occupation	N^{o}arrived pre 2001	% share of A8 migrants in occupation	N^{o}arrived 2001-2011	%share of A8 migrants in occupation
Managers & directors	12,296	12.9	27,925	4.2
Professional	17,507	18.4	45149	6.8
Associate professional	11,277	11.9	35,757	5.4
Administrative	10,185	10.7	37,177	5.6
Skilled trades	12,618	13.3	100,811	15.2
Caring, leisure & services	9,132	9.6	56,552	8.5
Sales & customer services	5,633	5.9	31,719	4.8
Machine operatives	6,381	6.7	108,344	16.4
Elementary occupations	10,044	10.6	219,195	33.1

Source: UK Census 2011

Turning now to the characteristics of the A8 migrants, Sumption and Somerville (2010) note that these migrants are on average younger and better educated than previous waves of migrants to the UK. Nevertheless, they often downgrade to low skilled occupations when they arrive in the UK (Dustmann et al., 2013). These findings are confirmed by 2011 UK Census data. Table 2.5 provides a breakdown of the occupations of A8 migrants present in the UK in 2011, distinguishing between migrants who have been in the UK since before 2001, and those who have arrived more recently, since 2001. It shows that approximately 50% of the more recently arrived A8 migrants work in the lowest skilled occupations, as machine operatives or in elementary occupations. In contrast, only 17% of the pre 2001 migrants work in these low skilled occupations. In addition, the share of A8 migrants working in high

skilled occupations (Managers, Professionals and Associate Professionals) is much lower for recent migrants, approximately 16% compared to 43% for pre 2001 migrants. However, despite a much lower share working in high skilled occupations, the raw numbers have increased dramatically. This could be important with regards to the migration trade link, because those in high skilled occupations may be more likely to be in a position to influence trade flows, compared to those in low skilled occupations.

Table 2.6: A8 Migrant Industry by Year of Arrival

Industry	N^{o}arrived pre 2001	% share of A8 migrants in occupation	N^{o}arrived 2001-2011	%share of A8 migrants in occupation
Agriculture, forestry & fishing	373	0.4	10,204	1.5
Manufacturing	6,582	6.9	107,634	16.2
Energy & water	807	0.8	8,000	1.2
Construction	9,494	10.0	67,491	10.2
Distribution, hotels & restaurants	19,620	20.6	182,062	27.5
Transport & communication	8,678	9.1	60,560	9.1
Financial, real estate, professional & administrative	18,119	19.1	115,427	17.4
Public administration, education & health	25,909	27.3	82,748	12.5
Other	5,491	5.8	28,503	4.3

Source: UK Census 2011

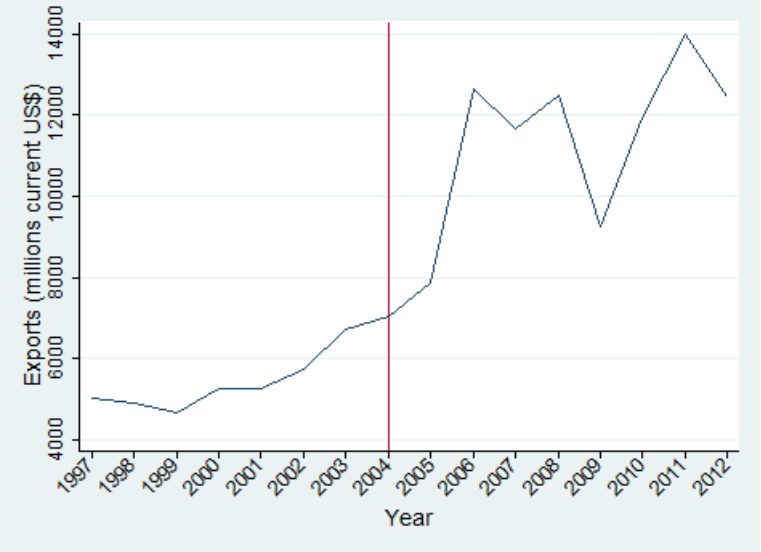
Again using data from the 2011 UK Census, Table 2.6 shows that the majority of recently arrived A8 migrants work in non-tradable industries such as: construction, hospitality, financial services and public administration. Consequently, these migrants are unlikely to have an impact trade flows by reducing transaction costs or through network effects. However, 16% of these migrants work in manufacturing, which could be important with regards to the migration trade link because the manufacturing industry is responsible for the majority of trade.

2.4.2 Trade Flow Trends

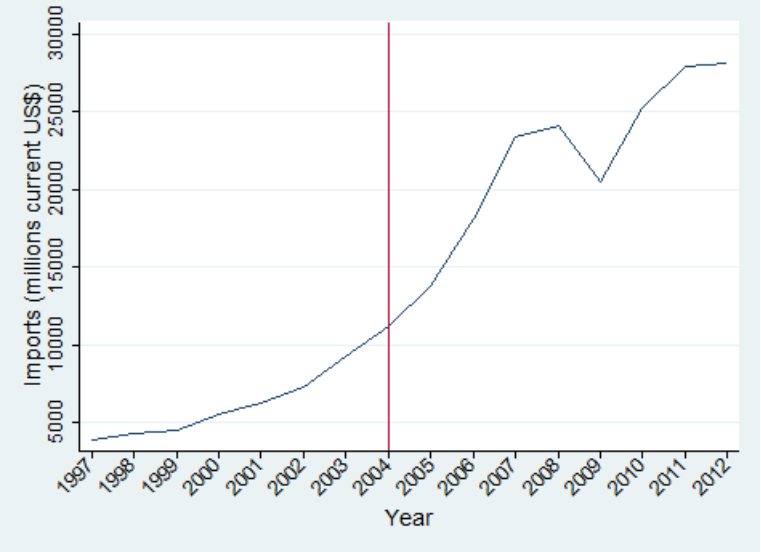
Having documented the large increase in A8 migrants present in the UK since 2004, we turn now to look at the pattern of UK-A8 trade flows. Figure 2.2a shows that UK exports to the A8 countries increased steadily between 1999 and 2005, and then increased substantially between 2005 and 2006, before tailing off slightly as a result of the economic crisis, and then picking up again from 2009 onwards. This large increase in exports after 2005 coincides with the large influx of A8 migrants to the UK. We can see from Figure 2.2b that the pattern for imports is slightly different, because although imports from the A8 countries increased between 1999 and 2007, we do not observe a jump after 2004, rather, we see a more gradual increase.

Table 2.7 reports UK trade flows by group of countries, splitting Europe into: A8, EU and other Europe. Including trade flows for 2004 and three years either side of the enlargement allows us to see how UK trade flows changed in this short, but crucial period of time. Trade flows for the full period 1997-2012 are available in the Appendix. Looking first at the value of UK exports to the A8, we see a large jump from $7,854 million in 2005 to $12,660 million in 2006. However, we observe a similar jump in UK exports to the EU between 2005 and 2006, while exports to the other continents increased more gradually over the seven year period. From the bottom half of Table 2.7, we can see that UK imports from all continents increased substantially between 2001 and 2007. However, proportionately, imports from the A8 increased the most in the three years after the accession, more than doubling between 2004 and 2007. Similarly to the exports case, imports from the EU also saw a large rise in this period.

Figure 2.2: UK Exports from and Imports to A8 Countries 1997-2012



(a) Exports



(b) Imports

Source: IMF Direction of Trade Statistics 2014 Edition

2.5 Empirical Strategy

This section will first introduce the data used in the baseline analysis, before introducing the difference-in-differences identification strategy. Finally, we provide a comparison of the difference-in-differences model with the more

Table 2.7: UK Trade Flows by Continent

Year	2001	2002	2003	2004	2005	2006	2007
UK Exports ($US millions)							
A8	5,265	5,724	6,714	7,051	7,854	12,660	11,659
Africa	6,575	6,814	8,201	9,681	9,630	10,684	11,838
Asia	25,005	25,604	31,701	37,426	40,691	43,043	49,128
EU	109,020	111,950	121,230	130,640	146,220	188,320	164,080
Other Europe	8,880	8,579	9,180	10,725	19,811	14,373	15,785
North America	49,124	49,442	55,490	60,319	60,049	63,954	68,025
South America	2,618	2,542	2,459	2,862	2,957	3,399	4,044
Oceania	3,354	3,216	3,783	4,433	4,755	5,067	6,620
UK Imports ($US millions)							
A8	6,235	7,363	9,221	11,188	13,767	18,129	23,392
Africa	9,877	10,065	11,208	14,176	15,428	18,611	19,117
Asia	54,976	57,359	67,103	85,746	95,427	108,525	122,184
EU	117,590	130,790	155,607	174,000	195,330	214,750	242,430
Other Europe	16,138	16,664	18,230	23,599	28,595	35,830	38,877
North America	52,250	47,237	47,610	52,413	48,198	56,457	64,053
South America	4,091	4,285	4,594	5,690	6,241	7,649	8,395
Oceania	2,785	2,816	3,186	3,703	4,327	6,310	6,882

Source: IMF Direction of Trade Statistics 2014 Edition

traditional gravity model approach.

2.5.1 Data

We use a panel dataset of UK trade flows with 143 countries covering the period 1997-2012. This period was chosen to cover a long time frame, without coinciding with any of the previous EU enlargements, the last of which occurred in 1995. Of the 143 partner countries, 8 are the accession countries, while the inclusion of the other 135 countries is based on data availability. Ireland and Sweden are notable exclusions because, along with the UK, they were the only EU15 countries not to impose any restrictions to the free movement of labour of A8 citizens in 2004. Consequently, these countries' trade flows may also have been affected by increased migration, so they are excluded. Bulgaria and Romania are also excluded because these countries joined the EU in 2007.

A full list of UK trading partner countries used in this analysis can be found in the Appendix. Import and export data come from the IMF Direction of Trade Statistics (DOTS) May 2014 edition (IMF, 2014) and are reported in current $US. Import data are recorded c.i.f (cost, insurance, freight), while exports are recorded f.o.b (free on board). GDP data are from the World Bank World Development Indicators and are also reported in current $US.

2.5.2 Difference-in-differences

In Section 2.3.2, we saw that the Association Agreements between the European Community and each of the A8 countries incorporated trade liberalisation. These agreements which were signed in the early to mid 1990s had a maximum ten year transition period during which tariffs were reduced year on year until they reached zero. Consequently, by 2004, when the A8 countries joined the EU, there was already free trade between the UK and these countries. Focusing on the UK provides a unique opportunity to exploit a quasi-natural experiment, because the UK was one of only three countries to allow immediate free movement of labour for A8 citizens. As there was already free trade between the UK and these countries prior to 2004, we argue that the major change brought about by the 2004 EU enlargement was the possibility for A8 citizens to live and work in the UK without needing a permit. Furthermore, such large inflows of migrants were unexpected, as shown in Dustmann et al. (2003), because the UK did not anticipate that the other major EU economies would implement restrictions to the free movement of labour of A8 citizens. They are therefore more plausibly exogenous with respect to trade flows, strengthening the causal interpretation of our model.

The opening up to free movement of labour at a particular point in time

allows us to conduct a before and after difference-in-differences analysis in order to examine the impact of migration on UK bilateral trade flows. Using the difference-in-differences method enables us to identify whether there has been a causal effect of migration on trade flows in this instance, by allowing us to exploit the sudden increase in the UK migrant stock from A8 countries.

We estimate the following model, where separate equations are estimated for imports and exports:

$$\ln(X_{ijt}) = \beta \ln(Y_{it}Y_{jt}) + \gamma(D_t A_j) + v_t + u_j + \epsilon_{ijt} \tag{2.5.1}$$

where $\ln(X_{ijt})$ is the log of the trade flow between the UK (i) and partner j at time t. The log of the product of countries' GDP ($Y_{it}Y_{jt}$) is included to control for changes in the size of countries. D_t is a dummy variable which takes the value 1 if $t > 2004$ and zero otherwise. A_j is a dummy variable which takes the value 1 if the partner country is one of the A8 countries and zero otherwise. More precisely, the interaction term $D_t A_j$ captures the accession treatment effect, and takes the value 1 if the observation is a UK trade flow with one of the A8 countries which occurred after 2004, and zero otherwise. Remembering that there was already free trade between the UK and A8 countries prior to 2004, this interaction treatment variable captures the effects of the 2004 EU enlargement and how the resulting increase in migrants affects UK bilateral trade flows with the A8 treatment group, compared to the change in UK trade flows with the 135 control countries. A full list of these countries is provided in Table 2.18 in the Appendix. While we use UK trade with 135 rest of world countries as the control group in our baseline model, there are potentially a number of different possible control groups we could

use for this analysis. We will discuss this further in Section 2.6.2.

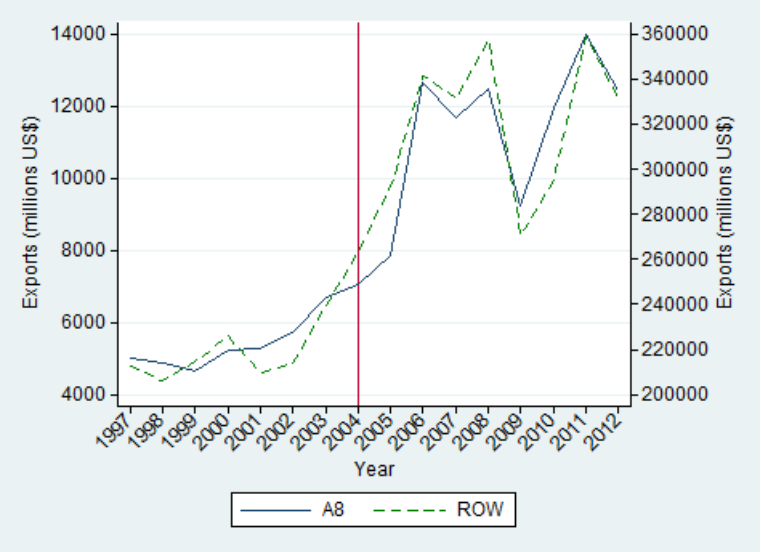
The estimated model includes both year (v_t) and trading partner fixed effects (u_j). Year fixed effects account for common changes in UK trade with the rest of the world over time. Trading partner rather than country pair fixed effects are included because the reporting country is always the UK. These fixed effects take into account any unobserved characteristics specific to a trading partner that do not change over time.

In our model, the dependent variable (the log of imports or exports) is likely to be serially correlated. The accession interaction term is also serially correlated because it equals zero up to 2004, and 1 afterwards. This lack of variation over time within a country exacerbates the serial correlation in the dependent variable (Bertrand et al., 2004). To account for this, the model is estimated using clustered standard errors, which allows the errors to be correlated within but not across country pairs.

In order for the difference-in-differences estimator to be valid, several conditions need to hold. Firstly, there should be no compositional change in the treatment and control groups over time, although the use of country fixed effects ensuring a within country comparison addresses this problem. Nevertheless, only countries with data for the whole period were chosen to be in the control group. Secondly, UK trade flows with the 135 control group countries should have been completely unaffected by the increase in A8 migration to the UK after 2004. Finally, the treatment and control groups should both experience the same macroeconomic shocks. More specifically, the common trends assumption requires that the treatment and control groups would have experienced the same trend in the absence of the treatment. As this cannot be directly tested, in Figure 2.3 we look at the pre-accession trend as evidence for

the common trends assumption. Figure 2.3 shows that UK-A8 and UK-ROW trade flows follow relatively similar trends in the pre-accession period between 1997-2004.

Figure 2.3: UK-A8 v UK-ROW Trade Flows



(a) Exports



(b) Imports

2.5.3 Difference-in-differences versus Gravity

In Section 2.2.2, we saw that the majority of existing studies in the literature use the gravity model to assess the impact of migration on trade flows. However, none of these studies have been undertaken during a period of huge change in the number of migrants, as happened in the UK after 2004. Even when a gravity model is estimated on a panel dataset, it estimates the average pro-trade effect of migration over the duration of the panel. In this chapter though, using the difference-in-differences approach enables us to clearly separate out the effects before and after 2004. This is crucial, as we are specifically trying to identify the impact that this large increase in migration has had on trade flows. A further advantage of the difference-in-differences approach is its ability to separate the impact of migration on trade for different countries. This method allows for a different impact on treatment and control groups. The difference-in-differences approach removes the variation in the control group, whereas the gravity model includes all migration flows for all countries. Consequently, the difference-in-differences method provides us with an explicit counterfactual.

One of the major criticisms of the migrant trade link literature has been the failure to convincingly address the issue of causality. Is it realistic to infer that the direction of causality runs from migration to trade? In existing gravity model studies, the exogeneity of the migrant stock has not been clearly established. However, in our study, the huge increase in the UK migrant stock from the A8 countries after 2004 was exogenous with respect to trade flows. The increase to the migrant stock was exogenous because A8 migrants came to the UK as a result of the fact that the UK did not impose any restrictions to the free movement of labour and because of the restrictions put in place

by other EU 15 countries, leading to a lack of other viable destinations. This is reinforced by Dustmann et al. (2003) who in their pre-accession scenario analysis, predicted net annual migrant inflows of 5,000-13,000 under the assumption that none of the EU15 countries would implement restrictions to the free movement of labour. When the migrant stock is exogenous, then both the gravity model and the difference-in-differences model can be used. In this case we opt to use the difference-in-differences approach in order to exploit this large change to the migrant stocks. We argue that the difference-in-differences model can be thought of as a simplified gravity model which replaces migrant stocks, M_{ij} in equation (2.2.3), with the accession treatment effect, $D_t A_j$ in equation (2.5.1), in an environment in which $D_t A_j$ is exogenous.

Despite the motivation for the use of the difference-in-differences approach, it does have several limitations. Firstly, unlike a gravity model, it does not allow us to study the intensity of the impact of migration on trade flows. Secondly, the model splits UK trade flows with 143 countries worldwide into a treatment group of UK trade with the A8 countries and a control group of UK trade with 135 other countries. However, it could be argued that UK trade with these 135 countries may not be an appropriate control group, as they may have been indirectly affected as a result of the EU enlargement; trade that previously took place between the UK and rest of world countries may have subsequently been diverted to the A8 countries. Alternatively, UK trade with these 135 countries may simply not be representative of what would have happened to UK A8 trade flows had there been no EU enlargement. Finally, the major criticism of this method is that by simply using a dummy variable which takes the value 1 for a UK A8 trade flow that occurred after 2004, it could be argued that the interaction term may merely be picking up other changes that occurred after these countries joined the EU that have not been

accounted for. While this is a possibility, we argue that the free movement of labour afforded to A8 citizens was the most significant aspect of the 2004 EU enlargement. Moreover, given the huge numbers of A8 migrants who came to the UK after 2004, we expect the accession interaction term to pick up any migration effect. Nevertheless, we address these concerns in Section 2.6.2 by using two alternative control groups, as well as a robustness check in Section 2.6.3 which includes the migrant stock in the model.

2.6 Results

In Section 2.2.2, we discussed two concerns when estimating this type of model in its log linear form: heteroskedasticity and how to deal with zero trade flows. In order to address these concerns, we report PPML estimates in addition to reporting OLS fixed effects estimates for our baseline results. In Section 2.6.4 where the need to deal with zero trade flows arises, we only report PPML estimates.

2.6.1 Baseline Results

Our baseline results are reported in Table 2.8. The accession term in Table 2.8 corresponds to γ in equation 2.5.1. The coefficients on the accession interaction term are positive and statistically significant for both imports and exports, although only at the 10% level for imports according to the OLS fixed effects specification. The levels of significance are reversed with the PPML estimation, with the accession term in the exports equation only being statistically significant at the 10% level, compared to at the 1% level for imports. The PPML coefficients on the accession term suggest that UK imports from A8

countries increased by 62%[11] more than UK imports from the rest of the world after 2004. The impact is noticeably smaller for exports, but still large, with UK exports to A8 increasing 20% more than UK exports to the rest of the world. These initial results suggest the existence of a migration effect.

Table 2.8: Baseline Results

	(1)	(2)	(3)	(4)
	OLS		PPML	
	Imports	Exports	Imports	Exports
Accession	.5513*	.3319***	.4830***	.1803*
	(.2853)	(.0772)	(.1561)	(.0957)
Ln $GDP_{it}GDP_{jt}$	.9354***	.6505***	.9349***	.6227***
	(.1776)	(.0635)	(.1087)	(.0816)
Year FE	Yes	Yes	Yes	Yes
Partner FE	Yes	Yes	Yes	Yes
Within R^2/R^2	.1281	.2986	.9761	.9820
N^o of observations	2288	2288	2288	2288
N^o of clusters	143	143	143	143

Standard errors clustered at the country level are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.Columns (3) and (4) present results from estimating ((2.5.1)) in its original multiplicative form using a PPML estimator, i.e. with the dependent variable in levels rather than logs. The interpretation of coefficients is the same as when estimating a model using OLS.

In addition to the baseline results shown in Table 2.8, we also test a model which includes two separate accession periods: a short term accession period from 2005-2008 and a medium term accession period from 2009-2012. This enables us to see whether there were differing accession effects in the short and medium term. The results are shown in Table 2.9. We can see that the coefficients on the accession terms are smaller for both imports and exports in the short term compared to the medium term. In addition, the short term effect for exports is not statistically significant. For imports, the 2009-2012 term has a much larger coefficient of 0.64, almost double the magnitude of the short term effect. It is perhaps not surprising to see a larger medium than

[11] exp(0.483)-1=0.62

short term effect, because it is likely to take time for trade flows to adjust as a result of a migration shock. One potential explanation for this difference between the imports and the exports could be that there was a much larger fall in UK exports than imports after 2008 as a result of the global financial crisis, so any potential medium term effect on exports may have been reduced as a result.

Table 2.9: Short and Medium term accession periods

	(1)	(2)
	PPML	
	Imports	Exports
Accession(2005-2008)	.3121**	.1168
	(.1276)	(.0775)
Accession(2009-2012)	.6363***	.2434**
	(.1814)	(.1200)
Ln GDP_{jt}	.9417***	.6233***
	(.1101)	(.0819)
Year FE	Yes	Yes
Partner FE	Yes	Yes
R^2	.9762	.9820
N^o of observations	2288	2288
N^o of clusters	143	143

Standard errors clustered at the country level are reported in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

2.6.2 Alternative Control Groups

As mentioned previously, a potential weakness of the difference-in-differences method estimated in the previous section is that using UK trade with the rest of the world may not be a suitable control group. The common trends assumption requires that the control group represents what would have happened to UK-A8 trade in the absence of the 2004 EU enlargement. However, it could be argued that a rest of world control group containing 135 diverse countries may not be the best representation of what would have happened to UK trade with

the A8 countries in the absence of EU enlargement. In order to address this, we re-estimate equation 2.5.1 using an alternative control group consisting of UK trade with other European countries who did not become members of the EU. Arguably this subset of countries is a more appropriate control group than UK rest of world trade as they shared more similarities with the A8 countries prior to the EU enlargement. Table 2.10 shows that these non-EU European countries had similarly high unemployment rates, typically greater than 10%, and also relatively high average annual GDP growth. Although in purchasing power parity terms, these countries had lower GDP per capita as a percentage of the UK's than the A8 countries, they arguably shared more similarities with the A8 countries than the rest of world control group. The control countries included in this alternative specification are: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Croatia, Georgia, Iceland, Macedonia, Moldova and Ukraine.

Table 2.10: Selection of Socio-economic Indicators for non-EU European Countries in 2000

Country	Population (millions)	Unemployment (%)	GDPpc PPP as % of UK's	Average annual GDP growth rate (%) 1997-2003
Albania	3.1	-	16.1	5.1
Armenia	3.1	-	8.8	8.1
Azerbaijan	8.0	11.8	13.4	9.4
Belarus	10.0	-	21.9	6.5
Bosnia&Herzegovina	3.8	-	16.6	11.3
Croatia	4.4	16.1	41.4	3.6
Georgia	4.4	10.8	9.9	5.7
Iceland	0.3	2.3	109.4	3.7
Macedonia	2.1	32.2	22.1	1.8
Moldova	3.6	8.5	7.0	2.0
Ukraine	49.2	11.6	14.5	3.5

Table 2.11 shows that the accession interaction term is statistically significant at the 1% level in the import equation, although with a smaller magnitude than in our baseline model. On the other hand, there is no accession effect

on exports. This means that the change in UK A8 exports before and after 2004 was not larger than the change in UK exports with non-EU European countries. These findings are consistent with what we found in our baseline model.

Table 2.11: Control Group: UK trade with other European non-EU countries

	(1)	(2)
	PPML	
	Imports	Exports
Accession	.3656***	.1059
	(.1409)	(.0838)
Ln $GDP_{it}GDP_{jt}$	.4531**	.6683***
	(.1944)	(.1304)
Year FE	Yes	Yes
Partner FE	Yes	Yes
R^2	.9685	.9807
N^o of observations	304	304

Clustered standard errors are not used in this case because 18 clusters is not a sufficient number of clusters (Bertrand et al., 2004). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

In order for our difference-in-differences estimation strategy to be valid, the control group should not be affected by the policy change. One could argue that either UK trade with the rest of the world or UK trade with non-EU European countries could have been affected by the EU enlargement. An increase in trade between the UK and the A8 countries could simply represent an increase in the production of tradable goods. However, it may be the case that as a result of the enlargement, trade that previously took place between the UK and rest of world countries, or with non-EU European countries, may have subsequently been diverted to the A8 countries, which would imply that these estimates would be biased upwards. Consequently, we perform an alternative estimation where the treatment group is still UK trade flows with the A8, but where the control group is now other EU15 countries' trade with the A8 coun-

tries. Belgium and Luxembourg are excluded from the control group due to missing data observations, while Ireland and Sweden are excluded because like the UK, they did not impose any restrictions to the free movement of labour of A8 citizens. As other EU15 countries implemented restrictions to the free movement of labour for A8 citizens due to fears over their impact on labour markets, public services and housing markets, these EU15 countries did not see a huge increase in A8 migrants immediately after 2004 as the UK did.[12] If it is indeed migrants who affect trade flows, then we would expect the change in UK-A8 trade flows pre and post accession to be larger than the change in other EU-15-A8 trade flows. We re-estimate equation 2.5.1, but now we define A_j as a dummy variable which takes the value 1 if the trade flow is a UK-A8 trade flow, and takes the value zero for an EU15-A8 trade flow.

Table 2.12: Control Group: EU15 trade flows with A8

	(1)	(2)
	PPML	
	Imports	Exports
Accession	.2817*	−.1548
	(.1483)	(.1074)
Ln $GDP_{it}GDP_{jt}$	.9017***	.7222***
	(.1846)	(.1865)
Year FE	Yes	Yes
Country Pair FE	Yes	Yes
R^2	.9929	.9914
N^o of observations	1320	1320
N^o of clusters	88	88

Standard errors clustered at the country pair level are reported in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

From Table 2.12 we can see that the magnitude of the accession coefficient for imports is similar to that reported in our first robustness check in Table 2.11, albeit only weakly statistically significant. This means that the

[12]See Baas and Brucker (2011) p.47 Table 3 which is reproduced in the Appendix for convenience

change in UK imports with the A8 countries was larger than the change in EU15-A8 imports. Consistent with our previous findings, there is no statistically significant effect for exports. [13] These findings provide further support for our baseline model.

2.6.3 Robustness Checks

Another possible criticism of the difference-in-differences method is that, as it fails to include migrant stocks in the model, it may simply be picking up some other effect, rather than a migration effect. For example, although the free trade agreements between the EU and CEECs that had been in place since the early to mid 1990s ensured that there were no tariff barriers in 2004, it is possible that other forms of non-observable trade costs such as lengthy customs controls, excessive documentation and bureaucracy and differing legal systems were significantly reduced by the A8 countries becoming members of the EU. In order to address this criticism, we estimate a gravity model augmented with the log of the migrant stock as has typically been used in the literature. Focusing solely on A8 countries, we use data on UK trade flows with A8 countries coupled with LFS data on A8 migrant stocks for the period 1998-2012 and estimate the following model:

$$lnX_{ijt} = \beta_1 lnY_{it}Y_{jt} + \beta_2 lnM_{ijt} + v_t + u_j + ln\varepsilon_{ijt} \tag{2.6.1}$$

where $Y_{it}Y_{jt}$ is the log of the product of GDPs, M_{ijt} is the migrant stock in the UK (i) from A8 partner country j at time t and v_t and u_j are year fixed

[13] We also excluded each EU15 country in turn in order to ensure that these results were not being driven by one particular country. The results were very similar, so these results do not appear to be driven by one country's trade flows.

effects and partner fixed effects respectively. Table 2.13 shows that migration had no positive impact on imports, but did have a positive, statistically significant effect on exports. This result contradicts the findings of both the baseline and alternative control group specifications. However, we think this result should be treated with caution due to the small sample size in this gravity specification. It is also important to remember that the gravity model estimates the average pro-trade effect of migration over the length of the panel, in contrast to the before and after accession effects estimated by the difference-in-differences approach.

Table 2.13: Robustness Check: Gravity Model

	(1)	(2)
	PPML	
	Imports	Exports
Ln M_{ijt}	−.0249	.1215**
	(.0598)	(.0472)
Ln GDP_{jt}	1.028***	.9715***
	(.3542)	(.1411)
Year FE	Yes	Yes
Partner FE	Yes	Yes
R^2	.9881	.9673
N^o of observations	120	120

Clustered standard errors are not used in this case because 8 clusters is not a sufficient number of clusters (Bertrand et al., 2004). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

We conduct one further robustness check by exploiting the subsequent EU enlargement when Bulgaria and Romania became member states in 2007. Unlike in 2004, the UK implemented the maximum seven year restriction period to the free movement of labour for citizens from Bulgaria and Romania. Highly skilled migrants were permitted to enter if they qualified for the Highly Skilled Migrant Programme, while low skilled workers could only be admitted to fill quotas for the Seasonal Agricultural Workers or Sector Based Schemes. As a

consequence of these restrictions, the UK did not see migrant inflows on the scale of those seen after the 2004 EU enlargement. We would not therefore expect to see an increase in UK trade with Bulgaria and Romania. Table 2.14 confirms that UK trade with Bulgaria and Romania did not increase relative to the UK's trade with other non-EU European countries after 2007. This finding supports our assertion that the increase in UK imports from A8 countries since 2004 is due to a migration effect.

Table 2.14: Robustness Check: Bulgaria and Romania Accession

	(1)	(2)
	PPML	
	Imports	Exports
2007 Accession	.0540	$-.2021^{*}$
	(.1835)	(.1131)
Ln $GDP_{it}GDP_{jt}$	$.9178^{***}$	1.037^{***}
	(.1060)	(.0740)
Year FE	Yes	Yes
Partner FE	Yes	Yes
R^2	.8846	.9098
N^o of observations	260	260

Clustered standard errors are not used in this case due to an insufficient number of clusters (Bertrand et al., 2004).
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

2.6.4 Differentiated Products

Our baseline results presented in Table 2.8, and the subsequent robustness checks using alternative control groups, provide suggestive evidence of a positive causal relationship between migrant inflows and UK-A8 imports. Nevertheless, despite the free trade agreements that were put in place as part of the Association Agreements in the 1990s, in reality, as discussed in Section 2.3.2, there was not free trade in all products prior to the EU expansion in 2004. Consequently, we may have concerns that any accession effect in the difference-

in-differences model may in fact be due to the removal of tariffs that occurred when the A8 countries joined the EU in 2004, rather than due to a migration effect. In order to address this concern, we use HS6 digit product level data, which enables us to exclude any goods with a non-zero tariff level from the analysis.

Table 2.15: UK-A8 Effectively Applied Preferential Tariffs

Country	N^o of products	N^o of products with 0 tariff	% of products with 0 tariff
Tariffs imposed on imports from EU (i.e. UK Exports)			
Lithuania (2003)^T	4,331	4,248	97.6
Poland (2003)^T	3,765	3,640	96.7
Slovenia (2003)^T	4,550	4,267	93.8
Czech R. (1999)^T	3,818	3,162	82.8
Estonia (2003)^{T*}	4,064	3,846	94.6
Hungary (2002)^W	4,078	3,791	93.0
Latvia (2001)^W	3,243	3,049	94.0
Tariffs imposed on imports into EU (i.e. UK Imports)			
Lithuania (2003)^T	1,894	1,840	97.1
Poland (2003)^T	3,385	3,267	96.5
Slovenia (2003)^T	2,638	2,569	97.4
Czech R. (2003)^T	3,387	3,298	97.4
Estonia (2003)^T	2,270	2,227	98.1
Hungary (2003)^T	3,117	3,012	96.6
Latvia (2003)^T	1,598	1,552	97.1
Slovakia (2003)^T	2,604	2,551	98.0

^{T} data come from TRAINS database; ^{W} data come from WTO-IDB database. *MFN tariffs. Data are unavailable for tariffs imposed by Slovakia in both the WTO-IDB and the Trains databases, so we include only those products which had zero MFN tariffs in our analysis.

We use data on tariffs from both the Trains and the WTO-IDB databases. The top panel of Table 2.15 shows the number of products that each A8 country imported from EU countries and the corresponding number of these products which had a zero tariff level. The data presented are for the most recent year for which data are available. Note that unless otherwise stated,

all tariffs are effectively applied preferential tariffs.[14] The top panel of Table 2.15 shows that, with the exception of the Czech Republic, at least 93% of all countries' products had zero tariffs before the accession in 2004. For the Czech Republic, this figure is only 83%. This is due to the fact that the most recent data are for 1999, so in reality, it is likely that more than 83% of products had zero tariffs before the accession. The bottom panel of Table 2.15 presents the corresponding data for the effectively applied preferential tariffs imposed by the EU on imports coming from A8 countries. We can see that at least 96.5% of imports coming into the UK from A8 countries in 2003 prior to the EU enlargement had zero tariffs.

In addition to enabling us to exclude any goods with a non-zero tariff level, using product level data allows us to group products according to the system of classifying goods according to their informational content developed by Rauch (1999). Goods are divided into three groups: goods traded on an organised exchange, goods with a reference price, and differentiated goods. Both goods traded on organised exchanges and those with a reference price are fairly homogeneous goods and we would therefore expect them to have a low informational content. Put simply, these goods are found everywhere, so migrants are unlikely to want to import them from their home country. Moreover, with regards to exports, they are unlikely to be able to provide information in order to reduce transaction costs for these globally traded goods. On the other hand, differentiated products tend to be more unique. Consequently, migrants may want to import these products which they may be unable to find in their

[14] Applied preferential tariffs, are the tariffs actually charged on the imports, rather than the bound tariffs which are negotiated during WTO negotiations. Effectively applied preferential tariffs are lower than Most Favoured Nation (MFN) tariffs which are those applied to any WTO member with whom the country does not share a preferential trade agreement. All tariffs used are ad valorem tariffs, meaning that the tariff is calculated as a percentage of the value of the product.

host country, and they are also more likely to be able to provide information to help to reduce the transaction costs of these goods. In Table 2.6, we saw that 16% of the A8 migrants who arrived between 2001-2011 worked in the manufacturing industry which is responsible for the majority of trade. As the majority of manufactured goods are classified as differentiated goods, the fact that a sizeable proportion of the migrants are working in this sector provides additional motivation for conducting this more disaggregated level analysis.

Table 2.16: Summary Statistics for Product Level Dataset

	Mean ($US 1000s)	Standard Deviation	Min	Max	Observations	N^{o}of 0 obs	N^{o}of products
Exports							
Differentiated	129.0	2278.2	0	584,880	598,320	415,288	2,770
Reference price	38.7	698.1	0	150,640.5	274,104	236,824	1,269
Homogeneous	50.4	2689.0	0	384,122	41,688	38,181	194
Unclassified	120.3	2832.7	0	385,316.5	79,920	64,494	370
Imports							
Differentiated	168.3	5017.7	0	1,200,000	576,936	506,352	2,671
Reference price	62.2	1665.5	0	298,612.1	253,368	239,584	1,173
Homogeneous	82.1	4215.4	0	599,023	42,336	41,229	196
Unclassified	206.3	9397.2	0	1,400,000	89,304	82,325	414

The goods labelled unclassified are unable to be classified according to the Rauch classification. Products have to be transformed from the HS nomenclature of the Wits Comtrade data to the SITC nomenclature of the Rauch classification. Some of these transformations are incompatible with the Rauch classification.

We use HS6 digit product level data for the period 1999-2010 from the Wits Comtrade database. Table 2.16 provides some summary statistics for these data, but more detailed information about the goods traded can be found in Table 2.23 in the Appendix to this chapter. From Table 2.16 it is clear that there are a large number of goods classified as differentiated goods, and particularly few classified as homogeneous goods. The penultimate column of Table 2.16 shows the large proportion of zero values in this dataset, and hence the importance of using the PPML estimator so that these observations are not dropped from our analysis which would lead to sample selection concerns.

We estimate the following model:

$$X_{ijkt} = \beta \ln(Y_{it}Y_{jt}) + \gamma(D_t A_j) + v_t + u_j + \epsilon_{ijkt} \tag{2.6.2}$$

where X_{ijkt} is the trade flow between the UK (i) and partner j of k goods at time t[15]. We estimate three separate equations, where k can be either differentiated goods, goods with a reference price or homogeneous goods. As in equation 2.5.1, the log of the product of countries' GDP ($Y_{it}Y_{jt}$) is included to control for changes in the size of countries. D_t is a dummy variable which takes the value 1 if $t > 2004$ and zero otherwise. A_j is a dummy variable which takes the value 1 if the partner country is one of the A8 countries and zero otherwise. More precisely, the interaction term $D_t A_j$ captures the change in UK A8 trade flows before and after 2004, compared to the change in UK non-EU European trade flows. A full list of the non-EU European countries used in the control group can be found in Table 2.19 in the Appendix to this chapter.

We choose non-EU European countries as the control group because the coefficient in our baseline analysis using UK trade with the rest of the world was large, approximately double that of the models using either of our alternative control groups. Given the pre-accession similarities between these non-EU European countries and the A8, we believe that UK trade with these countries is most likely to represent what UK-A8 trade flows would have been had the A8 not become members of the EU. Furthermore, we prefer non-EU European countries to EU15-A8 trade as a control group because although other EU15 countries did impose restrictions on the free movement of labour, they did

[15]In our benchmark estimation equation,2.5.1, our dependent variable was the log of the trade flow between the UK (i) and partner j because we first estimated our model using OLS. In this section we use the PPML estimator, so our dependent variable is the trade flows in levels, rather than logs.

still receive migrant inflows which may therefore have affected EU15-A8 trade flows.

Table 2.17: Product Level Results

	(1)	(2)	(3)	(4)	(5)	(6)
	Differentiated goods		Reference price goods		Homogeneous goods	
	Imports	Exports	Imports	Exports	Imports	Exports
Accession	.6116***	.0412	.3051	.2366	−.5352	−.3356
	(.1715)	(.0777)	(.2470)	(.1768)	(.6382)	(.7466)
Ln GDP_{jt}	.0194	.4980***	.5881	.2651	1.172	−.3240
	(.4043)	(.1113)	(.3622)	(.2179)	(.8492)	(1.466)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Partner FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	.0052	.0107	.0029	.0124	.0041	.0061
N^o of observations	576936	598320	253368	274104	42336	41688

Clustered standard errors are not used in this case because 18 clusters is not a sufficient number of clusters (Bertrand et al., 2004). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The results of this analysis are presented in Table 2.17. Column (1) shows that there is a positive, statistically significant accession effect for differentiated imports, with a coefficient of 0.61. Conversely, there is no effect for either reference priced or homogeneous imports. With regards to exports, in columns (2), (4) and (6) we find no accession effect for either differentiated, reference priced or homogeneous exports. This means that the change in UK A8 exports before and after 2004 was not statistically significantly different from the change in UK non-EU European exports. These findings support our baseline results presented in Section 2.6.1, and are consistent with our priors that migrants would only lead to increased trade in more heterogeneous, differentiated goods. This result seems to point towards the existence of a consumer good effect, which seems plausible given the increase in eastern European retail establishments for example, which did not exist in the UK prior to 2004.

With regards to the lack of an accession effect for exports, this result is perhaps not surprising. Thinking back to the mechanisms through which mi-

grants can affect exports that we discussed in Section 2.2.1, both the information and network channels are unlikely to function immediately. Building up the reputation of a network, contacts and migrants being in jobs where they can influence trade decisions will all take time. This idea is supported by Bratti et al. (2014) who split their sample into recently arrived and older migrant communities and find that only the older migrant communities have an impact on trade flows. On the other hand, the preference channel, the main channel through which migrants are likely to affect imports, could be expected to adjust more quickly. This could explain why we see a more immediate accession effect for differentiated imports, but not for exports.

It is important to note that from a global perspective, an import effect is not necessarily a trade creation effect. For example, if we think of a Polish migrant in the UK buying Polish products, there is no additional output, the product would simply have been sold back in Poland rather than in the UK had the migrant not migrated. That this effect is a consumer good effect seems plausible given the many eastern European retail establishments now present in the UK which did not exist prior to 2004. The increase in imports into the UK coupled with the lack of any increase in exports negatively affects the balance of payments, with a net outflow of money from the UK economy. In contrast, had we found an export effect, this would have represented new trade which would not have existed without the migration. We therefore find no evidence of trade creation at a global level as a result of migration to the UK after the 2004 EU enlargement.

2.7 Conclusion

In this chapter, we have exploited a quasi-experimental setting in order to establish a causal relationship between migration and trade flows. The UK saw a huge, sudden increase in migrants arriving from the A8 countries as a result of the 2004 EU enlargement. Such large inflows were unexpected, in particular due to the unanticipated restrictions to the free movement of labour imposed on A8 citizens by other existing EU member states. This enabled us to use a difference-in-differences approach to investigate whether this increase in migration led to increased trade flows between the UK and the A8 countries.

Our baseline results show that UK imports from the A8 countries increased relative to UK imports from the rest of the world.We find no effect for UK exports. We find similar results, albeit of a smaller magnitude, using both of our alternative control groups, UK trade with non-EU European countries and other EU countries' trade with the A8 countries, strengthening our baseline findings. Moving from aggregate to product level, and grouping products according to the Rauch classification, we find that the effect for imports is driven by differentiated import goods. These findings suggest that migrants increase imports of more unique goods only.

One potential explanation for the lack of a migration effect on exports is due to the length of time needed for migrants to begin to affect trade flows. This seems intuitive as it requires time for networks to develop and information to be shared. In addition, in the short term, very few A8 migrant workers were in job roles such as senior managers where they would be able to have an influence on exporting decisions. In contrast, we would expect any impact on imports to work through the preference channel, and it seems likely that tastes

and preferences would be able to adjust more quickly. Investigation into the length of time required for migrants to affect trade flows is an interesting area for further work. Another reason for the lack of a migration effect on exports is that we saw in Tables 2.5 and 2.6 that the majority of recently arrived A8 migrants are working in low skilled occupations and many in non-tradable industries and are therefore unlikely to be in a position initially to be able to influence trade flows.

One limitation of the difference-in-differences model estimated in this chapter is that it may not only be picking up a migration effect. Although there was free trade between the UK and the A8 countries prior to 2004, since the fall of the iron curtain, these central and eastern European economies have undergone radical changes and increased their levels of trade greatly. It could be the case that part of what the model is picking up is simply that UK-A8 trade flows may be converging over time to their long run level, perhaps similar to the level of trade between the UK and other EU15 countries.

A further limitation of our empirical strategy is that while we know there was free trade between the UK and the A8 countries prior to 2004 in terms of tariffs and quantitative restrictions having been removed, we cannot be sure that the enlargement had no impact on other trade costs. More specifically, it is likely that the A8 countries joining the single market would have led to the harmonisation of standards and the removal of other technical barriers to trade. This reduction in non-tariff barriers may well have reduced trade costs between the UK and the A8 countries, which could account for some of the increase in imports that we see. However, as this would have affected both UK-A8 and EU15-A8 trade, our findings that UK imports from the A8 countries increased relative to EU15 imports from the A8 countries provides further weight to the existence of a migration effect.

We are unable to make any definitive statements about the magnitude of this migration effect. Further work into the difficulties in measuring non-tariff barriers and how any reduction in non-tariff barriers may have affected trade costs is necessary in order to provide more conclusive evidence of a causal migration effect and its magnitude. Nevertheless, our findings using alternative control groups, as well as our product level analysis strongly suggest that migrants who came to the UK after the 2004 EU enlargement have led to increased imports into the UK from these central and eastern European countries. The increase in imports into the UK coupled with the lack of any increase in exports has resulted in a worsening of the UK's balance of payments and an absence of trade creation at a global level as a result of migration to the UK after the 2004 EU enlargement.

2.A Appendix

Table 2.18: List of Countries in Rest of World Control Group

Africa		Asia		EU	Other Europe	North America	South America	Oceania
Algeria	Madagascar	Bangladesh	Sri Lanka	Austria	Albania	Antigua &	Argentina	Australia
Angola	Malawi	Bhutan	Tajikistan	Denmark	Armenia	Barbuda	Bolivia	Fiji
Benin	Mali	Brunei	Thailand	Finland	Azerbaijan	Bahamas	Brazil	Papua N
Botswana	Mauritania	Cambodia	Turkey	France	Belarus	Canada	Chile	Guinea
Burkina	Mauritius	China	Turkmenistan	Germany	Bosnia &	Costa Rica	Colombia	Solomon
Burundi	Morocco	Hong Kong	Uzbekistan	Greece	Herzegovina	Dominica	Ecuador	Islands
Cameroon	Mozambique	India	Vietnam	Italy	Croatia	Dominican Rep.	Guyana	Tonga
Cape Verde	Namibia	Indonesia	Yemen	Netherlands	Georgia	El Salvador	Paraguay	Vanuatu
C. African Rep.	Niger	Japan		Portugal	Iceland	Grenada	Peru	
Chad	Nigeria	Jordan		Spain	Macedonia	Guatemala	Suriname	
Comoros	Rwanda	Kazakhstan			Moldova	Haiti	Uruguay	
Egypt	Senegal	South Korea			Norway	Honduras	Venezuela	
Eq. Guinea	Seychelles	Laos			Switzerland	Jamaica		
Eritrea	Sierra Leone	Lebanon			Ukraine	Mexico		
Ethiopia	South Africa	Macao				Nicaragua		
Gabon	Sudan	Maldives				Panama		
Gambia	Tanzania	Mongolia				St Kitts & Nevis		
Ghana	Togo	Nepal				St Lucia		
Guinea	Tunisia	Pakistan				St Vincent		
Ivory Coast	Uganda	Philippines				Trinidad&Tobago		
Kenya	Zambia	Russia				United States		
Liberia	Zimbabwe	Singapore						

Table 2.19: List of Countries used for Alternative Control Groups

Non-EU European	EU15
Albania	Austria
Armenia	Denmark
Azerbaijan	Finland
Belarus	France
Bosnia & Herzegovina*	Germany
Croatia	Greece
Georgia	Italy
Iceland	Netherlands
Macedonia	Portugal
Moldova	Spain
Ukraine	

*Bosnia & Herzegovina is omitted from the analysis in section 2.6.4 due to lack of data

Table 2.20: UK Migrant Stocks from A8 Countries 1998-2011

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2011 Census
Czech Republic	3143	5456	5723	4595	10314	14823	16661	9670	27524	29028	26936	26711	18544	30327	35871
Estonia	1322	2359	963	1586	1522	2153	2439	6143	787	6131	3711	5600	10308	7643	7864
Hungary	12538	16445	17919	13995	17985	12400	11776	12757	13238	24208	26035	21374	35148	55412	48308
Latvia	2516	3039	8117	6334	5864	6724	4720	9406	15701	12025	27411	24873	34887	70997	54669
Lithuania	1028	8403	9321	10095	10216	15949	13499	30444	41308	48983	68127	66526	84077	117607	97083
Poland	63481	46711	48432	59980	58162	76003	91220	114354	238076	365417	518905	533790	497482	549020	579121
Slovakia	2935	5926	5480	7131	3920	3202	6280	16235	29697	58782	50631	56649	35222	53034	57824
Slovenia	927	745	0	1481	487	836	2719	2039	1015	1060	0	1291	2399	574	2008

Source: UK Quarterly Labour Force Survey 1998-2011. 2011 UK Census.

Table 2.21: Baas and Brucker (2011) Estimates of A8 Migrant Stocks in EU15 Countries

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Austria	52786	54947	57301	59622	67675	75143	80706	86911	94084	98317	103755
Belgium	9667	12102	14106	16151	19524	25638	32199	42918	40400	40200	52900
Denmark	8763	9470	9664	9963	10762	12770	16203	21807	30033	33179	36590
Finland	12804	13860	14712	15825	16459	18266	20801	23957	27464	30877	35068
France	40852	48480	48984	34451	48584	36783	50418	43227	41573	48145	64800
Germany	434593	453100	466382	480690	438828	481672	525078	554372	567466	576432	612310
Greece	13832	13042	14887	16413	15194	19513	18357	20257	35100	31100	24300
Ireland	1182	4775	15036	27229	42988	93243	135800	194400	215700	191800	184100
Italy	40433	40108	41431	55593	67755	79819	94215	117042	128813	137306	132200
Luxembourg	1063	1100	1136	1518	2164	3252	3940	4561	5362	6232	6666
Netherlands	10063	11152	12147	13048	17814	23155	28344	36317	48131	58201	65276
Portugal	437	492	587	662	842	1061	1373	2477	2502	2843	2800
Spain	16396	23672	34076	42672	55735	70576	103190	126971	137068	139558	141465
Sweden	23884	22868	21376	21147	23257	26877	33757	42312	50575	57669	62440
UK	59153	67174	71035	100958	161693	290730	488895	656594	747100	752100	864600
EU15	725908	776342	822860	895942	989274	1258498	1633276	1974123	2171371	2203959	2389270

Source: Baas and Brucker (2011) Notes: Labour Force Survey Data for France, UK and Ireland. Belgium and Luxembourg: national population statistics extrapolated with Labour Force Survey data. Author's calculations based on the Eurostat Labour Force Survey, British Labour Force Survey and the national population statistics from Austria, Belgium, Denmark, Finland, Germany, Greece, Italy, Luxembourg, Netherlands, Portugal, Spain and Sweden.

Table 2.22: UK Trade Flows by Continent 1997-2012

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
UK Exports ($US millions)																
A8	5026	4896	4661	5244	5265	5724	6714	7051	7854	12660	11659	12476	9239	11926	13968	12446
Africa	7541	7250	6642	6490	6575	6814	8201	9681	9630	10684	11838	15640	11116	12619	15806	15103
Asia	32917	25400	24038	26857	25005	25604	31701	37426	40691	43043	49128	57495	42088	45316	57217	59668
EU	108530	109160	118140	120190	109020	111950	121230	130640	146220	188320	164080	171270	130100	144220	166080	158600
Other Europe	10584	10479	8949	8766	8880	8579	9180	10725	19811	14373	15785	19450	13026	21697	39971	20730
North America	40080	41379	45980	51785	49124	49442	55490	60319	60049	63954	68025	68443	55865	50600	54999	53279
South America	3983	3705	2702	2555	2618	2542	2459	2862	2957	3399	4044	5078	4820	4526	5453	6145
Oceania	4065	3747	3521	4078	3354	3216	3783	4433	4755	5067	6620	7611	4475	4112	5437	5476
UK Imports ($US millions)																
A8	3926	4308	4554	5605	6235	7363	9221	11188	13767	18129	23392	24139	20508	25244	27928	28118
Africa	5956	6091	6678	8421	9877	10065	11208	14176	15428	18611	19117	22517	18442	17053	23773	28854
Asia	48693	50904	52830	57941	54976	57359	67103	85746	95427	108525	122184	124099	102073	110322	121259	121509
EU	114825	117949	133315	129096	117590	130790	155607	174000	195330	214750	242430	237100	176468	198130	224510	227220
Other Europe	16669	15038	15990	18540	16138	16664	18230	23599	28595	35830	38877	38877	51259	40750	41204	41823
North America	46981	48731	48268	53633	52250	47237	47610	52413	48198	56457	64053	66231	53510	53779	69680	67460
South America	3831	3553	3636	3918	4091	4285	4594	5690	6241	7649	8395	10333	8215	8720	9951	9146
Oceania	2518	2582	2505	2585	2785	2816	3186	3703	4327	6310	6882	8280	5860	6559	7996	7113

Source: IMF Direction of Trade Statistics 2014 Edition

Table 2.23: Summary Statistics for Product Level Data by Section Heading

	Imports						Exports					
Chapter	Mean	Std Dev.	Min	Max	Obs.	N^o 0 obs.	Mean	Std Dev.	Min	Max	Obs.	N^o 0 obs.
Live animals & products	130.9	3650.8	0	253300.5	28512	27848	11.7	199.9	0	14169.6	27000	25769
Vegetable products	15.2	404.3	0	39938.4	49896	48579	3.3	44.8	0	2314.2	45792	42613
Animal/veg fats & oils	32.9	1056.6	0	65672.99	9720	9581	4.6	48.6	0	2411.5	9936	9080
Prepared foodstuffs	145.3	2349.3	0	119982.3	35208	33052	42.7	876.6	0	79143.5	33264	29417
Mineral products	602.7	19436.1	0	1400000	22680	22254	89.5	3366.8	0	384122	26568	24386
Chemical products	24.6	594.5	0	71171.6	135000	128285	108.4	2723.1	0	566556	149040	118635
Plastics and rubber	143.4	1514.0	0	86689.6	40176	34744	136.2	890.2	0	44013.3	40608	26037
Leather & travel goods	22.1	428.9	0	24611.7	12528	11252	59.2	969.6	0	46622.5	14904	11858
Wood, charcoal, cork	141.0	1611.2	0	87386	15984	14123	6.1	45.8	0	2322.4	15120	12835
Wood pulp & paper	87.3	971.2	0	45837.7	29160	26053	87.9	803.5	0	39804.8	30024	21866
Textiles & products	42.7	503.6	0	53575.2	161136	142999	37.1	649.9	0	82508.7	168480	128857
Footwear, umbrellas	27.0	343.1	0	15367.2	11880	10433	22.3	148.9	0	6224.3	11880	8419
Stone, cement, ceramic, glass	80.3	768.9	0	47030.2	28728	25467	30.2	237.6	0	16719.9	29376	22098
Pearls, precious metals	70.44	1506.4	0	104249.1	9720	9153	199.2	6158.3	0	385316.5	9720	8256
Base metals	98.7	1562.3	0	195538	114048	102611	53.1	548.3	0	46400.8	116640	90678
Electrical machinery	293.0	8070.8	0	1200000	160056	137878	237.4	3139.3	0	584880	163080	104086
Vehicles, aircraft, vessels	986.3	12331.0	0	592847	22248	19485	441.1	4688.3	0	321237	22896	16117
Optical & musical instruments	31.3	525.2	0	37167.6	44064	38767	67.4	527.5	0	40205.2	47952	33127
Arms & ammunition	12.7	110.1	0	2382.3	2160	2042	10.1	58.5	0	1294.6	2376	2033
Furniture, toys & miscellaneous	191.9	3236.3	0	211994	27432	23461	63.5	917.1	0	104818	27864	17507
Art & antiques	10.8	136.4	0	4963.4	1608	1423	328.7	5891.6	0	180591.7	1512	1113

Chapter 3

Immigration and Natives' Voting Outcomes

3.1 Introduction

More than 1 million migrants and refugees entered Europe during 2015 (UNHCR, 2015). In response, major European nations such as France and Germany reintroduced border controls in 2015, while Sweden, traditionally the most immigrant friendly Schengen nation, reintroduced controls on its border with Denmark at the beginning of 2016. As a result of these large inflows, immigration, refugee and asylum issues have once again become salient in the political debate.

Alongside these large immigration flows, extreme right-wing (ERW) political parties with an anti-immigration ideology have received increasing support across Europe. Not only have the electoral fortunes of more established parties such as the Austrian Freedom Party (FPÖ), France's Front National, Italy's Lega Nord and the Danish People's Party improved, but we have also seen the emergence of new political groups like the Swiss People's Party and Alternative for Germany. ERW parties are also increasingly likely to form a part of coalition governments. For example, in recent parliamentary elections, both the Norwegian Progress Party (2013) and the Finns Party (2015) entered into a coalition with their countries' respective Conservative parties. Increased power for ERW parties is likely to have major implications for future policy, particularly with regards to the size of the welfare state and levels of public spending. Their success could also have substantial effects on countries' future immigration policies.

In spite of the considerable heterogeneity between ERW parties in different European countries, one aspect that is common to all of them is their anti-immigration stance. Consequently, we might expect the proportion of

immigrants in a local area to affect ERW parties' electoral success for at least three reasons. First, natives may have concerns over real or perceived increases in competition in the labour market, particularly if they are substitutes for immigrant workers (Mayda, 2006). Second, natives may also have concerns relating to redistribution and the welfare state; this is likely to be of particular importance in the case of large inflows of refugees (Dahlberg et al., 2012). Third, Card et al. (2012) identify concerns over the ethnic and cultural composition which may foster anti-immigrant sentiments amongst natives. However, it also seems possible that there is a negative relationship between the proportion of immigrants and ERW party success. If there is a "fear of the unknown" in communities with low levels of migration, exacerbated by increased reports of immigration in the media, then the successful integration of migrants could lead to lower ERW vote shares in those communities with high levels of migration. This argument is consistent with the contact hypothesis put forward by Allport (1954) which states that positive intergroup interactions can help to reduce prejudice between groups.

Furthermore, even if we do observe a correlation between migrant shares and vote shares for ERW parties at the local level, this does not necessarily indicate the presence of a causal relationship. The proportion of migrants in a local area may not be random with respect to the vote share of a party opposed to migration. It seems possible that migrants may self select into areas where the natives are more welcoming and may avoid those areas where they are hostile. Similarly, natives with a preference for fewer migrants may choose to relocate into areas with lower levels of migration in response to an influx of migrants into their local area. In these scenarios, the location decision of both migrants and natives are likely to be correlated with voting outcomes, threatening the causal interpretation of this relationship.

The aim of this chapter therefore is to provide evidence on the causal link between the share of migrants in a local area and the electoral success of an ERW party. We focus on the Swedish case, which we believe is interesting for three reasons. First, Sweden received large inflows of refugees in the 1980s and 1990s as a result of conflicts in Iran, Iraq and the Former Yugoslavia. Second, between 1985 and 1994, a refugee placement policy was in operation which aimed to disperse refugees across the country. This policy provides us with a potential instrument for the migrant share conditional on the dispersal policy being exogenous with respect to voting behaviour in local areas. Third, the data generated by the placement policy allows us to distinguish between refugees and other types of migrant. We can therefore examine whether the response of natives' voting behaviour differs between these two groups.

During the 1980s and 1990s, immigration became increasingly salient. Figure 3.1 uses data from the annual Society, Opinion and Media (SOM) Institute surveys to show that concerns over immigration among the general public were rising over the period 1985-1994. The share of individuals reporting immigration as one of the top three issues facing Sweden at that time rose from 8% in 1987 to 16% in 1990 and peaked at 23% in 1993 at the height of the refugee inflows due to the Balkans war. At the same time, support for New Democracy, a populist, anti-immigration party, and the only party in Swedish politics at that time to take a strong stance against immigration, peaked in the 1991 Parliamentary election when they received 6.7% of the vote share.

We exploit within municipality variation in the migrant share to identify the effects of migration on the success of the anti-immigration New Democracy party. Our OLS estimates indicate that a one percentage point increase in migration is associated with a 0.28 percentage point increase in the New Democracy vote share. We then address the endogeneity of the migrant share

Figure 3.1: Salience of immigration to Swedish citizens



The dip in 1991 may be due to the fact that individuals could only select three issues and in 1991, there were major concerns about rising unemployment and the economic recession. Source: SOM Institute Surveys.

by using an instrument based on the number of refugees contracted to arrive in each municipality as part of the refugee placement policy. We show that, unsurprisingly, the arrival of refugees had a strong effect on the growth of the share of migrants in each municipality. However, despite the strong aggregate relationship in the time-series pattern of refugee arrivals and the New Democracy vote share, we do not find evidence of a positive relationship between the arrival of refugees and the New Democracy vote share in our 2SLS estimation.

There are two possible interpretations for this finding. The first is that natives may react differently to inflows of refugees into their local area than to the inflow of migrants more generally. Refugees may not be viewed by natives as increasing labour market competition, at least not in the short run. Humanitarian considerations may also play a role: natives may recognise that refugees have fled from terrible conditions and therefore feel more compassionate towards them than towards economic migrants. The second interpretation is that a policy which explicitly disperses migrants leads to weaker political reactions, perhaps because it leads to less pressure on local resources.This is

potentially an important finding for policy makers, especially given the current debate around refugee acceptance and quota systems which have been proposed to deal with the current crisis in Europe, such as by Moraga and Rapoport (2015).

The rest of the chapter is structured as follows. Section 3.2 provides a review of the related literature. Section 3.3 gives an overview of the history of immigration in Sweden and describes the refugee placement policy, while Section 3.4 provides some background to the Swedish political system. Section 3.5 presents the data, while Section 3.6 explains the model, how we address endogeneity concerns and presents our results. Section 3.7 concludes.

3.2 Literature Review

This study is broadly related to the large literature on the determinants of attitudes towards immigration and immigration policy, as well as being more closely related to a series of more recent papers which focus specifically on migration and voting patterns.

Regarding attitudes, in their seminal paper, Scheve and Slaughter (2001) focus on a factor proportions model which predicts that the attitudes of natives towards immigration should depend on the relative skill levels of both the natives and the migrants. Using American National Election Study (ANES) data, the authors find that low skilled workers are the most keen to limit the inflow of migrants into the country. As immigration to the US tends to be relatively low skilled, the authors argue that these findings support the predictions of the factor proportions model.

Mayda (2006) also finds some support for the factor proportions model in

her cross country study which uses data from the International Social Survey Program (ISSP) and the World Value Surveys. She shows that, in addition to the importance of economic determinants in the formation of attitudes towards immigration, non-economic factors are also important. The importance of non-economic factors is also supported by Card et al. (2012) who, using European Social Survey data, find that concerns over compositional amenities, or the characteristics of a local area, are between two to five times more important than economic concerns in determining differences in attitudes towards migration. This viewpoint is also supported by Hainmueller and Hopkins (2014) who, drawing on evidence from both the political economy and political psychology literatures, conclude that sociotropic concerns, particularly regarding the cultural impacts of immigration, play a much stronger role in determining attitudes towards immigration than individual economic circumstances.

These papers which study the relationship between immigration and attitudes towards immigrants and immigration policy provide a useful starting point with regards to introducing the potential channels through which we may expect immigration to affect voting outcomes. In the remainder of this section we will discuss the body of literature which focuses specifically on how immigration affects voting outcomes.

3.2.1 Migration and Voting Patterns

Several early studies by political scientists addressed the question of whether immigration affects voting outcomes. Using a variety of survey datasets, Lubbers et al. (2002) find a positive correlation between the number of immigrants in a country and the extreme right-wing vote share for countries in the EU, while for a set of western European countries Golder (2003) finds a positive re-

lationship between the proportion of immigrants in a country and the extreme right-wing vote share. In a study of the determinants of extreme right-wing voting in six western European countries (Austria, Belgium, Denmark, France, Netherlands and Norway) Rydgren (2008) only finds a relationship between the number of immigrants and the right wing vote share in the Netherlands and Denmark. Although these papers provide evidence of the correlation between the proportion of immigrants and voting outcomes, it is difficult to draw any causal interpretation from any of these studies as the authors do not address the endogeneity of location choice.

More directly related to our work are a series of recent papers which assess the causal impact of immigration on voting outcomes for a selection of European countries. Typically these papers regress national or local election vote shares of ERW parties such as the FPÖ (Halla et al., 2017) and Norwegian Progress Party (Sørensen, 2016), or centre-right coalitions (Barone et al., 2016) on the share of immigrants, or inflow of immigrants in a local area. Rather than studying the effects of migration on election outcomes, Brunner and Kuhn (2014) exploit Switzerland's direct democracy system in which individuals are asked to vote directly on specific immigration policies and proposals. This enables the authors to regress the share of anti-immigration votes in a municipality at a given time on the share of immigrants in that municipality. One advantage of this approach is that their study does not suffer from interpretational difficulties as a result of policy bundling as may be the case when using election voting outcomes.

Estimation Methods

Turning now to estimation methods, a variety of instrumental variable strategies have been used by existing papers in the literature to address concerns over the endogeneity of migrant location with respect to voting outcomes. A number of papers (Otto and Steinhardt (2014); Halla et al. (2017); Barone et al. (2016) and Mendez and Cutillas (2014)) use previous immigrant settlement patterns as an instrument for the current share of immigrants in an area. This identification strategy is based on the idea that historical migration patterns are likely to be correlated with current settlement patterns due to the formation of networks and migrants communities. Bartel (1989) established that migrants are more likely to cluster in areas with existing migrant communities. Barone et al. (2016) argue that conditional on controls, historical migration patterns should be uncorrelated with current voting outcomes because those immigrants typically arrived at a time when the economy was booming and were attracted by economic conditions. Moreover, Halla et al. (2017) actually estimate a model in first differences which only requires historical settlement patterns to be unrelated to changes in far-right vote shares.

Brunner and Kuhn (2014) take an alternative approach, instrumenting the share of immigrants in a municipality with the share of immigrants in the broader local labour market area. This measure is based on established commuting patterns and relies on the assumption that natives choose the broader area that they live in based on factors that are unrelated to their attitude towards immigration, such as family ties and job opportunities. Essentially they assume that an individual may move within a local labour market area as a result of their immigration preferences, but that they are not able to move across local labour markets.

Several papers based on Denmark are able to exploit the exogenous variation in the share of immigrants in different municipalities induced by a refugee placement programme which aimed to distribute refugees evenly across the country. In contrast to our Swedish case, Gerdes and Wadensjö (2010) have no data on the number of refugees due to be placed by the programme in Denmark. Consequently, they instrument the share of non-Western immigrants with the number of refugees who received social assistance, although they do note that the number of refugees contracted by the programme in Denmark would be a better instrument. Instead, Harmon (2017) exploits the fact that there were restrictions placed on migrants' ability to enter the real estate market. As a result, migrants had to live in rental accommodation. He uses the 1970 stock of high rise buildings as an instrumental variable because high rise buildings were typically used for rental accommodation and would therefore be strongly correlated with migrant location. Rather than using an instrumental variable approach, Dustmann et al. (2016) regress the far-right vote share directly on the number of allocated refugees from the placement policy as a share of the initial municipality population.

Key Findings

In terms of findings, Barone et al. (2016) find that a 1% increase in the immigrant share increases the vote share of centre-right coalition on average in Italy by 1.26%, but that there is no effect in cities. In their district fixed effects specification, Otto and Steinhardt (2014) find that a 1% increase in the share of immigrants in city districts in Hamburg leads to an increase in the vote share of far-right parties of 0.225%. For Austria, Halla et al. (2017) find that a 1 percentage point increase in the share of immigrants increases the FPÖ's vote share by 0.16 percentage points. In his IV estimation, Harmon

(2017) finds that a 1% increase in migration leads to between 0.9-2 percentage point increase in seats won by nationalist parties in Denmark. In addition to examining the effect on ERW parties, Otto and Steinhardt (2014) find that the share of immigrants in a district has an adverse effect on votes for the left-wing Green party. Similarly, Harmon (2017) finds that an increase in the proportion of migrants is associated with a fall in left-wing seats.

A number of papers make attempts to investigate the key channels through which immigration may affect voting outcomes. Using individual level data from the Swedish National Election Studies (SNES) Dahlberg et al. (2012) find that the presence of greater ethnic diversity leads to lower support for redistributive welfare policies, suggesting that the welfare state channel may be an important concern. Otto and Steinhardt (2014) separate migrants by type and find that increasing support for far-right parties is driven by increases in refugees only. In addition, they find little correlation between changes in unemployment and immigration, although they do acknowledge the limitations of examining this relationship at the city district level which fails to take commuting patterns into account. Nevertheless, taking these two findings together, added to the delays that refugees typically faced to enter the labour market, they conclude that concerns over the welfare state were likely to have been important, while labour market concerns were likely to have played a minimal role. On the other hand, Halla et al. (2017) find no effect among high skilled natives, but stronger effects for low skilled natives, suggesting that the labour market channel may have been important in Austria.

Other papers find support for the so called non-economic or compositional amenities channel established by Card et al. (2012). Brunner and Kuhn (2014) separate migrants according to how culturally similar they are to natives in terms of: language, lifestyle, customs, values and beliefs. They find no effect

on the share of anti-immigration votes when the migrants are culturally similar to natives, but an increase in migrants who are culturally different does lead to an increase in anti-immigration votes. In addition, Mendez and Cutillas (2014) find that an increase in migrants of black African origin led to increased right wing vote shares in Spain, but that there were no effects for any other type of migrant.

Sørensen (2016) finds further support for a non-economic channel. Using Norwegian Election Studies survey data, he shows that increases in non-Western migrants increased concerns for Norwegian culture[1]. Further analysis reveals that these effects disappear once the migrant level reaches a certain threshold. This is consistent with his benchmark vote shares model in which the quadratic non-Western migrant share term is negative and indicates that migration effects on the Progress party vote share disappear once the migrant share reaches approximately 4% of the population. The author argues that this is consistent with the theory of intergroup contact which was formalised by Allport (1954) in the social psychology literature. Intergroup contact can help to reduce prejudice between groups through three channels: increased knowledge, reduced anxiety, and enhanced empathy (Pettigrew et al., 2011).

Couttenier et al. (2016) suggest another possible non-economic channel through which migration, particularly asylum seeker and refugee migration, may increase anti-immigration sentiment in a host country. They show that asylum seekers who were exposed to conflicts and violence during childhood are more likely to commit violent crimes in their host country. They also find that labour market integration can help to eliminate the effect of exposure to conflicts during childhood. In particular, the ability to apply for jobs and

[1]Respondents were asked for their opinion on the following statement: "Immigration represents a serious threat to our national culture."

training, and to undertake civic education and language courses all help to reduce the likelihood of asylum seekers who were exposed to violence during childhood going on to commit violent crimes in their host country. Nevertheless, fears that inflows of migrants into an area may lead to increased crime is an important channel through which migration may lead to increased support for anti-immigration parties.

In contrast to the majority of other studies, Dustmann et al. (2016) focus solely on refugee migration, estimating the causal relationship of refugee settlement on vote shares for parties across the spectrum, but with a particular emphasis on far-right parties. Using data on the number of refugees allocated to municipalities as part of the Danish refugee placement policy, they find that for all but the largest municipalities ($<$p(95)), a one percentage point increase in refugee share between elections increases the vote share of anti-immigration parties by 1.23 and 1.98 percentage points in parliamentary and municipal elections respectively. These are large effects given their overall shares of 8.47% and 4.93% respectively.

Steinmayr (2016) also focuses solely on the effects of refugee migration. He exploits variation in the exposure to refugees at the neighbourhood level in Upper Austria to investigate the effects on the success of the FPÖ in the 2015 Austrian state elections. Refugees were accommodated in less than half of the neighbourhoods in the sample, permitting the author to focus on the extensive margin, the presence of refugees rather than the share. This distinction separates the effects of inflows of refugees into macro and micro level effects, where the macro level can be thought of in terms of information gleaned from the media and political campaigns, whereas the micro level refers to personal experience of contact with refugees in the local area. To address concerns over the non-random location of refugees, the author uses the share of pre-existing

group accommodation as an IV because these buildings were used to accommodate large, unexpected inflows of refugees. In contrast to the findings of other studies, he finds that hosting refugees was associated with a 4.42 percentage point fall in a neighbourhood's FPÖ vote share. Steinmayr (2016) interprets these findings as further support for the contact hypothesis.

In addition to these papers focusing on Europe, Mayda et al. (2015)'s recent addition to the literature examines the relationship between immigration and voting outcomes in the US. More specifically, they differentiate between naturalised and non-naturalised immigrants and the differing impacts these types of migrants have on Republican and Democrat vote shares. They find that on average, migration has a significant, negative effect on the Republican vote share. However, they also find that when the share of non-naturalised immigrants increases, so does the Republican vote share. They attribute these findings to the fact that an increase in non-naturalised immigrants raises the salience of immigration among natives, whereas an increase in naturalised immigrants increases the vote share of the Democrats because immigrants are less likely to vote for the Republican party. This direct effect is not relevant in our Swedish context because we focus on the large inflows of newly arrived, non-naturalised refugees and migrants who did not have voting rights.

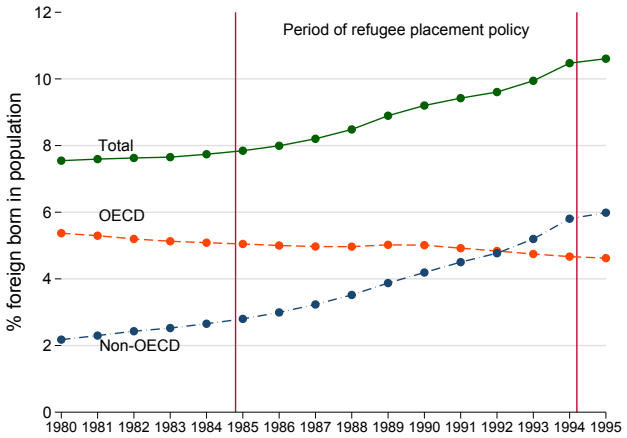
3.3 Migration Patterns in Sweden

3.3.1 Brief History of Migration to Sweden

In the 1960s and early 1970s, migration to Sweden was dominated by labour migrants from Nordic and western European countries. However, a combination of worsening economic conditions and tougher labour migrant regula-

tions in Sweden, as well as an economic boom in Finland, led to a fall in labour migration in the 1970s (Migrationsverket, 2016). Instead, migration to Sweden during the 1980s and 1990s was characterised by family reunification and refugee migration. This shift from labour to humanitarian migrants also marked a significant change from predominantly OECD, European migrants who were both culturally and ethnically similar to Swedes, to more heterogeneous non-OECD migrants from all over the world.

Figure 3.2: OECD and non-OECD foreign born as a percentage of the Swedish population 1980-1995

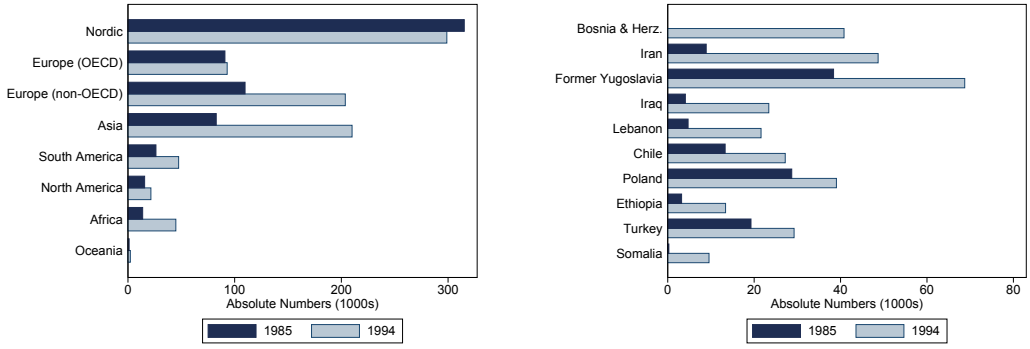


Source: Statistics Sweden (SCB)

Figure 3.2 illustrates the changing pattern of migration in Sweden during the 1980s and 1990s. We are particularly interested in the period 1985–1994, during which the refugee placement policy, described in detail in the next section, was in operation. Between 1985-1994 the total share of migrants in the population increased from 7.8% to 10.5%. The share of OECD migrants fell slightly from 5% to 4.6%, while the surge in non-OECD migration from only 2.8% to 5.8% of the population in less than a decade drove the overall increase in the migrant share. Much of this increase was due to the large inflows of refugees entering Sweden, initially from countries such as Chile and

Iran. By the late 1980s, there were increasing numbers escaping civil wars in African countries such as Somalia and Ethiopia and the 1990s saw large inflows from Iraq as a consequence of the Persian-Gulf war and from former Yugoslavia as a result of the Bosnian war. This is reflected in Figure 3.3a which illustrates how the number of migrants from non-Nordic European countries increased from just over 100,000 to approximately 200,000, while the numbers from Asian countries more than doubled to more than 200,000. From Figure 3.3b we see that these increases were driven by the large inflows from former Yugoslavian countries and Iran and Iraq in particular.

Figure 3.3: Foreign born population in Sweden in 1985 and 1994



(a) By Region (b) By Country

Panel (b) presents the ten countries with the largest increase in migrants 1985-1994.
Source: Statistics Sweden

3.3.2 Refugee Placement Policy

In May 1984, the Swedish Parliament approved a refugee placement programme, which was implemented in 1985. At the same time, the responsibility for managing refugee inflows was transferred from the Swedish Labour Market Board to the Swedish Immigration Board, marking a move away from the sole focus on labour market integration, towards a more holistic approach to the integration and welfare of refugees. Prior to these reforms, refugees had been

free to decide where to reside. Consequently, the largest cities and areas surrounding airports and ports hosted the majority of refugees arriving in Sweden. The primary purpose of the placement programme was to achieve a more even distribution of refugees across the country and to reduce the burden placed on the three major urban areas of Stockholm, Gothenburg and Malmö.

The initial idea had been to place refugees in sixty municipalities with suitable educational and language facilities, as well as labour markets deemed able to accommodate them. The Working Group for Responsibility of Refugees had calculated that the municipalities would need to accommodate 3,000-5,000 refugees annually (Andersson, 2003). However, these figures had been based on the number of refugees arriving in the early 1980s and it became evident that this was a severe underestimation when approximately 14,500 refugees arrived in Sweden in 1985 alone. The surge in the number of refugees arriving in Sweden meant that by 1989, 277 out of 284 municipalities were involved in the programme. As a result, many of the municipalities which did eventually become part of the policy had poor labour market conditions. Edin et al. (2003) argue that in practice, the availability of housing became the deciding factor in where to place refugees.

As refugees arrived in Sweden, they were placed in refugee reception centres across the country while they awaited the outcome of their residence permit application. They were sorted according to their native language when placed in these centres, but there was no correlation between where they arrived and where in the country they were placed (Åslund et al., 2010). Once a residence permit had been granted, the Immigration Board then assigned refugees to a municipality. Municipal officials then assigned them to housing. Importantly, municipal officials had no contact with refugees before they were assigned to that municipality. Although refugees were asked to state their preferred loca-

tion, the majority of refugees expressed a preference to be placed in Stockholm, Gothenburg or Malmö, where housing was scarce relative to demand. In order to move to a particular municipality, there had to be both space according to the number of contracted refugees it was due to accept and vacant housing at the precise time the refugee obtained their residence permit. Neither refugees, nor municipalities knew when this would occur, so in practice, refugees had little to no say over where they were placed (Åslund et al., 2010). If the number of applications for a municipality exceeded the number agreed in its contract at any one time, then the Immigration Board determined which refugees to send there based on observed characteristics such as native language, qualifications, or family size. In particular, refugees were placed in municipalities with existing migrants who spoke their language, in order to help facilitate their integration into the community.

The process of integrating refugees into Swedish society was split into two parts. Firstly, there was an initial eighteen month period where they received social assistance payments and participated in Swedish language courses. In the second phase, refugees were integrated into the labour market. The receipt of social assistance payments was not dependent on the refugee remaining in their assigned municipality, meaning they were free to relocate provided they could find accommodation elsewhere independently. Between 1985-1991, municipalities had their costs for accommodating refugees placed by the programme reimbursed by the central government. They received payment instalments during the placement year and for the subsequent three years in order to cover costs such as housing and social assistance payments. If a refugee relocated to a new municipality, then the payments moved with them to that new municipality. In 1991, the system changed and municipalities received a fixed amount per refugee. This lump sum payment was expected to cover

expenses for 3-5 years. Under this new compensation system, the municipality where the refugee had originally been placed received the payment, although the new municipality could claim compensation if the refugee moved within the first two years of having been placed (Dahlberg and Edmark, 2008).

Figure 3.4: Inflow of refugees over preceding three years as a share of population, by municipality 1985–1994

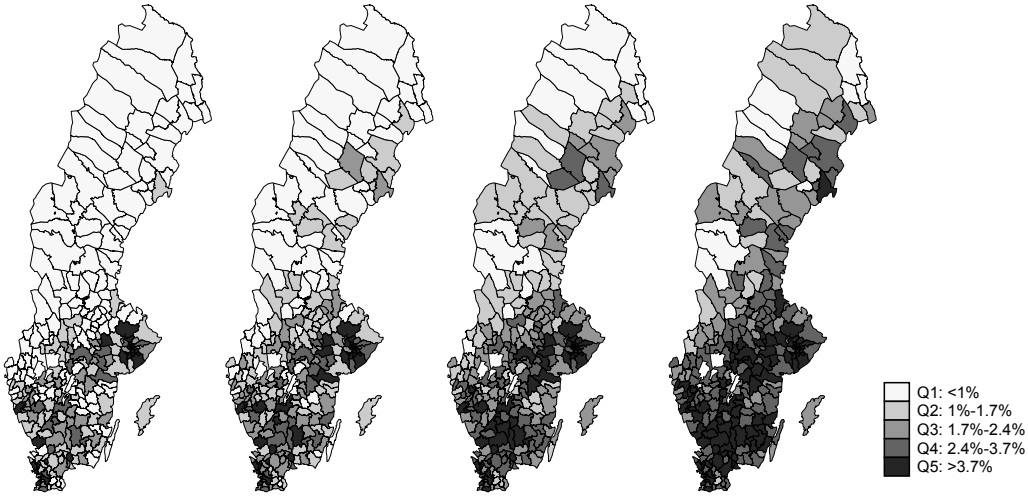


(a) 1986–1988 (b) 1989–1991 (c) 1992–1994

Source: Swedish Immigration Board

As previously stated, one of the main aims of the placement programme was to disperse refugees across the country and to reduce the concentration of refugees in the three metropolitan areas: Stockholm, Gothenburg and Malmö. Figure 3.4a shows that at the start of the policy, refugees were allocated to municipalities across the country, with the exception of the extreme north. This is consistent with the fact that the majority of the original sixty municipalities intended to be part of the programme were located in central and southern areas. Figure 3.4b shows that by 1989-1991, there were large inflows of refugees right across the entire country, with many northern municipalities

Figure 3.5: Share of non-OECD migrants by municipality 1985–1994



(a) 1985 (b) 1988 (c) 1991 (d) 1994

Source: Statistics Sweden (SCB)

in particular receiving inflows greater than 1.3% of the population. In Figure 3.4c we see that between 1992-1994 the inflows remained spread across the whole country, but we see many more municipalities received inflows greater than 1.3% of the population as large inflows of refugees arrived from former Yugoslavia. Figure 3.5 illustrates the rapid changes in the settlement patterns of non-OECD migrants as a result of this policy. In 1985, before the placement policy had had a chance to take effect, non-OECD migrants made up less than 1% of the population in the majority of municipalities, particularly in northern areas. These migrants were clustered in relatively few municipalities, hence the need for the dispersal policy. By 1991 non-OECD migrants made up up to 3.7% of the population in many northern municipalities with little previous experience of migration. In addition, the number of southern municipalities with a share of non-OECD migrants greater than 3.7% had seen a marked increase. By 1994, the settlement pattern of non-OECD migrants had completely changed, both in terms of density and distribution.

3.4 Political Parties and their Manifestos

3.4.1 Electoral System in Sweden

Sweden has three levels of government, and consequently three types of domestic election: national, county and municipality. Between 1985-1994, these elections all took place every three years on the third Sunday in September. At the national level, the unicameral Swedish parliament is made up of 349 members. The primary roles of the parliament are to determine the central government's budget and how it should be distributed, to hold the government to account and to draw up policies such as foreign policy which need to be addressed at the national level. Immigration policy is decided at the national level. In addition, at that time, there were 25 counties run by elected county councils and 284 municipalities runs by municipal councils. Municipalities levy income taxes and are responsible for a variety of services such as: primary and secondary school education, social services, sanitation, roads and planning. County councils are responsible for tasks which cannot be handled at the municipality level such as healthcare and public transport.

In terms of eligibility, all Swedish citizens[2] aged 18 and above who are, or have previously been, registered as a resident in Sweden are eligible to vote in parliamentary elections. In addition, Nordic and EU citizens are entitled to vote in county council and municipal council elections, as are other foreign citizens who have lived in Sweden continuously for at least three years prior to the election. All citizens are only entitled to vote in the county and municipality in which they are registered according to the population register.

[2]In order to obtain Swedish citizenship, an individual must have been resident in Sweden for five years, or two years if they originate from another Nordic country (Migrationsverket, 2016)

A party must obtain a minimum of 4% of the votes nationally in order to be represented in the parliament. Alternatively, if a party receives 12% of the votes in a particular constituency, then it can participate in the distribution of seats for that constituency. In county council elections this minimum threshold is 3% and no threshold exists for municipal elections. Sweden was split into 28 constituencies (29 since 1994) which were broadly consistent with the counties, plus Stockholm, Gothenburg and the area containing Malmö. Each constituency has between 2-34 seats. Of the 349 seats in the parliament, 310 are permanent seats distributed according to the modified Saint Laguë method of proportional representation[3], and 39 are adjustment seats. Prior to the election, the 310 permanent seats are allocated proportionally to the constituencies according to the share of the electorate in each constituency. In county council elections, 9/10 of the seats are permanent and 1/10 are adjustment seats. All seats in municipal council elections are permanent. Once all of the seats have been distributed, candidates from the relevant parties are then selected. Sweden uses an open party list system where voters vote for their preferred candidate. In order to be selected, a candidate must receive 5% of the votes in a constituency. In addition to this 5% threshold, in county (municipal) council elections, the candidate must also receive at least 100(50) votes. If more than one candidate clears the 5% threshold, then seats are allocated to the candidate with the highest number of votes first. If after this,

[3]Sainte Laguë formula: ((v/1.4)/2s+1) where v is total number of votes for a party and s is number of seats allocated so far. The party with the highest figure receives the next seat and this is repeated until all 310 permanent seats have been allocated. After the 310 permanent seats have been distributed, all of the votes for each party across the whole of Sweden are totalled, as if Sweden were one constituency, and then the 349 seats are distributed according to the proportional Saint Laguë formula described above. The outcomes of the two distributions are compared and any party that wins more seats according to the second distribution then receives adjustment seats. Any party that obtained more seats according to the first distribution retains this number of seats and there are then fewer adjustment seats available. A party is allocated adjustment seats in the constituency where it has the largest comparative figure following the distribution of the permanent seats.

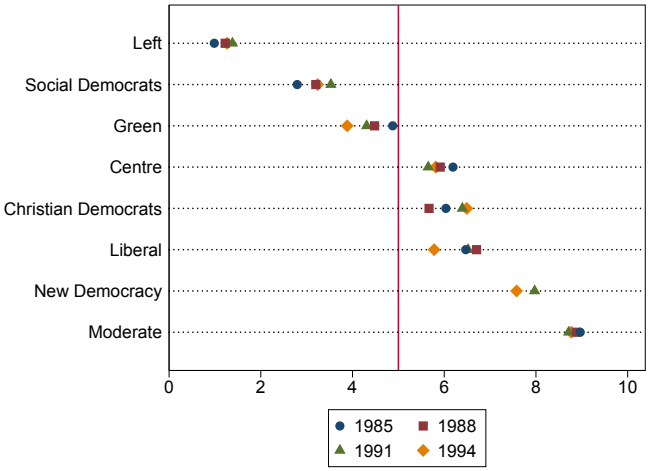
not all of the seats have been allocated, then the candidate at the top of the party list is awarded the next seat until all seats have been filled.

3.4.2 Swedish Political Parties 1985-1994

Between 1985–1994 there were seven major political parties operating in Sweden at all three levels of Swedish politics. The parties can be broadly split into a left and a right bloc; the right bloc comprised the Moderate, Centre and Liberal parties as well as the Christian Democrats, while the left bloc was made up of the Social Democrats, Left party and the Green party at the national level (Folke, 2014). Figure 3.6 supports this assertion; it shows the political parties ranked on a left-right scale from 0-10 (0 most left-wing to 10 most right-wing) by respondents in four waves of the Swedish National Election Studies (Holmberg and Gilljam, 1997). The median value 5 is represented by the vertical line and each party falls on the same side of this line in all years, highlighting the consistency in the public perception of the parties across years. Representatives from the seven main parties also dominated the elected municipal councils, although local party candidates also held seats in many municipalities (Folke, 2014). However, the left-right split was less clearly defined than at the national level, with coalitions frequently being formed across the national level left-right divide.

Despite rising public concern over immigration (Figure 3.1), the mainstream parties continued to support the acceptance of more refugees into Sweden, which created space for an anti-immigration niche in Swedish politics. In February 1991, New Democracy, a right-wing, populist party was founded, filling this niche. The party campaigned to reduce immigration, for the in-

Figure 3.6: Public perception of political parties' position on the left-right spectrum



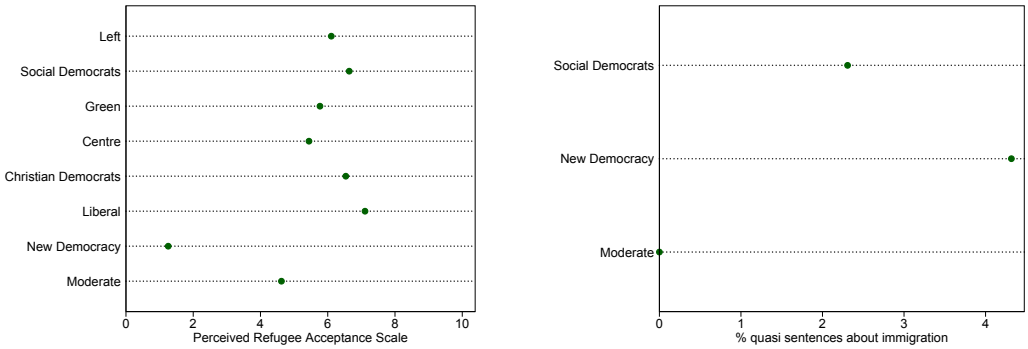
Scale: 0 most left-wing to 10 most right-wing. Source: Swedish National Election Studies

troduction of temporary rather than permanent residence permits and for refugees to be granted loans rather than social assistance in order to support themselves. In addition, party representatives frequently claimed that many asylum seekers were in fact economic migrants with no justification for remaining in Sweden (Rydgren, 2006).

With regards to each party's stance on immigration and asylum matters, respondents in the 1994 wave of the Swedish National Election Studies(SNES) were asked to provide their perception of each party. More specifically, respondents were asked to place each party on a scale 0-10 according to how they perceived their policies on how many refugees Sweden should receive, with 0 being very restrictive and 10 meaning very generous. From Figure 3.7a we see that New Democracy's stance was perceived as being much more hostile than the other parties, with a mean of just over 1. In contrast, the other parties all had a mean of between 4 and 7, highlighting the public perception that New Democracy had a much stronger anti-immigration stance than any of the mainstream parties. It is also clear from Figure 3.7a that right-wing parties

were not perceived to have a stronger anti-immigration stance than left-wing parties, with the possible exception of the Moderate party. Similarly, Figure 3.7b presents a more objective measure of party stance on immigration: the share of quasi sentences in the party's manifesto relating to immigration As expected, we see that immigration was a more salient issue in New Democracy's manifesto than for either the Social Democrats or the Moderate party.

Figure 3.7: Party position regarding immigration



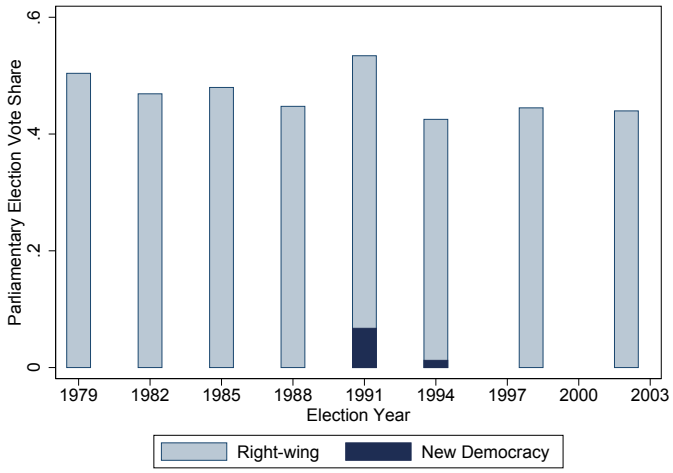
(a) Subjective (b) Objective

Respondents in the 1994 Swedish National Election Studies were asked to rate how willing they thought parties were to accept more refugees into Sweden, with 0 meaning very hostile and 10 being very welcoming. The Manifesto Project calculates the share of quasi sentences relating to immigration in each party's manifesto. These data are only available for the Social Democrats,Moderate, and New Democracy Parties. We thank Yotam Margalit for providing us with this information.

In the 1991 parliamentary election, there was a major rightward shift in the Swedish political system which is clearly evident in Figure 3.8. The right-wing vote share increased to 53.4%, up from just 44.7% in 1988. The Social Democrats, who had been in power since 1982, recorded their worst result since 1928, the Green party failed to clear the 4% threshold required for parliamentary representation and the Left party only narrowly managed to do so. This resulted in the Moderate, Centre, Liberal and Christian Democrat parties forming a minority government. Despite only forming in February of the election year, New Democracy had immediate success, winning 6.7% of

the vote and 25 seats. New Democracy's success, however, was a short-lived phenomenon as they only received 1.2% of the parliamentary vote in 1994 and lost all seats as the Social Democrats formed a minority government. The collapse of New Democracy in 1994 has been attributed to internal conflicts within the party and the resignation of one of the two party leaders in February 1994 (Widfeldt, 2000). In addition, the incumbent government began to tighten Swedish asylum policy. For example, in 1993 visa restrictions were introduced for Bosnian citizens. Furthermore, when the Social Democrats came to power in 1994, the minister for immigration continued to tighten asylum policy (Widfeldt, 2001). These factors may also have contributed to the short lived success of New Democracy.

Figure 3.8: Right-wing parliamentary vote share 1979-2002



Elections took place every 3 years 1979-1994 and every 4 years thereafter. Right-wing includes the Moderate, Centre, Liberal, and Christian Democrat parties, in addition to New Democracy. Source: Swedish National Data Service.

3.5 Data Description

Our basic strategy will be to relate voting patterns to the share of immigrants in a municipality. We wish to control for any municipality characteristics which might plausibly affect voting patterns and which might also be correlated with migrant shares. In Table 3.1 we present municipality level summary statistics, focusing on the election years 1988, 1991 and 1994. We use data from Statistics Sweden to calculate the share of migrants living in municipality i in election year t. These data come from the Total Population Registers and therefore provide a precise record of how many migrants from each country of origin were present in each municipality in each year. In Section 3.3.1 we established that the increased migration to Sweden between 1985-1994 was driven by migrants from non-OECD countries. Consequently, following Dahlberg et al. (2012), we focus on migration from non-OECD countries plus Turkey.[4] The increase in non-OECD migrants, particularly between 1991 and 1994, is very clear. There was however substantial variation across municipalities. In 1994, the non-OECD migrant share ranged from 0.56% in Älvdalen to 19.2% in Botkyrka.

Contracted refugees are calculated as the cumulative number of refugees contracted to municipality i since the previous election as a % of the municipality population. This measure is based on the number of refugees that were to be admitted according to the contracts signed between the Swedish Immigration Board and the municipalities. These data come from the Swedish

[4]Dahlberg et al. (2012) define migrants according to foreign citizenship. Instead, we define a migrant by their country of birth as this avoids the issue of naturalisation. The definition of non-OECD is based on countries who were not OECD members in 1994, with the exception of Turkey. Turkey is included with non-OECD countries due to the significant inflows of refugees from Turkey to Sweden during this period.

Table 3.1: Summary Statistics 1988–1994

	1988		1991		1994	
	Mean	SD	Mean	SD	Mean	SD
Migration patterns (as a % of total population)						
Non-OECD migrants	2.16	1.76	2.88	2.09	3.88	2.44
OECD migrants	4.29	2.89	4.29	2.84	4.33	2.72
Contracted refugees	0.53	0.28	0.86	0.39	1.33	0.88
Voting patterns						
New Democracy vote share	0	0	6.78	1.86	1.15	0.50
Right-wing vote share	44.41	10.74	52.31	10.88	40.91	10.49
Turnout	86.05	2.28	86.62	2.26	86.81	2.12
Invalid votes	1.14	0.31	1.56	0.36	1.44	0.36
Municipality characteristics						
Population (100,000s)	0.30	0.52	0.30	0.53	0.31	0.54
Housing vacancies	2.67	3.74	0.76	1.31	2.45	2.80
Unemployment	2.83	1.32	1.73	0.96	2.58	1.01
Welfare spending pc(SEK100)	3.91	2.46	4.78	2.45	5.26	2.17
Share female	49.79	0.98	49.82	0.96	49.85	0.89
Share Tertiary educ.	5.22	2.94	5.55	3.07	6.26	3.47
Share Age 65+	18.16	4.34	18.58	4.27	18.51	4.06
Number of municipalities	278		278		278	

All variables are expressed in percentage terms except for welfare spending which represents social spending per thousand inhabitants in SEK100 deflated to 1994 values and population which is expressed in 100,000s. Contracted refugees refers to the the number of refugees that were to be accepted according to contracts signed between the Swedish Immigration Board and municipalities, expressed as a share of the municipality population. All variables in the second panel refer to Parliamentary elections. Vote shares are expressed as a % of the number of valid votes cast. The turnout rate is reported as a % of the number of eligible voters and the invalid votes are expressed as a % of the total votes cast. Tertiary education is defined by Statistics Sweden as at least three years of post-secondary education. This corresponds to ISCED97 levels 5 and 6.

Immigration Board.[5] The contracted inflow of refugees increased over each three-year period from 0.5% of the population in 1986–1988 to 1.3% of the population in 1992–1994. Again, there was a great deal of variation across the municipalities, with some smaller municipalities taking a much larger share, up to 12% of the population.

[5]We thank Per Pettersson-Lidbom for kindly providing us with data on the contracted refugee inflows, as well as data on housing vacancies and welfare spending. Data on welfare spending come from the National Board of Health and Welfare and housing vacancy data are from Statistiska meddelanden publications.

Election data were provided by the Swedish National Data Service. We aggregate party vote shares to the municipality level. Turnout rates were high and stable across the period. As noted in Section 3.4.2, the right-wing vote share jumped in 1991 and dropped back in 1994. The final panel of Table 3.1 reports various municipality characteristics, mostly taken from Statistics Sweden. The average municipality had approximately 30,300 inhabitants, the share of the population with tertiary level education increased from 5.2% to 6.3%. Housing vacancy rates and unemployment dropped markedly between 1988 and 1991, but increased again between 1991 and 1994.[6] We discuss the municipality characteristics included in our model in more detail in the next section.

3.6 Empirical Analysis

This section will first introduce the benchmark model used in our analysis, before we then try to address the endogeneity of the migrant share by using an instrument based on the refugee placement policy which we discussed in Section 3.3.2. We then examine some alternative responses to migration inflows, and finally, we take a closer look at what may be causing our OLS results.

3.6.1 Benchmark Model

We wish to establish whether immigration has a causal impact on voting behaviour at the municipality level, and more precisely, whether the arrival of migrants from non-OECD countries into Swedish municipalities during the

[6] We include 278 of the 284 municipalities in our final sample, excluding the six municipalities with missing data on housing vacancies (Borgholm, Grästorp, Haparanda, Lomma, Pajala and Valdemarsvik).

1980s and 1990s caused an increase in vote share for political parties which supported reductions in immigration. Our primary focus is on the propensity to vote for New Democracy, which as argued in Section 3.4, was the party with the strongest anti-immigrant policy stance.

Our simplest model relates the fraction of the population who vote New Democracy in municipality i at time t to the fraction of the population who are non-OECD migrants in that municipality, m_{it}, controlling for an aggregate time effect, γ_t, which captures the general increase in New Democracy vote shares between 1988 and 1991, and the subsequent decrease between 1991 and 1994:

$$nd_{it} = \beta_0 + \beta_1 m_{it} + \gamma_t + \epsilon_{it} \qquad t{=}1991{,}1994 \tag{3.6.1}$$

However, it is unlikely that migrants are randomly allocated across municipalities with respect to their voting behaviour, in which case some factors in ϵ_{it} are correlated with m_{it}. We therefore control for various observable pre-existing municipality-level characteristics, measured three years earlier (recall that elections were held every three years):

$$nd_{it} = \beta_0 + \beta_1 m_{it} + \boldsymbol{\beta}_2 \mathbf{x}_{it-3} + \theta_i + \gamma_t + \varepsilon_{it} \qquad t{=}1991{,}1994 \tag{3.6.2}$$

The vector $\mathbf{x}_{it-3}$ includes the existing within-municipality share of: OECD migrants, females, individuals with tertiary education, individuals aged 65 plus, population, unemployment rate, housing vacancies and welfare spending (see Table 3.1). Each of these factors might plausibly affect voting behaviour and the location of non-OECD migrants. In particular, municipality labour

market opportunities and housing vacancies were key factors which influenced the numbers of refugees accepted by municipalities (Andersson, 2003; Edin et al., 2003). We also include a municipality fixed effect θ_i to account for time invariant, unobservable drivers of support for right wing parties, and a time effect γ_t. To estimate (3.6.2) we take first differences rather than a within-transformation because when we address endogeneity concerns in Section 3.6.2, we instrument for the inflow, Δm_{it}, rather than the stock of non-OECD migrants.[7]

$$\Delta nd_{it} = \beta_1 \Delta m_{it} + \boldsymbol{\beta}_2 \Delta \mathbf{x}_{it-3} + \delta_t + \Delta \varepsilon_{it} \qquad t{=}1991{,}1994 \tag{3.6.3}$$

Note that in general, changes in voting behaviour might also occur as a direct effect of the increase in the share of migrants in the voting population. However, this is not a concern here because we focus our analysis on parliamentary level elections as only Swedish citizens were able to vote in these.[8]

Our baseline model (3.6.3) is consistent with the majority of models used in the existing literature. Barone et al. (2016), Otto and Steinhardt (2014), Sørensen (2016) and Gerdes and Wadensjö (2010) all estimate models in levels which are essentially the same as (3.6.2). These papers use a within transformation to deal with municipality or district level fixed effects. Sørensen (2016) uses $ln(m_{it} + 1)$ rather than the migrant share as his main explanatory variable, while Gerdes and Wadensjö (2010) use a monotonic transformation of a

[7]Note that Card and Peri (2016) argue that one should calculate the change in migrant stock as $\Delta m_{it} = (M_{it} - M_{it-3})/P_{it-3}$ to avoid confounding the effects of changes in the number of natives with the immigration supply shock. We obtain very similar results using both definitions of Δm_{it}, so we proceed in the standard way i.e. $\Delta m_{it} = M_{it}/P_{it} - M_{it-3}/P_{it=3}$

[8]In order to obtain Swedish citizenship, individuals from non-OECD countries had to have been resident in Sweden for a minimum of five years (Migrationsverket, 2016). As the largest inflows of non-OECD migrants occurred in the late 1980s and early 1990s, we believe that it is unlikely that any change in New Democracy vote shares are due to the direct effect of the increase in the share of non-OECD migrants in the voting population.

log odds ratio rather than a vote share as their dependent variable. In addition, Otto and Steinhardt (2014) also use a pooled fractional probit estimator to take account of the binary nature of the dependent variable. Halla et al. (2017) estimate a within municipality model in differences which is consistent with (3.6.3). Harmon (2017) also estimates a model in differences, although he includes a municipality specific trend respectively, which is not consistent with the model we estimate in (3.6.3).

Results from estimating these models are reported in Table 3.2. All estimates are weighted by municipality population in order to obtain results which are representative at the national level.[9]. In column (1) we report the simple correlation between the non-OECD migrant share and the New Democracy vote share, including only year fixed effects. The coefficient on the non-OECD migrant share is positive and statistically significant, albeit small.[10] In column (2) we then add the vector of municipality covariates. The relationship between the non-OECD migrant share and New Democracy vote share remains statistically significant but is slightly smaller than in column (1). Several of the municipality characteristics have a significant effect on the New Democracy vote share, the unemployment rate, the share of tertiary educated, the OECD migrant share and the housing vacancy rate. However, note that in column (2) we do not control for municipality fixed effects, and all of these results, it turns out, are driven by between municipality variation. In order to account for the 0-1 nature of the dependent variable, we also estimate (2) using a fractional logit estimator. The average marginal effect is 0.049 and is consistent with our OLS results, albeit not statistically significant.

[9]Weighting our regressions affects our results and we discuss this further in Section 3.6.4

[10]The R^2 of the model containing time dummies and without m_{it} is 0.85, indicating that the majority of variation in New Democracy vote shares is accounted for by time dummies, rather than driven by within municipality variation.

In column (3) we control for municipality fixed effects by estimating equation (3.6.3). This causes a large increase in the size of the estimated coefficient. This increase is consistent with the hypothesis that migrant location is endogenous with respect to ϵ_{it} in (3.6.2). Our results suggest that a one percentage point increase in the share of non-OECD migrants in a municipality is associated with a 0.28 percentage point increase in the New Democracy vote share. The average increase in the non-OECD migrant share in a municipality was between 0.57% and 1.00% over each three-year period, so this represents approximately the predicted average effect across municipalities. This finding is broadly consistent with a number of FE estimates for other European countries: Barone et al. (2016) 0.321*** for Italy; Halla et al. (2017) 0.159*** for Austria; Otto and Steinhardt (2014) 0.225*** for Germany.[11]

3.6.2 IV Results

Our baseline model (column(3) in Table 3.2) allows for the possibility that the migrant share is endogenous with respect to fixed municipality characteristics. However, in order for this model to identify the causal impact of non-OECD migration shares on voting patterns, we require that the change in the non-OECD migrant share within municipalities is random with respect to $\Delta\epsilon_{it}$ There are a number of reasons why this assumption may not hold. First, migrants may choose not to live in, or may move away from municipalities where the natives become more hostile towards them. If immigrants leave municipalities which experienced a shift in voting towards New Democracy, this would imply a negative correlation between $\Delta\varepsilon_{it}$ and Δm_{it}, leading to a downward bias in the estimate of β_1. Second, if those natives residing in a municipality

[11]We also estimate (3.6.2) using a standard within estimator. The coefficient on the non-OECD migrant share, 0.230***, is highly statistically significant and is consistent with our first differences estimate reported in column 3.

Table 3.2: OLS estimates of the effect of non-OECD migrants on New Democracy vote share

	(1) OLS	(2) OLS	(3) First Differences
m_{it}	0.068***	0.053*	0.276***
	(0.020)	(0.030)	(0.067)
Share of OECD migrants		0.050**	0.282
		(0.021)	(0.175)
Unemployment rate		−0.531***	−0.004
		(0.080)	(0.137)
Housing vacancy rate		−0.099***	0.038
		(0.024)	(0.032)
Log Population		−0.001	0.040**
		(0.001)	(0.016)
Log Welfare spending		0.002	−0.002
		(0.002)	(0.002)
Share Female		−0.067	−0.188
		(0.110)	(0.455)
Share Tertiary educ.		−0.038**	−0.066
		(0.018)	(0.115)
Share Age 65+		0.007	−0.014
		(0.022)	(0.109)
Constant	0.065***	0.114**	0.066***
	(0.001)	(0.046)	(0.002)
Year=1994	−0.056***	−0.050***	−0.125***
	(0.001)	(0.001)	(0.004)
Municipality covariates		Yes	Yes
Population weighted	Yes	Yes	Yes
Number of obs.	556	556	556
Number of mun.	278	278	278
R^2	0.861	0.888	0.949

Standard errors clustered at the municipality level are reported in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

which saw a large increase in its share of migrants have strong preferences for fewer migrants, then we may expect them to respond by moving out of the local area. This would result in a lower share of potential New Democracy voters living in areas with a high migrant density. Again, this would imply a negative correlation between $\Delta\varepsilon_{it}$ and Δm_{it}, leading to a downward bias in the estimate of β_1.

Following Dahlberg et al. (2012) we deploy an IV strategy which exploits as a first stage the relationship between refugee placement and changing shares

of non-OECD migrants. More precisely, we instrument Δm_{it} with the share of contracted refugees each municipality was due to receive from the refugee placement programme, cr_{it}.[12] This contracted refugee share is based on the numbers agreed in written contracts between the Swedish Immigration Board and each municipality. As we showed in Section 3.3.2, the refugee placement policy had significant effects on the settlement pattern of migrants in Sweden, suggesting that it allocated refugees to municipalities they would not otherwise have chosen. The placement policy therefore helps us to overcome the potential endogeneity of migrant location choice.

For cr_{it} to be a valid instrument, we require that, conditional on controls $\Delta \mathbf{x}_{it}$, the share of contracted refugees is random with respect to $\Delta \varepsilon_{it}$, and thus only has an effect on Δnd_{it} through its effect on Δm_{it}. There are two threats to this assumption. First, municipalities with pre-existing hostility towards migrants may have refused to take refugees and this may have been correlated with changes in political preferences. However, we argue that this was not the case because of the much greater than anticipated number of refugees arriving in Sweden at that time. Put simply, these refugees had to go somewhere. Edin et al. (2003) state that interviews conducted with officials confirmed that refusals to take refugees were rare and that the bad press surrounding the few cases where it did happen ensured that other municipalities accepted their share of refugees. In fact, only three of the 284 municipalities played no part at all in the placement scheme.[13]

[12]Dahlberg et al. (2012) use a closely related instrument based on the share of refugees that were actually placed by the programme; the contracted refugee instrument was not available to them at the time. Dahlberg et al. (2017) argue that both instruments are likely to satisfy both the relevance and the exogeneity criteria. We therefore also consider placed refugees as a potential instrument. Nekby and Pettersson-Lidbom (2017) argue that the "placed refugee" instrument is actually based on payments made to municipalities for migration inflows more generally. We discuss the differences between these two instruments in more detail below.

[13]Sjöbo, Vellinge and Övertorneå

Second, and relatedly, we may still be concerned that a municipality's willingness to negotiate fewer refugees was correlated with changes in the political preferences of its citizens. However, as New Democracy was only created in 1991, there were no representatives from the party present on municipal councils, so they lacked the capability to influence the refugee contract negotiations for the first six years of the programme. We showed in Figure 3.7 that none of the mainstream right-wing parties, or indeed any other mainstream party, took a strong stance on refugee migration. Consequently, we would not expect the number of refugees contracted to a municipality to be correlated with the political preferences of its citizens.

In order to examine the exogeneity of our contracted refugee share instrument with respect to changes in voting patterns, we regress the share of contracted refugees between $t-3$ and t on the change in the municipal council right-wing vote share between $t-6$ and $t-3$. We focus on municipal council elections because the contracted refugee share was agreed by representatives for each municipality. If our contracted refugee instrument is indeed exogenous, it should be uncorrelated with changes in vote shares between elections which occurred prior to when the contracted refugee share was determined. Ideally we would use changes in the New Democracy vote share to test this relationship. However, since New Democracy was only founded in 1991, instead we use changes in the right-wing vote share which is available for the entire period of interest.

Table 3.3 shows that there is no correlation between the contracted share of refugees and changes in voting patterns prior to the determination of the contracted refugee share. This result strengthens our claims that the contracted refugee share is a valid instrument. In the bottom panel of Table 3.3, we show that there is a negative relationship between the right-wing vote share

in levels (at $t-3$) and the contracted refugee share, but only for the first three years of the policy. This finding is unsurprising because as discussed in Section 3.4, initially only a small number of municipalities were due to take part in the policy. We might expect that the more right-wing municipalities may not have been amongst the first to welcome refugees. As we only require the contracted refugee share to be exogenous with respect to the change in voting outcomes, this is not an issue.

Table 3.3: OLS regressions of contracted refugee share on the change in the municipal council right-wing vote share between previous elections

	(1) cr_{it}	**(2)** cr_{i88}	**(3)** cr_{i91}	**(4)** cr_{i94}
ΔR_{it-3}	0.007	0.000	0.007	0.002
	(0.008)	(0.009)	(0.009)	(0.016)
Number of obs.	834	278	278	278
R^2	0.385	0.138	0.302	0.269
R_{it-3}	-0.004^{*}	-0.005^{***}	-0.003	-0.005
	(0.002)	(0.002)	(0.003)	(0.005)
Number of obs.	834	278	278	278
R^2	0.387	0.160	0.304	0.271

Regressions include the same municipality covariates reported in Table 3.2. Standard errors clustered at the municipality level are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Our IV results are reported in Table 3.4. We report two sets of results. The first uses our preferred instrument, the number of contracted refugees. The second uses the same instrument as Dahlberg et al. (2012), the share of refugees actually placed by the programme. The former is our preferred instrument because it further removes an element of migrant self-selection. Column (1) shows that, unsurprisingly, the refugee placement policy is a highly relevant instrument: our first stage regression results show that a 1% increase in the share of contracted refugees caused a 0.5% increase in the number of non-OECD migrants in that municipality. The fact that there is not a one-to-one

relationship between contracted refugees and non-OECD migrants suggests that, over the three-year period some refugees may have subsequently moved on to other locations. Our first-stage estimate is consistent with Dahlberg and Edmark (2008)'s claim that more than 60% of allocated refugees were still residing in their assigned municipality after four years. Column (2), however, shows that the estimated effect on the New Democracy vote share is zero, albeit with a large standard error. Thus, despite the fact that placement of refugees caused large and significant increases in the share of non-OECD migrants in Swedish municipalities, our IV results indicate that this had no significant effect on votes for New Democracy. It is however important to note the imprecision of these estimates, and that conducting a Hausman test shows that our our IV estimates are not significantly different from our benchmark OLS estimates presented in Table 3.2.

As a robustness check, in columns (3) and (4) of Table 3.4 we use placed refugees rather than contracted refugees as an instrument. Nekby and Pettersson-Lidbom (2017) argue that the placed refugees instrument is actually based on payments made by the Swedish Immigration Board to municipalities and that this includes payments for all new migrants, not just those subject to the placement policy. Consequently, we may have concerns that this measure will pick up migrants who may have self selected away from those municipalities where natives were more hostile towards migrants and this is likely to be correlated with changes in voting outcomes. We find that the relationship between this instrument and the non-OECD migrant share is larger (0.871 compared to 0.458), which is consistent with the hypothesis that this instrument is measuring migrant flows rather than refugee placements more narrowly. The estimated effect of migrant shares on voting behaviour, shown in Column (4) is also imprecisely estimated, but similar in magnitude to the baseline estimate

Table 3.4: IV estimates of the effect of non-OECD migrants on New Democracy vote share

	(1) 1st stage	(2) 2nd stage	(3) 1st stage	(4) 2nd stage
m_{it}		−0.001		0.201
		(0.228)		(0.163)
Contracted refugees	0.458***			
	(0.071)			
"Placed refugees"			0.871***	
			(0.087)	
Municipality covariates	Yes	Yes	Yes	Yes
First stage F stat.	41.55		101.32	
Number of obs.	556	556	556	556
Number of mun.	278	278	278	278
R^2	0.293	0.948	0.552	0.949

Estimates are based on Equation (3.6.3) with Δm_{it} instrumented with contracted or placed refugee shares. Regressions include the same municipality covariates reported in Table 3.2. Standard errors clustered at the municipality level are reported in parentheses. Conducting a Hausman test gives a p value of 0.19 so our IV estimates are not significantly different from our benchmark OLS estimates presented in Table 3.2. As a robustness check we also examine the two years separately. The second stage coefficients on m_{it} are both statistically insignificant: -0.922(0.725) for 1991 and 0.226(0.410) for 1994. * p < 0.1, ** p < 0.05, *** p < 0.01.

shown in column (4) of Table 3.2. This is also consistent with the claim that the placed refugees instrument is picking up self-selection of migrants because it is based on payments for migration flows rather than contracts for refugees which are more plausibly exogenous to migrants' choices about where to locate.

Using our preferred instrument, therefore, we find no evidence of a relationship between migrant shares and New Democracy vote shares. The assumption that migrants self-select away from locations with growing right-wing vote shares would lead us to expect that the coefficients from estimating our baseline model, equation 3.6.3), would be smaller than the IV estimates, but there is no evidence for this. There are two possible interpretations of the fact that refugee inflows in Sweden during this period had no effect on New Democracy vote shares. The first is that natives may react differently to inflows

of refugees into their local area than to the inflow of migrants more generally. Refugees may not be viewed by natives as labour market competition, at least not in the short run. Humanitarian considerations may also play a role: natives may recognise that refugees have fled from terrible conditions and therefore feel more compassionate towards them than towards economic migrants. The second interpretation is that a policy which explicitly disperses migrants leads to weaker political reactions, perhaps because it leads to less pressure on local resources.

3.6.3 Other Responses to Migrant Inflows

Our key finding is that the increase in non-OECD migrants that was driven by the allocation of refugees had no systematic effect on the New Democracy vote share in 1991 or 1994. However, there are a number of other potential native responses to migrant inflows which might explain our results.

First, natives might respond to an influx of migrants into their municipality by moving away. If those natives residing in a municipality which saw a large increase in its share of migrants have strong preferences for fewer migrants, then we may expect them to respond by moving out of the local area altogether. This would result in a lower share of likely New Democracy voters living in areas with a high migrant density. To test this, we follow Peri and Sparber (2011) and regress the change in the share of natives, $(N_{it} - N_{it-3})/(N_{it-3} + M_{it-3})$ on the change in the share of migrants $(M_{it} - M_{it-3})/(N_{it-3} + M_{it-3})$, controlling for the same municipality-level characteristics as in (3.6.2). Results are reported in column (1) of Table 3.5. The coefficient is negative, but not statistically significant. While we find no statistically significant evidence of native outmigration, as the coefficient is imprecisely estimated, we cannot

Table 3.5: Additional Results

	(1) Share of natives	(2) Turnout	(3) Invalid votes	(4) Votes for other parties	(5) Right-wing vote share	(6) ND vote share municipal elections
m_{it}	−0.154	−0.093	−0.032	−0.074	0.174	0.140
	(0.159)	(0.119)	(0.029)	(0.053)	(0.126)	(0.122)
Year=1994	−0.023***	−0.007***	−0.004***	−0.001	−0.200***	−0.045***
	(0.003)	(0.002)	(0.001)	(0.002)	(0.005)	(0.004)
Constant	0.005*	0.009***	0.004***	0.003*	0.074***	0.027***
	(0.003)	(0.002)	(0.001)	(0.002)	(0.003)	(0.003)
Municipality covariates	Yes	Yes	Yes	Yes	Yes	Yes
Population weighted	No	Yes	Yes	Yes	Yes	No
Number of obs.	556	556	556	556	556	556
Number of mun.	278	278	278	278	278	278
R^2	0.352	0.252	0.634	0.032	0.963	0.525

All estimates are OLS in first differences. All regressions include the same set of municipality covariates used in Table 3.2. In column (4) Other parties refer to small, non-mainstream parties. Columns (1) and (6) are not weighted by municipality population because these outcomes occur at the municipality level, rather than at the national level as for the Parliamentary elections (columns (2)-(5)). Standard errors clustered at the municipality level are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

entirely rule this out.

Second, natives' voting behaviour might change along dimensions other than the New Democracy vote share. We argued that changes in New Democracy vote shares were the most plausible response, because this was the only party at the 1991 and 1994 elections which offered any kind of anti-migration manifesto (see Section 3.4). Nevertheless, in column (2) we test whether there is any impact of migration on voter turnout, in column (3) we test whether there is any impact on the share of invalid votes and in column (4) we test whether there is any impact on the vote share of other parties. Other parties refer to small, non-mainstream parties. This measure could, for example, contain a local level far-right party. In this case, this party may see an increase in its vote share in response to migration, rather than us observing an effect for the national level New Democracy party. We find no evidence that increased migration had any effect on turnout, invalid votes or the vote shares of other, non-mainstream parties.

In addition to considering the direct effect of an increase in migration on the vote share of an anti-immigration party, we may also expect to observe an effect on the right-wing vote share more generally. Right-wing parties are typically associated with more restrictive welfare state policies and we may expect this to be a channel through which natives may react in response to a large inflow of predominantly refugee migration. We define a right-wing party as any party which falls to the right of the median value of 5 on the left-right spectrum shown in Figure 3.6. Column (5) of Table 3.5 shows that there is a positive estimated coefficient on the right-wing vote share, but that it is smaller in magnitude than the effect on the New Democracy vote share, and is not statistically significant. That we don't find a statistically significant effect

on the right-wing vote share is perhaps not surprising in light of the fact that we have already established that none of the mainstream right-wing parties had an anti-migration stance.

Finally, in our benchmark analysis, we focused on the success of New Democracy at the parliamentary election level. Arguably, we may expect to observe stronger effects in local elections. ERW parties have traditionally built on success at a local level, and in the Swedish case, the refugee placement policy quotas were negotiated between the Immigration Board and municipal officials. However, at the height of their success in 1991, New Democracy received only 2.75% of the vote share in Municipal Council Elections compared to 6.7% in the parliamentary elections. New Democracy can be considered to be an atypical ERW party because it was not built up from the grass roots level of politics, but rather came into existence suddenly in 1991. For this reason, it is unsurprising that Column (6) of Table 3.5 we do not find any effect of migration on the New Democracy vote share in the Municipal Council elections. with our IV results presented in Section 3.6.2.

3.6.4 What is Driving our OLS Results?

Our OLS results suggest that a one percentage point increase in the share of non-OECD migrants in a municipality is associated with a 0.28 percentage point increase in the New Democracy vote share. However, our IV results showed that despite the fact that placement of refugees caused large and significant increases in the share of non-OECD migrants in Swedish municipalities, this had no significant effect on votes for New Democracy.

In order to see what may be driving our OLS result, in Table 3.6 we split the sample according to whether a municipality is in the vicinity of one of

the three major urban areas, Stockholm, Gothenburg or Malmö. Column 1 includes municipalities in all other counties, while column (2) contains all municipalities in the counties of Stockholm, Vastra Gotaland (Gothenburg) and Skåne (Malmö). Table 3.6 clearly shows that our OLS results are driven by those municipalities surrounding the three major urban areas.

Table 3.6: OLS estimates of the effect of non-OECD migrants on New Democracy vote share split according to whether a municipality is in SGM county

	(1) Non-SGM county	(2) SGM county
m_{it}	0.036	0.246**
	(0.136)	(0.100)
Constant	0.059***	0.070***
	(0.004)	(0.004)
Year=1994	−0.111***	−0.135***
	(0.006)	(0.006)
Municipality covariates	Yes	Yes
Population weighted	Yes	Yes
Number of obs.	348	208
Number of mun.	174	104
R^2	0.933	0.972

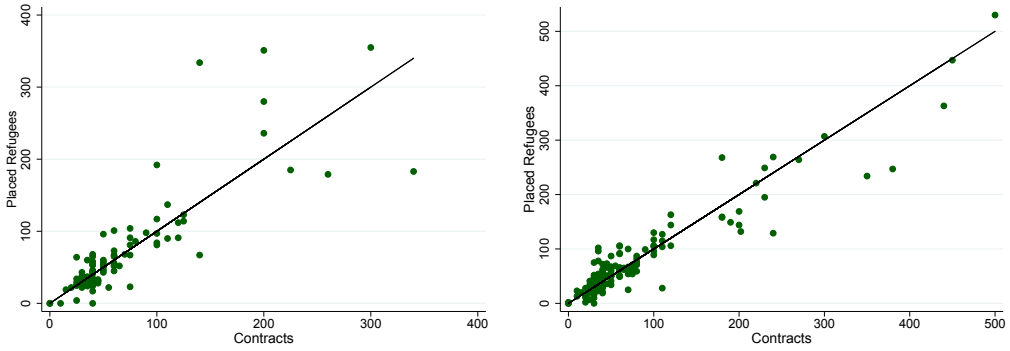
Standard errors clustered at the municipality level are reported in parentheses. Regressions include the same municipality covariates reported in Table 3.2. * p < 0.1, ** p < 0.05, *** p < 0.01.

From Section 3.3.2, we know that the primary purpose of the refugee placement policy was to achieve a more even distribution of refugees across the country and to reduce the burden placed on the three major areas of Stockholm, Gothenburg and Malmö. From our OLS and IV results, we know that any effect on New Democracy vote shares is driven not by contracted refugees, but by increases in non-OECD migrants more generally. One interpretation of these findings is that while refugees may have been dispersed across the country, other non-OECD migrants may have continued to be over-represented in the three major urban areas. If natives react differently to inflows of refugees into their local area than to the inflow of migrants more generally, this could

explain the differences between our OLS and IV results. While this is possible, refugees and other non-OECD migrants, typically family reunification migrants, entering Sweden during this period came from the same countries of origin, so were therefore similar ethnically and culturally. It therefore seems unlikely that the native Swedish population would have been able to easily distinguish between refugees and other non-OECD migrants.

An alternative explanation is that we may have concerns that due to their popularity, these large, urban areas may have systematically received more refugees than they were contracted to. This would lead to a weak first stage relationship for these urban municipalities, giving them less weight in the second stage, and potentially explaining the disparity between the OLS and IV results. Figure 3.9 plots the number of contracted refugees against the number of placed refugees for municipalities in Stockholm, Gothenburg and Malmö counties (panel a) and all other municipalities (panel b). Any fears that municipalities in these major urban areas systematically received more refugees than they were contracted to are unfounded.[14]

Figure 3.9: Contracted versus actual numbers of refugees placed 1990



(a) SGM (b) non-SGM

Although we have shown that the municipalities surrounding Stockholm,

[14] 1990 is chosen as an example, plots are similar for all other years.

Gothenburg and Malmö did not initially receive systematically higher inflows of refugees, it is possible that over time, some refugees may have subsequently moved away from their allocated municipalities and back towards the largest urban areas. Table 3.7 provides some suggestive evidence that this was indeed the case. In particular, the bottom panel of Table 3.7 shows that in the first three years of the policy, 1985-1988, the inflows of non-OECD migrants and contracted refugees were very similar for municipalities not in the Stockholm, Gothenburg and Malmö areas. However, looking at subsequent time periods shows that while the inflows of contracted and actually placed refugees remained similar, roughly 0.9% for the period 1988-1991, the change in the non-OECD migrant share was somewhat lower, 0.6%.

Table 3.7: Summary Statistics 1988–1994 split by municipalities in SGM counties and others

	1988		1991		1994	
	Mean	SD	Mean	SD	Mean	SD
SGM municipalities						
ΔNon-OECD migrants	0.611	0.35	0.884	0.513	1.07	0.648
Contracted refugees	0.522	0.226	0.74	0.25	1.067	0.39
Placed refugees	0.571	0.275	0.727	0.319	1.125	0.571
Number of municipalities	104		104		104	
non-SGM municipalities						
ΔNon-OECD migrants	0.539	0.324	0.624	0.384	0.959	0.707
Contracted refugees	0.53	0.304	0.936	0.43	1.483	1.036
Placed refugees	0.598	0.4	0.972	0.521	1.466	0.926
Number of municipalities	174		174		174	

These findings are consistent with Dahlberg and Edmark (2008)'s claim that while more than 60% of allocated refugees were still residing in their assigned municipality after four years, approximately 70% of those who did relocate, moved to one of the three counties containing Stockholm, Gothenburg and Malmö. Thinking back to the characteristics of the refugee placement

policy, these findings are unsurprising. After the initial eighteen month period when refugees received social assistance payments, they were then integrated into the labour market. However, as the initial idea of allocating refugees to municipalities with good labour market opportunities was abandoned at the outset, it is likely that many of these refugees moved back to the largest urban areas to find work. This may explain why our OLS results are driven by municipalities surrounding the three major urban areas.

3.7 Conclusion

In this chapter we have examined whether an increase in the share of migrants in a municipality causes natives to vote for an anti-immigration party. We focused on the case of Sweden, a country that experienced large increases in migration from non-OECD countries during the 1980s and 1990s. We exploited the implementation of a refugee placement policy which, conditional on municipality characteristics, generated exogenous variation in the non-OECD migrant share with respect to voting outcomes. This enabled us to instrument the inflow of non-OECD migrants into a municipality with the contracted share of refugees they were due to receive from the placement policy, allowing us to address the endogeneity of migrant location issue, thus strengthening the causal interpretation of our results.

In our benchmark OLS specification we find that an increase in the share of non-OECD migrants in a municipality is associated with an increase in the New Democracy vote share. However, our 2SLS estimates show that despite the fact that the arrival of refugees had a strong effect on the growth of the share of migrants in each municipality, there is no relationship between the arrival of refugees and the New Democracy vote share. Further analysis shows

that our OLS results are driven by municipalities in the counties which contain the three largest urban areas of Stockholm, Gothenburg and Malmö. We find no evidence that these areas systematically received more refugees, but we do find that some refugees subsequently move to these larger, urban areas after several years in their allocated municipality. This is consistent with the lack of labour market opportunities in some smaller, more rural areas and the fact that under the placement policy refugees were integrated into the labour market after eighteen months to two years after they arrived in a municipality.

With regards to the placement policy, it is important to note that introducing refugees into municipalities did not foster support for the anti-immigration New Democracy party. Furthermore, in the areas with little prior experience of migration which typically saw large inflows of migrants as a proportion of the population, there was also no impact on New Democracy vote shares in our OLS specification. Coupled with our OLS findings for the three major urban areas, this suggests that there may be some threshold level above which natives increase their support for anti-immigration parties.

Our findings, or more specifically, the lack of effect that we observe in our 2SLS estimates, contrasts with the findings of Harmon (2017) and Dustmann et al. (2016) for Denmark and Sørensen (2016) for Norway. This is perhaps surprising as migration to both Denmark and Norway in the 1980s and 1990s was also predominantly refugee and family reunification migration. We believe there are several potential reasons for the differences observed in Sweden compared to these other Nordic countries. Both Denmark and Norway implemented similar refugee placement policies to Sweden, but have seen sustained success for the Danish People's Party and Progress Party respectively. Both the Danish[15] and Norwegian Progress Parties were founded in the early 1970s,

[15]The Danish People's Party split from the Danish Progress Party in 1995

while in Sweden, no ERW party existed prior to the implementation of the refugee placement policy. In contrast to these parties, Rydgren (2006) argues that one of the reasons for New Democracy's lack of sustained success was due to the fact that the party operated at the national level without much regional support. In addition to this, internal organisational difficulties led to its demise in 1994 and its disappearance from the Swedish political scene by 1998 Rydgren (2006).

One further potential explanation for the differences between our findings for Sweden and those of Dustmann et al. (2016) for Denmark is the difference in the politicisation of immigration and asylum issues by the mainstream political parties. Green-Pedersen and Krogstrup (2008) argues that the two leading Danish centre-right parties, the Conservatives and Liberals, commanded a larger share of vote than the leading Swedish mainstream right-wing Moderate party. The Moderate party therefore relied more heavily on the support of more centrist parties, such as the Liberal party to form a government. As immigration was an issue over which these parties were ideologically divided, Green-Pedersen and Krogstrup (2008) argues that this explains why the mainstream Swedish parties largely chose to ignore the issue of immigration in their manifestos and during the electoral campaigns. Therefore although New democracy campaigned on a strongly anti-immigration platform in Sweden, the greater attention paid to immigration issues by the more mainstream parties in Denmark may explain why Dustmann et al. (2016) find a positive relationship between the inflow of refugees into a local area and the anti-immigration party vote share, while we do not for Sweden.

Finally, a potential concern with our analysis is that New Democracy was only successful between 1991-1994 which might indicate that support for New Democracy may have been due to something other than its immigration stance.

However, it is important to note that we have shown that the salience of immigration did decrease dramatically after 1993, coinciding with a marked decline in the number of asylum applications. This coupled with internal conflicts within the party and the tightening of asylum policy by the Social Democrats led to the demise of New Democracy. Furthermore, we can draw some parallels between the fleeting success of New Democracy and the recent success of the far-right, anti-migration Sweden Democrats. The Sweden Democrats entered the Swedish Parliament for the first time in 2010 winning 5.7% of the vote share and further increased this margin to 12.9% in 2014. Like New Democracy, their success has come during a period of large inflows of migrants, predominantly refugees. While the salience of immigration diminished in the interim period of the late 1990s and 2000s, the recent success of the Sweden Democrats suggests that these underlying anti-immigration sentiments have once again come to the fore. In contrast to New Democracy, the Sweden Democrats have strong foundations in local levels of politics and have built on this to become successful at the national level. Another possible explanation for their success is the existence of a migration threshold above which natives increase their support for anti-immigration parties; Sweden has continued to welcome large numbers of migrants and refugees and in 2015, 17% of its population were foreign born.

Chapter 4

Immigration and House Prices in England and Wales: a re-evaluation of the evidence

4.1 Introduction

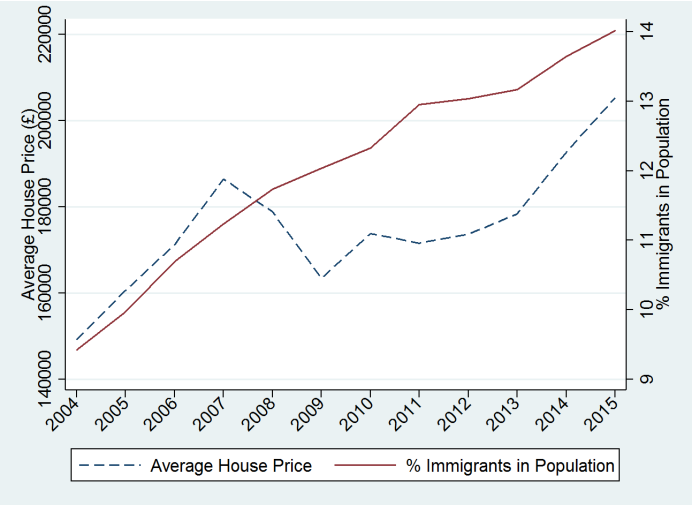
[1]There is a large literature which focuses on the labour market effects of immigration. However, in order to assess the broader impact of immigration on a local area, Saiz (2003) argues that it is necessary to look beyond labour market effects. The housing market is one such area of the economy likely to be affected by immigration. While migrants require both jobs and housing, the supply of housing is, at least in the short term, fixed and so price effects might be easier to identify relative to labour market effects. Understanding the effects that immigration has on house prices is essential because housing is a major source of household wealth. Increasing house prices as a result of immigration could therefore have important welfare effects for native citizens. While existing home owners may become richer, rising house prices and a lack of affordability could potentially contribute to greater inequality, particularly inter-generational inequality, with many younger individuals and first time buyers unable to afford to buy property.

Figure 4.1 plots the average house price in England and Wales against the share of immigrants in the population between 2004-2015. We can see that the share of immigrants in the population increased steadily from roughly 9.5% in 2004 to 14% in 2015. In terms of numbers, Annual Population Survey (APS) data show that between 2004-2015 the population increased by 4.69 million, with migrants accounting for 65% of this growth. During this period, the average house price also rose sharply between 2004 and 2007, before falling

[1]This chapter contains statisitcal data from the Office for National Statistics supplied by the UK Data Service. The use of these data does not imply the endorsement of the data owner or the UK Data Service at the UK Data Archive in relation to the interpretation or analysis of the data. This work uses research datasets which may not exactly reproduce National Statistics aggregates. We thank the UK Data Service for their assistance in accessing the Secure Lab version of the Quarterly Labour Force Survey (ONS, 2017).

during the global financial crisis, recovering between 2010 and 2013 and then rising sharply again most recently between 2013 and 2015. Overall, the average house price rose from roughly £150,000 in 2004 to £205,000 in 2015. Regarding affordability, in 2015 the median house price was more than nine times the median salary in England and Wales (ONS, 2016).

Figure 4.1: Immigration and Average House Prices in England and Wales 2004-2015



Sources: Land Registry HPI dataset and Annual Population Survey.

Discussions in the media about housing, both in terms of rising house prices and the shortage of housing frequently propose immigration as one of the leading causes.[2] Following a similar narrative, in her January 2017 speech on the government's plan for Brexit, Theresa May spoke about how "in the last decade or so, we have seen record levels of net migration in Britain, and that sheer volume has put pressure on public services, stretched our infrastructure, especially housing". However, there are numerous potential explanations for the large rises in house prices observed at the national level. Some factors, such as low interest rates and deregulation of the mortgage market, are countrywide effects. Other factors, such as migration, are likely to have heterogeneous

[2]See Swinford (2015) and Slack (2016) for example.

effects across local areas. Therefore, in order to investigate whether there is a causal relationship between the large increases in both migrant shares and house prices that we observe at the national level, we exploit variation in the migrant share at a much finer geographical level.

The simplest way in which we might expect the proportion of migrants in a local area to affect house prices is by driving an increase in the demand for housing in that area, thus pushing house prices up. On the other hand, inflows of migrants could lower average income levels, lead to increased levels of crime, cause pressure on local public services, or a deterioration in the quality of the housing stock. Furthermore, migrant inflows could lead existing native residents to move to other areas if they have a preference for living in more ethnically homogeneous communities. We would expect these factors to have a negative effect on house prices, making the direction of the expected overall effect of migration on house prices a priori uncertain.

The aim of this chapter is therefore to explore whether inflows of migrants have a causal impact on house prices in England and Wales using a spatial correlations approach. Methodologically, we exploit variation in migrant inflows across local authority districts to identify the effects of migration on changes in house prices. We then address the endogeneity of the migrant share by using an instrument based on historical settlement patterns. This identification strategy is based on the idea that historical migration patterns are likely to be correlated with current settlement patterns due to the formation of networks and migrant communities. While our study is closely related to Sá (2015), we contribute to the literature in three ways. First, we use data at a more disaggregated level, the local authority district, in order to better account for unobserved local level characteristics. Second, we examine the suitability of an instrumental variable based on historical settlement patterns in the case of the

England and Wales. Third, we exploit data on the postcode of each individual housing transaction in an attempt to better control for housing quality.

In our benchmark OLS specification we find no evidence of any relationship between the inflow of migrants into a local area and changes in house prices. The inclusion of postcode area fixed effects does not change the results, nor do we find any relationship for properties at different parts of the price distribution. In contrast to our OLS findings, our 2SLS results suggest that a migrant inflow equivalent to 1% of the population is associated with a fall in house prices of 2.4%. Further examination reveals that this effect is driven by local authorities in London, and that our instrument based on historical migrant settlement patterns is weak and fails to fulfil the relevance requirement for local authorities outside of London. The negative relationship we find in our 2SLS estimation can perhaps be explained by the fact that we find evidence of substantial native displacement from local authorities which experienced large inflows of migrants. However, there is no evidence that this is a causal relationship.

The remainder of this chapter is organised as follows. Section 4.2 gives some background to both migrant and house price patterns in England and Wales. Section 4.3 provides an overview of the mechanisms through which immigration may affect house prices, as well as the models and key results from the literature. Section 4.4 introduces the data, while Section 4.5 presents our empirical strategy and results. Additional results and robustness checks are shown in Section 4.6, while our IV strategy and results are presented in Section 4.7. We look at potential explanations for our results in Section 4.8 and provide a discussion of the findings in Section 4.9. Section 4.10 concludes.

4.2 Background

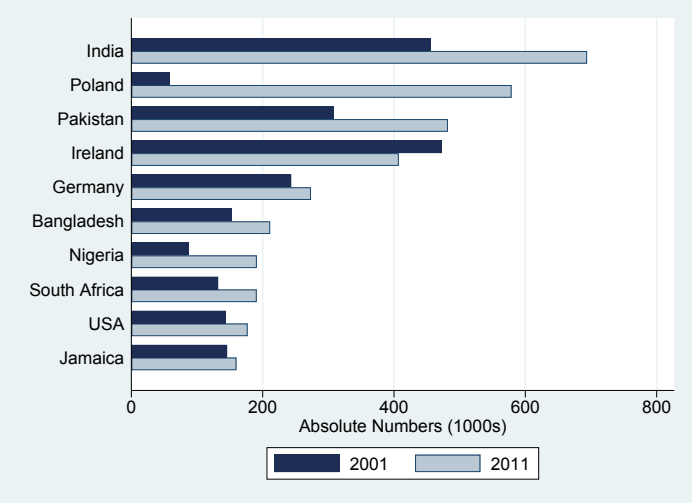
We have already seen in Figure 4.1 that the number of migrants in the UK as a share of the population increased from roughly 9.5% in 2004 to 14% in 2015. This section gives an overview of migration patterns in England and Wales and how they have changed over time, before looking at the characteristics of areas which have seen large inflows of migrants. Finally, we examine house price patterns, both geographically and over time, as well as the housing tenure of migrants compared to natives.

4.2.1 Migration patterns in England and Wales

From the end of World War 2 to the turn of the century, migration to England and Wales was dominated by migrants from the Commonwealth countries and Ireland. This is reflected in Figure 4.2 which, using Census data, illustrates the number of migrants present in 2001 and 2011 for the ten countries of birth with the largest migrant stocks in 2011. We can see that a large number of migrants come from the subcontinent, with roughly 1.4 million migrants from India, Pakistan and Bangladesh present in England and Wales in 2011.

Looking at the difference between migrant stocks in 2001 and 2011, we see that large numbers of migrants continued to arrive from India and Pakistan in particular during this period. However, since the early 2000s, there has been a notable shift towards migrants from the European Union. As discussed at length in Chapter 2, in 2004, the EU underwent its largest enlargement to date, expanding from 15 to 25 member countries. This opened up free movement of labour to eight central and eastern European countries (A8),

Figure 4.2: Migrant stocks in England and Wales for the top 10 countries of birth in 2011



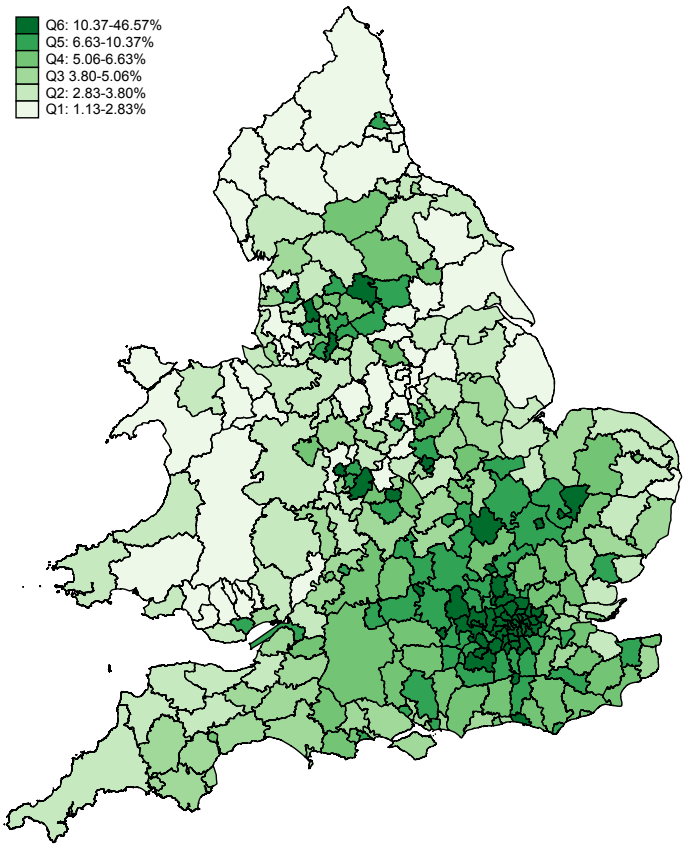
Source: UK Census 2001 & 2011.

plus Bulgaria and Romania in 2007. The United Kingdom was one of only three countries not to impose any restrictions to the free movement of labour in 2004, which resulted in large inflows of migrants from these A8 countries. We can see evidence of this in Figure 4.2 which shows that the stock of Polish migrants increased tenfold from just 58,000 in 2001 to 580,000 in 2011. While migrant inflows from Poland were by far the largest in magnitude, there were also sizeable increases from other members of the A8; the number of migrants from the Czech Republic trebled from 12,000 to 36,000, while the figure from the Baltic states[3] rose from 10,000 to 160,000. In addition, the number of migrants from Romania increased from 7,000 to 80,000.

Traditionally, migrants in England and Wales have been heavily concentrated in London, as well as in the south east more broadly, with only small pockets in other parts of the country. Figure 4.3 shows this pattern quite clearly using data from the 2001 Census. Although the migrant share varies hugely in the sixth quantile from 10%-46%, the vast majority of these local

[3]Estonia, Latvia and Lithuania

Figure 4.3: Migrant share by Local Authority



Source: UK Census 2001.

authorities are in London, where on average the migrant share was 27% in 2001, compared to only 5.6% elsewhere in England and Wales.

Table 4.1 shows the distribution of migrant inflows, defined as the change in the migrant stock, between Census years as a proportion of the previous period population. As we would expect, both between 1991-2001 and 2001-2011, London boroughs saw much larger migrant inflows than other areas with a median inflow of more than 7% between 1991-2001 and 14% between 2001-2011. In contrast, the corresponding numbers for all other local authorities were 1% and 2.5% respectively. Nevertheless, the figures for 2001-2011 do show that the changing patterns regarding the origin of migrants have also been accompanied by changes in the settlement patterns of migrants. There was a

great deal of heterogeneity in migrant inflows between 2001-2011, with some areas outside of London seeing very large inflows of migrants. In particular, those in the 75th percentile saw inflows equivalent to at least 4.5% of their initial population.

Table 4.1: Distribution of migrant inflows across London boroughs and other local authorities

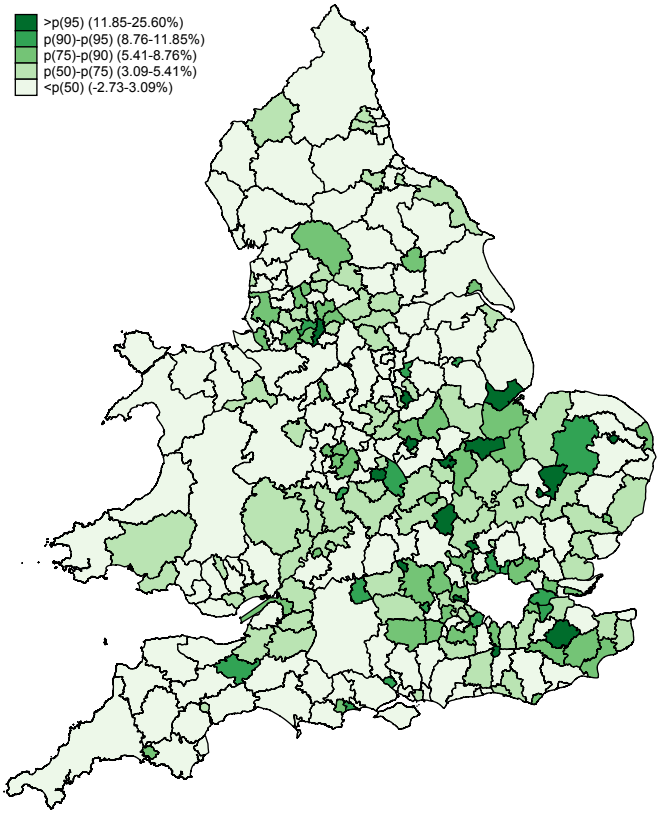
	p(5)	p(10)	p(25)	p(50)	p(75)	p(90)	p(95)
				All LA excl. London boroughs			
1991-2001	0.17	0.27	0.53	0.97	1.59	2.48	3.40
2001-2011	0.72	0.94	1.46	2.54	4.49	7.36	9.90
				London boroughs			
1991-2001	1.80	3.74	5.99	7.39	9.13	10.53	15.78
2001-2011	5.25	6.85	10.90	14.29	18.69	21.07	23.55

All figures reported are migrant inflows which are calculated as the change in the migrant stock as a percentage of the initial population ($\Delta M_{it}/Pop_{t-10}$). Source: UK Census 1991-2011.

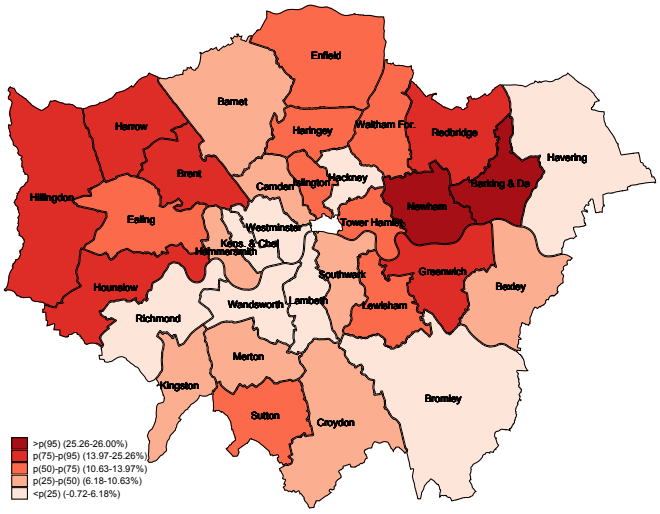
While the decennial Census data used so far provide us with the most accurate data on migrants and their changing settlement patterns, APS data allow us to look specifically at our period of interest, 2004-2015. Figures 4.4a and 4.4b use APS data for 2004-2015 to separate London boroughs from other local authorities in order to observe these large migrant inflows to other areas of the country more clearly. Figure 4.4a shows that the local authorities with the largest migrant inflows (>p(75)) between 2004-2015 were more dispersed across the country compared to those with the largest migrant stocks in 2001 shown in Figure 4.3, meaning that some areas with previously low migrant shares experienced large inflows of migrants for the first time. The 90th percentile contains parts of eastern England such as Boston, Norwich, Ipswich and Cambridge, as well as the east midlands cities of Peterborough, Nottingham and Leicester, and more rural parts of Northamptonshire. Despite these changing settlement patterns, from Figure 4.4b we can see that local authorities in London still saw very large inflows of migrants, with only those below

the 25th percentile for London boroughs seeing an inflow smaller than 10% of the population.

Figure 4.4: Inflows of migrants between 2004-2015



(a) Rest of England & Wales



(b) London

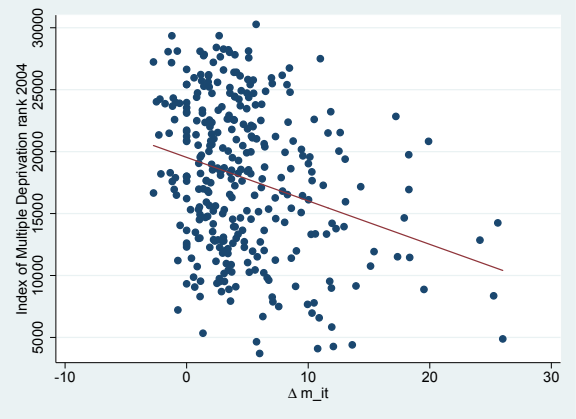
Source: Annual Population Survey 2004-2015.

Having established that migrant settlement patterns in England and Wales have changed alongside the changing nature of migration since the early 2000s, we now turn to the characteristics of areas which received the largest migrant inflows during our period of interest. Figure 4.5 plots the inflow of migrants between 2005-2015 as a share of the 2005 population against each local authority's Index of Multiple Deprivation (IMD) Rank in 2004. The IMD is calculated using scores from seven different domains: income, employment, health, education, barriers to housing and services, crime and living environment. The data are provided at the lower layer super output area level (LSOA)[4], with each LSOA given a rank between 1 for the most deprived, and 32,482 for the least deprived. We then calculate the average deprivation rank of the LSOAs within each local authority. Despite considerable heterogeneity, Figure 4.5 clearly shows that more deprived local authorities saw larger migrant inflows between 2005-2015. This may have implications with regards to house price growth, as we may expect prices to grow more slowly in more deprived areas.

Taking a closer look at the individual domains which make up the IMD reveals that there is a negative relationship between migrant inflows and each separate domain. Of particular interest are the income, employment and crime domains. Figure 4.6 illustrates that there is a stronger negative correlation for income deprivation than for employment deprivation, suggesting that local authorities which received large inflows of migrants tended to have lower wages rather than lower levels of employment. The strongest relationship is in terms of crime deprivation, with a correlation of -0.45, indicating that the areas

[4]LSOAs are geographic areas used in the reporting of small area statistics in the UK Census. Each of these areas are similar in size, with a mean population of 1,500 (minimum 1,000 and maximum 3,000), and have boundaries which remain constant in order to facilitate comparisons over time.

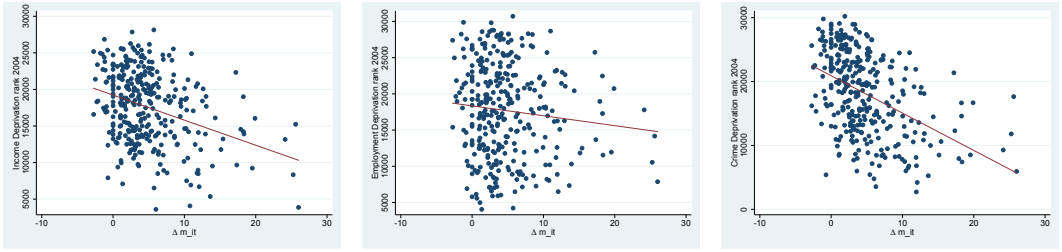
Figure 4.5: Relationship between inflow of migrants 2005-2015 and 2004 Index of Multiple Deprivation Rank



The lowest IMD rank represents the most deprived area. The IMD was constructed by the Social Disadvantage Research Centre at the University of Oxford. The data are provided by at the LSOA level and we calculate the average deprivation rank of the LSOAs within each local authority. The lowest IMD rank represents the most deprived area. The correlation coefficient is -0.28.

which saw the largest migrant inflows had higher pre-existing crime rates.

Figure 4.6: Relationship between inflow of migrants 2005-2015 and initial (2004) Deprivation Rank for three sub-domains: income, employment and crime.



(a) Income (corr=-0.34) (b) Employment (corr=-0.10) (c) Crime (corr=-0.45)

Source: Index of Multiple Deprivation (IMD) Rank 2004. The IMD was constructed by the Social Disadvantage Research Centre at the University of Oxford.

4.2.2 House prices

In this section we examine house price patterns both geographically and over time. There has been a clear upward trend in house prices in England and

Wales over the past 20 years. During that time, the average house price in England and Wales has increased fourfold, from £50,000 in 1995 to just over £200,000 in 2015. Using data from the Land Registry HPI dataset (Land Registry, 2016*b*)[5], Figure 4.7 shows that house prices in London have been consistently higher than in other parts of the country, but that they have also grown at a faster rate, from a mean of roughly £75,000 in 1995 to £450,000 in 2015. In contrast, Figure 4.7c shows that house prices in the north east have risen from just under £50,000 to approximately £140,000 across the same time period.

Figure 4.7: Average House Price by Government Office Region 1995-2015



(a) South & Wales (b) Midlands (c) North

Source: Land Registry HPI Dataset. Data are not seasonally adjusted.

Figure 4.8 shows that in the early 2000s house price growth was actually strongest in the north of England and in Wales (panel a), with weaker growth in London and the south east. However, from 2005 onwards house price growth in London in particular far outstrips that in all other parts of the country (panels b and c).

While Figures 4.7 and 4.8 give a broad overview of the average house price trends in the different regions of England and Wales, Figure 4.9 presents

[5]The House Price Index dataset uses data on house price sales from the Land Registry to create a seasonally adjusted index of house prices at the national and regional levels. A non-seasonally adjusted index is also produced at the local authority level. Using the hedonic regression method, the index adjusts for changes in housing quality by using repeated sales.

Figure 4.8: Average House Price Growth by Government Office Region 2000-2015

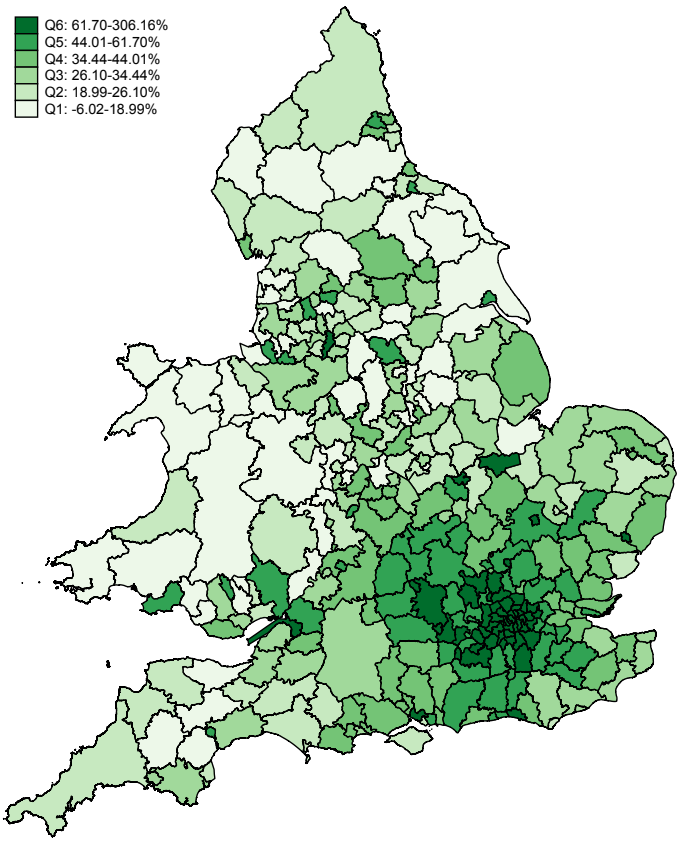


(a) 2000-2005 (b) 2005-2010 (c) 2010-2015

Source: Land Registry HPI Dataset. Data are not seasonally adjusted.

the change in the mean house price between 2005-2015 at the local authority level. Unsurprisingly, we can see that the strongest house price growth has been concentrated very much in London boroughs and the south east, with very few local authorities in other parts of the country in the highest quantiles.

Figure 4.9: Percentage change in house prices 2005-2015



Source: Land Registry Price Paid dataset

In response to rising house prices and concerns over a lack of affordability, particularly for first time buyers, in 2013 the government introduced the Help to Buy Scheme. The Scheme aims to help first time buyers get onto the property ladder in one of two ways: by providing an equity loan, or through the Mortgage Guarantee Scheme. Prospective first time buyers are only required to post a minimum 5% deposit. The equity loan is available to both first time buyers and existing home owners looking to buy a new build property and is available on new build properties in England up to the value of £600,000 and up to the value of £300,000 in Wales until 2021. The government provides an equity loan of up to 20% of the value of the property, with up to 75% financed by a standard mortgage provider. The equity loan is interest free for the first five years and is then repaid when the property is sold. Alternatively, the Mortgage Guarantee Scheme is a government-backed mortgage available on both new and old properties to first time buyers and existing home owners looking to move.

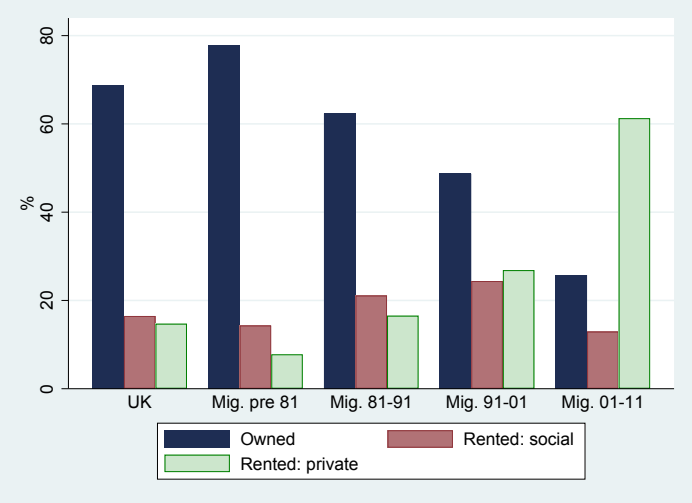
Housing Tenure

With regards to housing tenure, it is important to note that the housing market can be divided into three major segments: owner occupied, the private rental market and social housing, and that immigration is likely to affect each of these sub-markets separately. Figure 4.10 shows that only 26% of migrants who arrived in the UK between 2001 and 2011 live in a property that they own. This is much lower than the corresponding figures for both UK born (69%), and migrants who arrived prior to 1981 (78%), between 1981-1991 (62%), and between 1991-2001 (49%). In contrast, 61% of migrants who arrived between 2001-2011 lived in privately rented accommodation, a much higher figure than for either natives or earlier migrants. In part this is likely to reflect differences in time spent in the UK, but it may also be driven by the

fact that newly arrived migrants are more likely to be younger than natives and previous migrants, and also by the more temporary nature of many of the migrant inflows (Sumption and Somerville, 2010). Figure 4.10 also shows that migrants who arrived in the UK between 2001 and 2011 are less likely to be living in social housing than UK natives or migrants who arrived prior to 2001.

In order for there to be a positive relationship between migration and house prices at the local level, the inflow of migrants would have to increase the demand for housing. The large proportion of migrants living in rented accommodation may reduce the likelihood of this happening. Nevertheless, due to the large numbers of migrants who have arrived in the UK since 2001, 26% of new migrants living in a property that they own still represents a potentially sizeable increase in the demand for properties. In addition, the existence of a relationship between migrants and house prices does not require that migrants buy houses. Specifically, the high number of newly arrived migrants renting privately could cause an indirect effect, by helping to fuel an increase in the demand for buy to let properties. Although the focus of this chapter is on the effect that immigration has on house prices i.e. owner occupied, rather than rental prices, it is important to note that the owner occupied market does not operate in isolation. We will examine the relationship between immigration and housing tenure in Section 4.8.2

Figure 4.10: Housing tenure of UK and foreign born split by year of arrival in UK



4.3 Literature Review

This study is related to several papers which focus on the relationship between immigration and prices more generally. Cortes (2008) studies the effects of low-skilled immigration on the prices of non-traded goods and services in US cities using decennial Census data. Using a Heckscher-Ohlin framework, but with one non-traded sector, Cortes shows that factor price insensitivity no longer holds and that low-skilled workers' wages are determined locally. Empirically, she finds that a ten percent increase in the share of low-skilled migrants reduces the price of immigrant-intensive services by two percent. This result occurs because the wages of competing migrants, rather than low-skilled natives, are driven down. Quantitatively the effects are small because non-traded goods and services make up a relatively small fraction of consumers' household budget; this is particularly the case for low-skilled natives who tend to consume more non-traded, immigrant-intensive goods and services.

Frattini (2008) conducts a regional level analysis of the relationship between immigration and the prices of more than 300 goods in the UK during the period 1995-2006. He notes that on the supply side, we might expect goods prices to fall for those products or services which can now be produced more cheaply, with the reverse true for those products which see a relative increase in production costs due to immigration, when changes in the composition of the labour force affect relative wages. Whereas on the demand side, although we would expect aggregate demand to increase, at the product level, this relationship is a priori unclear because migrants may alter the composition of demand. Empirically, he finds that immigration leads to a fall in the price of non-tradable goods and services, but a rise in the price of tradable goods, which he attributes to increased demand.

While these papers provide a useful starting point, housing can be thought of as a specific segment of the market for non-traded goods, with distinct characteristics. In particular, the supply of housing is typically fixed in the short-term, meaning that the housing supply curve is vertical in the short-run, but upward sloping in the long-run. The remainder of this section focuses specifically on the relationship between immigration and house prices. First we will explain the mechanisms through which immigration may affect house prices, before looking at the standard estimation methodology and the econometric challenges to be addressed. Finally we will discuss the key findings in the literature.

4.3.1 Mechanisms

A priori the relationship between immigration and house prices is unclear. On the one hand, assuming an upward sloping housing supply curve, an increase in

the migrant stock would increase the population and therefore the demand for housing, leading to a rise in house prices. In addition to this population effect, migrants could potentially also drive increases in productivity which could also lead to a rise in house prices if accompanied by an increase in consumer confidence or income.

On the other hand, Saiz and Wachter (2011) suggest three potential explanations for why an increase in migration may in fact lead to a fall in house prices. First, natives may have a preference for living near other natives, leading to native outmigration from areas which experience an influx of migrants. They suggest that this preference for living alongside other natives may be a preference for living in a more ethnically homogeneous community, but that it may simply be a preference for living alongside individuals considered to be of a similar socio-economic status. Second, immigration may cause pressure on local public services, or lead to higher rates of crime which may reduce the desirability of an area, and consequently its house prices. Finally, immigration may alter the quality of the housing stock. For example, immigrants may be more willing to live in substandard homes with poor facilities, which may discourage landlords from maintaining their properties. Braakmann (2017) argues that migrants may be more prepared to live in crowded conditions, which may not result in an increase in the population leading to an increase in demand for housing. More rental accommodation and a less well maintained neighbourhood could also lead to native outmigration if natives perceive that these factors may affect the price of their house or the desirability of the area.

Sá (2015) also discusses the importance of native displacement, but focuses on a more subtle mechanism: an income effect. She argues that an increase in migrants to a local area changes the composition of the population in that area, which leads to a change in income which affects housing demand and

therefore prices. Sá (2015) presents a theoretical model of the relationship between migration and house prices which extends the model of Saiz (2007), which unambiguously predicted a positive relationship, with the inclusion of a parameter to capture natives preferences towards immigrants and the addition of an income effect which amplifies the negative effect of native displacement. The model predicts the existence of a negative relationship when natives dislike migration and when migration leads to a fall in native wages. In particular, this leads to the displacement of high income natives, causing a fall in house prices via this income effect.

Consideration of these various mechanisms must take into account the level of geographical aggregation used in the study. Ottaviano and Peri (2006), Saiz (2007) and Gonzalez and Ortega (2013) all find a positive relationship between immigration and house prices focusing on the effects in relatively large geographical areas. However, Saiz and Wachter (2011) posit that these positive effects at more aggregated geographical levels may simply represent that the number of individuals has increased and with it so has the demand and therefore the price of housing. They argue that this positive aggregate effect may conceal sorting within local areas. For instance, an increase in migrants to one district could lead to native displacement towards a second district, which may then see its house prices rise, while the original district may then see a slight fall in house prices. Analysis at a greater level of aggregation would conceal this more nuanced effect.

4.3.2 Estimation Methods

In order to estimate the relationship between immigration and house prices, the majority of papers in the literature use a spatial correlations approach. Saiz

and Wachter (2011) regress the change in the log of the average neighbourhood house price on the change in the migrant share using data at the US Census tract level[6]. Studying this relationship in changes enables the authors to control for time invariant omitted variables which relate to the quality of neighbourhoods; they argue that each neighbourhoods' relative quality tends to stay constant over time. Nevertheless, the inclusion of MSA*year fixed effects, does enable them to control for regional trends over time. Their model also includes a vector of changes in housing stock traits such as number of bedrooms, facilities such as plumbing and heating, and age of properties, in order to account for adjustments to housing quality over time. In addition, they include a vector of initial neighbourhood socio-economic characteristics relating to education, age, family income and ownership rates. They include these socio-economic characteristics in levels because changes to socio-economic characteristics are likely to be endogenous with respect to immigration. Finally, their regressions are weighted by the initial number of owner occupied properties.

Sá (2015) estimates a similar model for English and Welsh local authority counties using annual data for the period 2003-2010. She uses the change in the log of a House Price Index (HPI) as her dependent variable in an attempt to better control for changes in the quality of housing over time. The HPI is calculated using repeated sales in order to control for changes in housing quality over time. In contrast to Saiz and Wachter (2011), Sá's key explanatory variable of interest is defined in terms of the change in the number of working age migrants as a share of the initial working age population. Her model also contains a vector of local authority characteristics, containing one year lags of the following variables: unemployment rate, to control for local macroeconomic

[6] A Census tract contained approximately 4000 inhabitants on average during their period of analysis.

conditions; the share of the local population claiming state benefits; the local crime rate, which may affect housing demand; the ratio of the number of dwellings to local population, to capture housing supply; and an index of local housing quality. Year dummies capture national trends in inflation and other variables, while local authority fixed effects capture local authority specific trends in house prices.

Gonzalez and Ortega (2013) also use a model in first differences to investigate the relationship between migration and house prices for fifty Spanish provinces. One advantage of their study is that their dependent variable is the change in the log housing price per square metre, which enables them to better control for property size compared with the majority of other studies which simply use some form of mean price. This reduces the likelihood that changes in province level mean house prices are simply being caused by the sale of different sized properties in different periods. In contrast to the other studies, their main explanatory variable of interest is log of the total working age population, rather than the migrant share, which they also use in a robustness check. The authors argue that using total population growth leaves their estimates unaffected by native displacement. However, this method arguably gives a less precise estimate of the effect of migation on house prices and relies on the assumption that migrants are driving population growth. In addition, it seems that rather than leaving their estimates unaffected by native displacement, this model simply does not address this issue. Nevertheless, as they previously found native displacement to be close to zero for Spain, this is unlikely to be hugely important. Like Saiz and Wachter (2011), they also weight regressions by the working age population in each province, and in several robustness checks, they also include region-specific time trends to account for regional business cycles, as well as an interaction between the initial house

price and the time trend.

In contrast to the papers discussed so far, Braakmann (2017) for the UK, Accetturo et al. (2014) studying Italy, and Ottaviano and Peri (2006) looking at the US, all estimate models in levels. The inclusion of local area fixed effects aims to control for time invariant local characteristics. Ottaviano and Peri (2006) address a slightly different question by focusing on the relationship between ethnic diversity and rents in US cities. They regress the log rental price on an index of fractionalisation which measures both the richness of a city in terms of the number of different countries of birth present and the diversity, i.e. the evenness of migrant group sizes. The model also includes a vector of city characteristics including average schooling, employment and income per capita, as well as year fixed effects and city fixed effects to control for time invariant city characteristics.

Turning now to the question of establishing causality, a variety of methods have been used by existing papers in the literature to address concerns over the endogeneity of migrant location with respect to house prices. Immigration and house prices may be commonly determined by unobserved factors such as local amenities. In the benchmark models presented above, the inclusion of local area fixed effects for a model in levels, or estimating these effects in changes should control for these effects as long as they are time invariant. In practice however, it is likely that major improvements to amenities or the infrastructure of a local area which occur over time, may be likely to both attract migrants and raise house prices. Furthermore, concerns over potential reverse causality remain.

In order to address these issues, the most common approach has been to use some variation of the shift-share instrument based on historical settlement

patterns first introduced by Card (2001). For the UK, both Sá (2015) and Braakmann (2017) use this approach, while Accetturo et al. (2014) and Ottaviano and Peri (2006) also use it for Italy and the US respectively. Instead, Saiz and Wachter (2011) create a gravity inspired geographic pull instrumental variable for each neighbourhood, which is essentially the sum of a measure of the lagged immigrant density of each surrounding neighbourhood multiplied by their area and weighted inversely by the distance between the two neighbourhoods. The instrument captures the idea that we would expect more migration into a neighbourhood, the higher the pre-existing levels of migration in surrounding areas, and the closer these areas are to that neighbourhood. Gonzalez and Ortega (2013) use an ethnic networks instrument, which exploits differences in the accessibility of each province and the ease of transportation from the country of origin to create a province-country of origin specific IV.

Saiz (2003) takes an alternative approach, using a difference-in-differences estimation strategy to exploit the effects of large inflows of migrants into the Miami area as a result of the Mariel boatlift. He compares pre and post-migrant shock changes in Miami rental prices with changes in rental prices for three separate control groups: other metropolitan areas in Florida; a selection of ten metropolitan areas with similar pre-migrant shock evolutions of rental prices; and all US metropolitan areas.

4.3.3 Key Findings

In terms of findings, Saiz (2007) shows that in the US, an increase in the migrant stock equivalent to 1% of the initial metropolitan area population leads to a 1% rise in both rental and house prices. Similarly, Ottaviano and Peri (2006) find that ethnic diversity has a positive effect on both average house

price growth and rental prices in 160 major metropolitan areas in the US. The authors argue that these effects provide suggestive evidence that greater ethnic diversity fuels increases in productivity.

For US metropolitan areas, Mussa et al. (2017) find effects of a similar magnitude to Saiz (2007), with an inflow of migrants equivalent to one percent of the population leading to a 0.8% rise in both rental and house prices. However, they also show that the indirect effects are much larger, with a 1.6% increase in rental prices and a 9.6% increase in house prices in surrounding MSAs. The authors argue that larger spillover effects compared to the direct effects are likely to result from native displacement, and while they have no concrete explanation for the much larger spillover effects for house prices, they posit that this could be due to natives deciding to buy rather than continuing to rent when they are displaced. For Canada, Akbari and Aydede (2012) find that migrants only caused a fairly modest rise in house prices, with an elasticity of just 0.12%, and that this was entirely driven by established migrants who had been resident in Canada for more than 10 years.

Using a difference-in-differences estimation strategy, Saiz (2003) shows that in the short run, the large inflow of low-skilled Cuban migrants after the Mariel boatlift, equivalent to roughly 8% of Miami's existing population, greatly increased rental prices in Miami relative to changes in comparison areas. Estimates of the price differential vary from 7-10% depending on the control group. Interestingly, properties in the highest quartile for rental prices were not affected.

In addition to house prices, Gonzalez and Ortega (2013) also look at the effect immigration had on the construction of new dwellings in Spanish provinces. They find that a 1% increase in the population, driven by migrant

inflows, led to between a 1-1.6% increase in house prices and a slightly smaller 0.8-1% rise in the number of dwellings. The authors conclude that between 1998 and 2008, immigration was responsible for one quarter of the rise in house prices in Spain and for half of the increase in the housing stock.

During our discussion of the potential mechanisms through which immigration may affect house prices, we noted the importance of the level of geographical aggregation used for the analysis. In contrast to the positive relationship consistently observed by papers using relatively large geographical areas as their unit of analysis, several more recent papers present alternative findings using data at a greater level of disaggregation. Using US Census tract, or put simply, neighbourhood data, Saiz and Wachter (2011) show that house prices grow more slowly in neighbourhoods with larger migrant inflows. The authors note that these findings are consistent with native displacement from areas which receive the largest inflows of migrants. Interestingly, they find suggestive evidence that this displacement may be due to the lower socio-economic status of the migrants rather than due to the fact they are migrants.

Accetturo et al. (2014) analyse the relationship between immigration and house prices for 20 large Italian cities between 2003-2010. In addition to studying the effect at the city level, their data also permit analysis at the much finer, within city district level. They find that an increase in migrants equivalent to 10% of the population is associated with a 5% increase in house prices at the city level. However, when the authors instead look at the within city effects, they find that a similar 10% increase in the migrant stock at the district level reduces house prices by 2 percentage points relative to the city average. The authors also show that for every ten migrants that arrive in a district, six natives are displaced to other areas of the city. They argue that these findings support the idea that natives perceive inflows of migrants to

cause local amenities to deteriorate, although they are not able to test this theory.

Key Findings - UK papers

Using UK Labour Force Survey (LFS) and Land Registry data for 170 local authority counties in England and Wales, Sá (2015) finds that a 1% increase in the migrant stock leads to a 1.7% fall in house prices. She also finds that natives respond to inflows of migrants by moving out of the area and that in particular, those at the top of the wage distribution are the most likely to relocate which tends to push prices down via an income effect.

Braakmann (2017) uses data from the 2001 and 2011 UK Census to study the effect of immigration at different parts of the house price distribution for 376 local authority districts. He finds that immigration has virtually no effect on house prices above the median, but does find evidence of price decreases at the lower end of the distribution in his 2SLS specification. In addition to the effects on house prices, Braakmann (2017) also finds evidence that areas with higher migrant shares tend to have higher numbers of occupants per room, suggesting that migrants may be willing to live in more crowded conditions.

While our study is closely related to Sá (2015), we contribute to the literature in three ways. First, we use data at a more disaggregated level, the local authority district, in order to better account for unobserved local level characteristics. Our second contribution is to examine the suitability of an instrumental variable based on historical settlement patterns in the case of the UK. Finally, we exploit data on the postcode of each individual housing transaction in an attempt to better control for housing quality and other local characteristics at a much narrower geographical level.

Two of the contributions we make in this chapter relate to the importance

of taking into consideration the level of geographical aggregation used in the study. Conceptually, the ideal scenario with which to examine the relationship between immigration and house prices would be to measure within house price changes, holding all other factors constant. Instead, larger geographical areas may contain inner city, suburban and rural areas, all with vastly different types of housing in terms of property size and quality. We may therefore have concerns that a change in the mean house price in a larger area may simply reflect changes in the composition of housing sales, and therefore mask the direct effects of immigration. By focusing first on smaller, local authority district areas, and then controlling for postcode local authority areas, we would expect housing type and quality to be more similar. We would therefore expect analysis at this smaller geographical level to better capture the direct effect of immigration on house prices.

4.4 Data

In order to analyse the relationship between migrant inflows and changes in house prices, we use annual data for 346 local authorities in England and Wales between 2004-2015. We are particularly interested in this period because as shown in Figure 4.1, this was a period during which there was a large increase in the share of migrants in the population partly as a result of the 2004 EU enlargement, as well as huge house price growth. We conduct the analysis at the local authority district level.[7] Local authorities can be split into single tier unitary authorities (55) and Welsh principal areas (22), and lower tier metropolitan districts (36), London boroughs (32), and district councils (201). Our level of analysis differs from Sá (2015) who instead aggregates the district

[7]We use post-2009 definitions of local authorities and exclude Isles of Scilly and City of London due to missing data.

councils into 27 upper tier county councils. To give an indication of size, the mean population over the period 2004-2015 was roughly 105,000 for a district council and 780,000 for a county council.[8] As we are interested in analysing the relationship between migration and house prices at the local level, we prefer to use local authority districts as our unit of analysis in order to better account for unobserved local level characteristics.

Our data on house prices come from the Land Registry Price Paid dataset (Land Registry, 2016*a*). The dataset contains the following information for all properties sold at full market value: full address and postcode of the property, sale price, sale date, property type, whether the property is a new build and whether the tenure is freehold or leasehold.[9] We calculate the mean house price for each local authority on an annual basis.

The data on migrants come from the Office for National Statistics (ONS) Population in the UK by country of birth estimates, which are based on the Annual Population Survey (APS).[10] The APS provides data on the stock of migrants, defined as foreign born individuals, in each local authority on an annual basis. We define the migrant inflow as the change in the migrant stock as a proportion of the existing population. With regards to additional variables, we use data on the number of dwellings in each local authority from the Department for Communities and Local Government and from Statistics Wales. Data on the number of crimes recorded by the police and on the number

[8]Note that the mean population for all local authorities over the period 2004-2015 shown in Table 4.2 is higher than for district councils because these contain all local authorities, including London boroughs, unitary authorities and metropolitan districts which tend to have higher populations than district councils.

[9]We use data on nominal house prices because we are interested in changes in house prices and as the CPI is a national index, the change in the house price is identical whether we use nominal or real figures. We are unable to use regional CPI data as the regional aggregates are only used to produce the published national index, and are not themselves published by the ONS (Frattini, 2008).

[10]APS data are only available from 2004 onwards.

of working aged individuals claiming at least one of the key Department for Work and Pensions benefits[11] are published by the ONS, as are employment and unemployment rates.

Table 4.2: Summary Statistics 2005-2015

Variable	Mean	Std. Dev.	Min.	Max.	N
Migration					
No. migrants	20528	30403	0	249000	3569
Population	165716	109258	34300	1111300	3569
m_{it}	0.102	0.1	0	0.583	3569
Δm_{it}	0.004	0.021	-0.09	0.142	3569
Housing					
Mean price	196822	94337	52169	1275234	3569
Δ mean price	0.03	0.055	-0.172	0.292	3569
No. sales	2617	1815	435	20267	3569
price_p2	76955	31012	15000	250000	3569
price_p25	143543	60188	30000	700000	3569
price_median	188668	85824	51000	1200000	3569
price_p75	262498	144310	87000	2270000	3569
price_p98	646454	640610	186995	14591058	3569
Local authority characteristics					
Benefits claimants	0.128	0.046	0.046	0.29	3569
Unemployment rate	0.062	0.028	0.009	0.223	3435
Employment rate	0.728	0.056	0.531	0.881	3569
GVA per capita (£)	21916	13026	9071	225818	3569
Dwelling stock per capita	0.436	0.026	0.329	0.548	3569
Crimes per 100 pop.	7.891	3.423	2.056	36.951	3569

All house prices are reported in £. Unless otherwise stated, local authority characteristics are reported in percentage terms. The migrant share m_{it} and change in the migrant share Δm_{it} are reported as a share of the population. The change in mean house price is reported as a share of the existing mean house price.

Our final sample contains data for 338 of the 346 local authorities[12] and is an unbalanced panel due to changes in the geographical level of crime report-

[11] Income support, Jobseekers's Alowance, Carer's Allowance, Disability Living Allowance, Incapacity Benefit, Bereavement Benefit, Pension Credit and Widow's Benefit.

[12] The 7 local authorities in Dorset (Christchurch, East Dorset, North Dorset, Purbeck, St. Edmundsbury, West Dorset, and Weymouth and Portland) plus Malvern Hills are excluded due to missing data.

ing for some local authorities leaving us with incomplete data for 36 of the 338 local authorities. Table 4.2 contains summary statistics for our variables of interest. We can see that the average house price over this period was approximately £197,000, but that this conceals considerable heterogeneity both across time and geographically, with the lowest average house price of just £52,169 registered in Burnley in 2005 and the highest figure of £1.275 million in Kensington and Chelsea in 2014. On average house prices increased by 3% a year, but again, this conceals considerable heterogeneity. In 2009 house prices fell by 17% in the London borough of Barking and Dagenham, while at the other end of the scale, in 2006 house prices in Burnley rose by 29%. Turning to our key explanatory variable of interest, the average annual inflow of migrants as a share of the existing population was 0.4% between 2005-2015. The largest annual inflows were in Watford in 2013 (14.2%), Forest Heath in 2007 (13.9%) and Boston in 2008 (13.1%).

4.5 Empirical Strategy - Benchmark Model

We wish to establish whether immigration has a causal impact on house prices at the local authority level. More precisely, we are interested in whether the arrival of large numbers of migrants into local authorities in England and Wales caused an increase in house prices. We estimate the following benchmark model:

$$\Delta ln(HP_{it}) = \beta_0 + \beta_1 \Delta m_{it} + \boldsymbol{\beta}_2 \mathbf{x}_{it-1} + \beta_3 \Delta pop_{it-1} + \delta_t + \phi_i + \varepsilon_{it} \quad (4.5.1)$$

Our dependent variable, $\Delta ln(HP_{it})$, is the change in the log of the mean

house price in local authority i between years $t-1$ and t. We calculate the geometric rather than the arithmetic mean price as the geometric mean is less distorted by high values.[13] The explanatory variable of interest, Δm_{it} is the change in the stock of foreign born in local authority i between years $t-1$ and t as a proportion of the population in $t-1$. Immigration and house prices may be commonly determined by unobserved local authority characteristics, so studying this relationship in changes allows us to control for time invariant unobserved effects.

The model includes a vector of lagged, time varying local authority characteristics, $\mathbf{x}_{it-1}$, including: the employment rate, the number of working aged individuals claiming any type of state benefit as a proportion of the total working age population, the total number of dwellings as a proportion of the population as a measure of housing supply, and the number of crimes per 100 population as a high crime rate may make an area undesirable which could affect house prices. We control for employment because we would expect higher employment to be associated with more people being able to afford to buy property and therefore we would expect more to be spent on housing. While employment is important, we also include the proportion of benefit claimants as a rough measure of low income, because even if individuals are working, those on low income may not be able to afford buy housing. In line with other papers in the literature, we include this vector of lagged control variables in levels due to concerns that changes in these variables are likely to be endogenous with respect to changes in the migrant share. We also include population growth in the previous period, Δpop_{it-1}, because this is likely to influence the

[13] We also report results using the arithmetic mean in column (2) of Table 4.14 in the Appendix to this chapter. We prefer to use data on house prices from the Land Registry Price Paid dataset in order to be consistent with our analysis in Section 4.6.1, but we do report results using the House Price Index data in column (3) of Table 4.14 in the Appendix to this chapter.

demand for housing and therefore the change in house prices.

Year fixed effects, δ_t, are included to control for nationwide variables such as the availability of credit, interest rates and general macroeconomic shocks, while local authority fixed effects, ϕ_i, control for trends in local authority house prices as our model is written in first differences. The combination of both year fixed effects and local level economic conditions proxied by local authority employment rates enables us to control for both the general macroeconomic shocks caused by the global financial crisis and for the global financial crisis to affect local authority areas differently.

The model we estimate is similar to several models in the existing literature, particularly those used by Saiz and Wachter (2011) and Sá (2015). Nevertheless, there are a few differences. Both Saiz and Wachter (2011) and Gonzalez and Ortega (2013) weight their regressions by the initial number of owner occupied properties and working age population respectively. As our outcome of interest is local level changes in house prices, rather than a national level outcome, we choose not to weight our regressions. More specfically, given the changing migration patterns that we documented in Section 4.2.1 which showed that some smaller, more rural areas received large migrant inflows, we do not think that it is appropriate to weight our regressions by the local authority population.[14] Secondly, Sá (2015) defines her key variable of interest as the number of working age migrants as a proportion of the working age population at $t-1$. While we might be particularly interested in working age migrants as they make up the majority of all migrants, calculating the share as a share of the working age population in our opinion artificially inflates the migrant share. As individuals of all ages require housing, we prefer to define

[14] As a robustness check, we do report our benchmark specification weighted by 2001 local authority population in column (4) of Table 4.14 in the Appendix to this chapter.

the migrant share in terms of the entire population rather than simply those of working age.

Table 4.3: OLS estimates of the effect of migrants on house prices

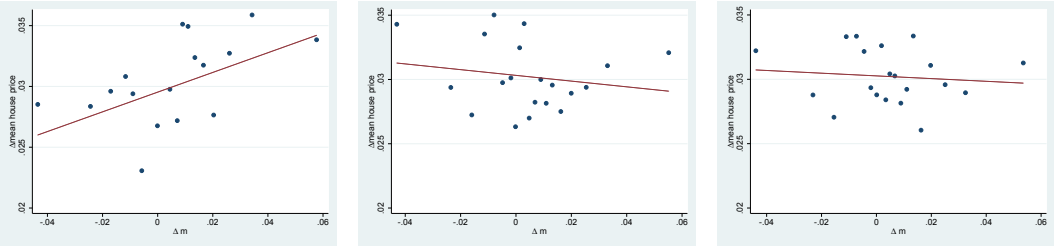
	(1)	(2)	(3)	(4)
Δm_{it}	0.061	0.011	−0.022	−0.011
	(0.045)	(0.046)	(0.026)	(0.027)
Employment rate		−0.015	−0.054***	0.004
		(0.026)	(0.019)	(0.020)
Benefits claimants		−0.122***	−0.134***	0.697***
		(0.035)	(0.032)	(0.188)
Dwelling stock		−0.210***	−0.087***	−1.593***
		(0.040)	(0.030)	(0.161)
Crime rate per 100 persons		0.003***	0.002***	0.004***
		(0.000)	(0.000)	(0.001)
$\Delta ln(pop)_{t-1}$		−0.475**	0.312**	0.060
		(0.184)	(0.153)	(0.177)
Number of obs.	3569	3569	3569	3569
Number of LA	338	338	338	338
Year FE			Yes	Yes
LA FE				Yes
R^2	0.001	0.032	0.627	0.684

Dependent variable is the change in the log of the geometric mean house price. Standard errors clustered at the local authority level are reported in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

Results from estimating our benchmark model are presented in Table 4.3. In column (1) we report the raw correlation between the migrant inflow share and the change in mean house price. There is a positive correlation, but it is not statistically significant. In column (2) we add the local authority level controls which causes the coefficient of interest to fall, but still remain positive and statistically insignificant. The coefficients on both the share of benefits claimants and dwelling stock, our measure of housing supply, are negative as expected. This tells us that house prices were growing faster in areas with a smaller proportion of benefit claimants and also in areas where the supply of housing was more restricted which we would expect to raise prices. The positive coefficient on the crime rate suggests that house prices were growing faster in areas with more crime, which is not what we might expect, but could

perhaps be explained by higher crime rates in cities where there may also have been higher house price growth, particularly in London for example. The negative coefficient on the lagged change in population is also puzzling, but we can see that it does become positive as we would expect when we add year fixed effects in column (3). The addition of year fixed effects turns the coefficient on Δm_{it} slightly negative, but it is still statistically insignificant. The addition of local authority fixed effects in column (4) makes little difference to our coefficient of interest, Δm_{it}. Our benchmark findings indicate that there does not appear to be any statistically significant relationship between the inflow of migrants to an area and the change in its house prices.

Figure 4.11: Binscatter plots of benchmark OLS regressions



(a) Raw (b) Year FE (c) Year & LA FE

Panel (a) corresponds to column (1), panel (b) corresponds to column (3) and panel (c) corresponds to column (4) of Table 4.3.

Figure 4.11 presents a visual representation of our benchmark regression results. Panel (a) shows the raw relationship, while (b) includes both local authority covariates and year fixed effects and panel (c) also includes local authority fixed effects. Figure 4.11 confirms what we have shown in Table 4.3, that there is no statistically significant relationship between the inflow of migrants to an area and the change in its house prices.

In order to ensure that these findings are robust, we report results from additional specifications in Table 4.4. To ensure robustness we also include

additional local authority characteristics such as the unemployment rate[15], as well as GVA per capita as a measure of local income. We also separate the crime rate into violent and non-violent crimes. Our choice of covariates does not affect the coefficient on our key variable of interest, Δm_{it}.

Table 4.4: Alternative OLS specifications estimating the effect of migrants on house prices

	(1)	(2)	(3)
$\Delta m_{it}/Pop_{it-1}$	−0.011	−0.011	−0.005
	(0.027)	(0.026)	(0.028)
Employment rate	0.004		−0.018
	(0.020)		(0.022)
Benefits claimants	0.697***	0.693***	0.346*
	(0.188)	(0.194)	(0.206)
Dwelling stock	−1.593***	−1.575***	−1.504***
	(0.161)	(0.157)	(0.155)
Crime rate per 100 persons	0.004***		0.005***
	(0.001)		(0.001)
$\Delta ln(pop)_{t-1}$	0.060	−0.005	0.042
	(0.177)	(0.175)	(0.198)
Unemployment rate		−0.130***	
		(0.042)	
Violent crimes per 100 persons		0.008*	
		(0.005)	
Non-violent crimes per 100 persons		0.003**	
		(0.001)	
Ln GVA per capita		−0.025	
		(0.021)	
New housing			−0.824***
			(0.302)
Number of obs.	3569	3435	3052
Number of LA	338	338	316
Year FE	Yes	Yes	Yes
LA FE	Yes	Yes	Yes
R^2	0.684	0.685	0.694

Dependent variable is the change in the log of the geometric mean house price. Standard errors clustered at the local authority level are reported in parentheses. The number of observations is reduced in Column (2) due to missing unemployment rate data doe some local authorities. The number of observations is lower in Column (3) because the new housing variable is missing for Welsh local authorities. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

In the final column of Table 4.4, we also include a new housing variable as

[15]Missing data restrict the sample so we prefer not to include the unemployment rate in our benchmark model

a measure of the change in housing supply. We would expect house prices to increase more in areas with a less elastic housing supply. We may have concerns over the potential for reverse causality because an influx of migrants may lead to an increase in the housing supply in order to cope with the increased demand. Nevertheless, we do include this measure as a robustness check. Using Department for Communities and Local Government data, we calculate the number of properties completed between years $t-1$ and t and divide this by the dwelling stock in $t-1$.[16] As we would expect, the coefficient on new housing is negative meaning that the higher the number new homes built as a share of the existing stock, the lower the change in house prices is. The coefficient on our key variable of interest Δm_{it} is very similar to what we have previously found in our benchmark specification, replicated in column (1) of Table 4.4 for ease of comparison.

4.6 Additional Results

In this section we present several additional results. First, we examine heterogeneity in our house price outcome variable, before moving on to exploit transaction level data to better control for housing quality.

Housing type

In our benchmark estimates presented in Table 4.3, we found no statistically significant relationship between migrant inflows and changes in house prices. However, simply looking at the effect of migrant inflows on the mean house price does not enable us to observe potential heterogeneity in these effects. We may not expect migrant inflows to impact all natives equally. In

[16] These data originally come from completed returns from the National House Building Council and only exist for English local authorities.

particular, migrants may be more likely to live in certain types of property such as flats and terraced housing, rather than in typically larger semi-detached or detached homes. Furthermore, we would expect properties of the same type to be more similar in terms of quality, reducing the likelihood of changes in prices simply reflecting changes in the composition of housing sales. The Land Registry HPI dataset allows us to differentiate between these types of housing. Table 4.5 shows that we do not find any effects of migrant inflows on changes in house prices when we differentiate by housing type.

Table 4.5: Benchmark OLS specification by housing type

	(1) Detached	(2) Semi-detached	(3) Terraced	(4) Flats
$\Delta m_{it}/Pop_{it-1}$	−0.016	−0.013	−0.013	−0.017
	(0.023)	(0.022)	(0.023)	(0.023)
Number of obs.	3569	3569	3569	3569
Number of LA	338	338	338	338
Year FE	Yes	Yes	Yes	Yes
LA FE	Yes	Yes	Yes	Yes
R^2	0.817	0.830	0.837	0.835

Standard errors are clustered at the local authority level. The dependent variable is the change in the mean house price of each housing type; these data come from the Land Registry HPI dataset. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Price distribution

In addition to housing type, we may also expect heterogeneous effects with respect to the price of properties. For example, if migrants are at the lower end of the income spectrum, we may expect a greater effect on the demand for properties at the lower end of the price distribution. Table 4.6 shows that we find no evidence that migrant inflows have any effect on changes in house prices at any part of the house price distribution.

Table 4.6: Benchmark OLS specification at different parts of the house price distribution

Percentile	(1) p(2)	(2) p(25)	(3) p(50)	(4) p(75)	(5) p(98)
$\Delta m_{it}/Pop_{it-1}$	−0.076	−0.008	−0.019	−0.011	−0.039
	(0.089)	(0.032)	(0.032)	(0.036)	(0.075)
Number of obs.	3569	3569	3569	3569	3569
Number of LA	338	338	338	338	338
Year FE	Yes	Yes	Yes	Yes	Yes
LA FE	Yes	Yes	Yes	Yes	Yes
R^2	0.405	0.619	0.614	0.588	0.314

Standard errors are clustered at the local authority level. The data for the dependent variables come from the Land Registry Price Paid dataset. * p < 0.1, ** p < 0.05, *** p < 0.01.

4.6.1 Local Authority-Postcode Area Fixed Effects

In our benchmark analysis, we build on existing work by Sá (2015), by attempting to better control for local conditions by using smaller, local authority districts as our unit of analysis. Nevertheless, it is likely that there is still a great deal of heterogeneity within these districts. In particular, we may have concerns about capturing differences in housing quality. In order to address this, we exploit transaction level data on house sales provided by the Land Registry. These transaction level data provide us with the full address of each property that has been sold during our period of interest. We would expect houses in the same postcode area to be much more similar in terms of quality, compared to in the entire local authority district area. Estimating a model with postcode area fixed effects therefore enables us to better control for housing quality and other unobserved characteristics at a much narrower geographical level.

Our full sample of housing transactions 2004-2015 contains approximately 1.13 million unique postcodes, too many to be able to estimate a model with

postcode fixed effects. Instead, we create a shortened postcode variable omitting the final two letters. This leaves the first two letters (area), the first number (district) and the second number (sector). Table 4.7 shows that we have roughly 8,000 shortened postcode areas in our samples. Because some of these shortened postcode areas now cross local authority boundaries, we estimate the model using postcode-local authority fixed effects.[17]

Table 4.7: Number of postcode areas in transaction level data sample 2004-2015

	Detached	Semi	Terraced	Flats
Shortened postcodes	8,065	8,026	8,112	7,994
Postcode LA combinations	11,909	11,844	11,378	9,580

The model we estimate is similar to our benchmark model reported in equation 4.5.1, except that now our dependent variable is defined as the change in the log of the mean house price at the postcode-local authority area level and the model now includes postcode-local authority area fixed effects rather than local authority fixed effects. We estimate separate regressions for each housing type: detached, semi-detached, terraced and flats. OLS estimates are reported in Table 4.8. Focusing on the full specification including local authority characteristics, year and postcode-local authority area fixed effects presented in column (4), we find no effect for detached, semi-detached and terraced housing, consistent with both our findings in Table 4.5. However, in contrast to our findings in Table 4.5, we do now find a negative, statistically significant coefficient for flats.

[17]Some descriptive statistics for these transaction level data are presented in Tables 4.15 and 4.16 in the Appendix to this chapter. Table 4.15 shows that between 55-67% of LA postcode combinations are present in every year. Approximately 10-15% of LA-postcode combinations only present in one year of the data. Table 4.16 shows that the mean number of transactions used to calculate the mean house price for each housing type-year-LA postcode cell is between 24-32 depending on housing type. There is a great deal of variability though and in each sample the minimum number of observations is only one.

Table 4.8: Micro data OLS regressions with year and postcode-local authority area fixed effects

	(1) Raw Correlation	(2) LA controls	(3) Year FE	(4) Year & P-LA FE
Detached				
Δm_{it}	0.099	0.037	−0.032	−0.030
	(0.071)	(0.073)	(0.056)	(0.059)
Number of obs.	86,685	86,685	86,685	86,685
Number of LA	338	338	338	338
Semi-Detached				
Δm_{it}	0.118*	0.034	−0.030	−0.013
	(0.068)	(0.068)	(0.040)	(0.042)
Number of obs.	91,081	91,081	91,081	91,081
Number of LA	338	338	338	338
Terraced				
Δm_{it}	0.108	0.004	−0.058	−0.047
	(0.067)	(0.067)	(0.040)	(0.043)
Number of obs.	90,826	90,826	90,826	90,826
Number of LA	338	338	338	338
Flat				
Δm_{it}	0.046	−0.061	−0.142**	−0.128**
	(0.072)	(0.075)	(0.058)	(0.065)
Number of obs.	76,616	76,616	76,616	76,616
Number of LA	338	338	338	338
R^2	0.000	0.006	0.045	0.044

Standard errors clustered at the local authority level are reported in parentheses. The dependent variable is the change in the geometric mean house price of each housing type; these data come from the Land Registry Price Paid dataset. Regressions contain the same local authority covariates as our benchmark model presented in Table 4.3. * p < 0.1, ** p < 0.05, *** p < 0.01.

There are several possible explanations for this result. The first interpretation is that this result underlies the importance of controlling for unobserved characteristics at a very narrow geographical level. However, given the consistency of the findings for detached, semi-detached and terraced houses, an alternative interpretation is that this result could be driven by local authorities in London due to the large number of flats in London compared to in the rest of England and Wales. We will look further into differences in the effect

between London and other areas in the next section.[18]

4.7 IV

In order for our model to identify the causal impact of migration on house prices, we require that the change in the migrant share within local authorities is random with respect to changes in house prices. There are a number of reasons why this assumption may not hold in the benchmark model estimated in Section 4.5. Immigration and house prices may be commonly determined by unobserved factors such as local amenities. Estimating a model in changes should control for these effects as long as they are time invariant. In practice however, it seems plausible that major improvements to amenities or the infrastructure of a local area which occur over time, may be likely to both attract migrants and raise house prices. This would imply a positive correlation between ε_{it} and Δm_{it}, leading to an upward bias in the estimate of β_1. We may have further concerns over the non-random location of migrants. On the one hand, migrants may choose to locate in more prosperous areas where housing prices are growing faster. On the other hand, migrants may only be able to afford to live in areas with lower house prices, or may choose to locate in areas with lower house price growth, which may bias our estimates of β_1 downwards. In fact, we observed in Section 4.2.1 that migrants tended to live in more deprived local authorities.

To address these endogeneity concerns, we construct the commonly used shift-share instrument based on historical settlement patterns, which was first

[18]Although the coefficient on Δm_{it} in our OLS estimates for London, presented in Table 4.13 in the Appendix to this chapter, was not statistically significant, the coefficient is similar to the one presented in Table 4.8. The estimations using postcode-local authority area fixed effects do not give an equal weighting to each local authority, which may explain the difference between these results and those presented in Table 4.13.

introduced by Card (2001). More precisely, we instrument Δm_{it} with the predicted change in the stock of migrants based on migrant settlement patterns in 1991. We construct the instrument as follows:

$$\Sigma_c \lambda_{ci91} \Delta \mu_{ct} / pop_{it-1} \tag{4.7.1}$$

where $\lambda_{ci91} \Delta \mu_{ct}$ is the predicted change in the stock of immigrants from region of birth c in year t in local authority i based on migrant settlement patterns using 1991 Census data. We separate migrants according to the regions of birth available in the 1991 Census: Republic of Ireland, Old Commonwealth, East Africa, Other Africa, Caribbean, Bangladesh, India, Pakistan, South-east Asia, Cyprus, other new Commonwealth, European Community, other Europe, China and rest of world. Summing across these regions of origin we obtain a time variant measure of the predicted migrant inflow for each local authority. In order for our instrument to be valid, we require the change in house prices to be exogenous with respect to migrant settlement patterns in 1991. More precisely, we require that the historical migrant settlement patterns are only correlated with changes in house prices through their effect on changes in migrant stocks. This seems a plausible assumption given the length of time elapsed and the fact we only require the instrument to be uncorrelated with changes in house prices, rather than levels.

Our IV results are reported in Table 4.9. The first thing to note in column (1) is that the historical settlement pattern IV is a strong instrument, with a coefficient of 0.6, and a first stage F statistic of 15. In contrast to our benchmark OLS results, column (1) shows that there is a large, negative, statistically significant coefficient on our explanatory variable of interest, Δm_{it}. Regarding the magnitude of this effect, a migrant inflow equivalent to 1% of

the existing population is associated with a 2.4% fall in house prices. This effect is in line with Sá (2015) who finds a 1% increase in the migrant stock leads to a 1.7% fall in house prices.

Table 4.9: IV estimates of the effect of migrants on house prices

	(1) All	(2) London	(3) Other
Δm_{it}	-2.399^{***}	-1.952^{**}	-0.456
	(0.840)	(0.828)	(1.707)
Employment rate	-0.018	-0.004	-0.029
	(0.051)	(0.179)	(0.035)
Benefits claimants	0.315	-1.091^{*}	0.818^{***}
	(0.204)	(0.561)	(0.202)
Dwelling stock	-0.961^{***}	0.753	-1.305^{***}
	(0.266)	(0.522)	(0.230)
Crime rate per 100 persons	-0.000	0.004	-0.000
	(0.001)	(0.004)	(0.001)
$\Delta ln(pop)_{t-1}$	0.216	0.460	0.047
	(0.346)	(0.740)	(0.227)
Number of obs.	3566	352	3214
Number of LA	335	32	303
Year FE	Yes	Yes	Yes
LA FE	Yes	Yes	Yes
First stage			
Shift-share	0.597^{***}	0.603^{***}	0.509
	(0.151)	(0.198)	(0.348)
Kleibergen Paap F stat.	15.53	9.30	2.14

Standard errors clustered at the local authority level are reported in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

In Section 4.2 we established that both migrant inflows and house price patterns differed between London and the rest of the country. Therefore, in columns (2) and (3) of Table 4.9, we split the sample into two sub samples: London boroughs (column 2) and all other local authorities (column 3). The results in column (2) for London boroughs are similar to those in column (1) for the entire sample. However, in column (3) we see that the F statistic on our historical settlement patterns instrument falls to only 2, indicating that the instrument does not fulfil the relevance criteria and is therefore not a valid instrument for local authorities outside London. Given the descriptive

evidence showing changes in recent migrant settlement patterns presented in Section 4.2.1, this result is not surprising. It is clear from Table 4.9 that local authorities in London are driving the IV results. Given the differing patterns of both migration and house prices that we observed in Section 4.2, an instrument which fails to work for local authorities outside of London is problematic for our analysis.[19]

Do historical settlement patterns matter?

Having identified doubts over the validity of using the shift-share instrument for England and Wales, in this section we will explore this further and then examine the link between recent migrant inflows and historical settlement patterns more closely.

With heterogeneous treatment effects, 2SLS identifies a local average treatment effect (LATE). To identify the LATE, we make four assumptions: independence, monotonicity, the existence of a first stage, and that the exclusion restriction is satisfied. Using the framework put forward by Angrist and Pischke (2009), we can split local authorities into compliers, always-takers and never-takers. In this context, we can think of a complier as either a local authority i with a large historical stock of migrants from country of origin c which receives a large migrant inflow from country of origin c, or alternatively a local authority i with a small historical stock of migrants from country of origin c and which does not receive a large migrant inflow from country of origin c ($D_{ic} = 1$ if $Z_i = 1$ or $D_{ic} = 0$ if $Z_i = 0$, where D_{ic} refers to migrant inflows into local authority i from country of origin c and Z_i refers to whether the instrument is "switched on" for local authority i). An always-taker would

[19]See Table 4.13 in the Appendix to this chapter for OLS results split by London boroughs and all other local authorities.

be a local authority which receives a large migrant inflow from country c regardless of its historical settlement pattern ($D_{ic} = 1$ if $Z_i = 1$ or $D_{ic} = 1$ if $Z_i = 0$). Conversely, a never-taker would be a local authority which does not receive a large migrant inflow from country c regardless of its historical settlement pattern ($D_{ic} = 0$ if $Z_i = 1$ or $D_{ic} = 0$ if $Z_i = 0$).

LATE is not informative about the effects on always-takers and never-takers. Each IV estimates a unique causal parameter, one specific to the sub-population of compliers for that instrument. It is therefore the case that different valid instruments for the same causal relation estimate different things. Put differently, we may have concerns that our IV results using the shift-share instrument may be driven by particular local authorities who can be thought of as compliers in this context, but that results from an alternative instrument may find different results.

We now turn to examining the link between recent migrant inflows and historical settlement patterns more closely. In Section 4.2.1 we established that the settlement patterns of migrants since the 2004 EU enlargement have been different to those of migrants present in England and Wales prior to this period. With regards to the validity of the shift-share instrument, we are interested not simply in migrant settlement patterns, but in migrant settlement patterns by region of origin.

In Figure 4.2 we saw that as well as large inflows of eastern European, particularly Polish migrants, England and Wales continued to receive large inflows of migrants from both India and Pakistan. We might well expect these migrants to continue to locate in areas with large existing Indian and Pakistani communities. From Census data we know that there were approximately 165,000 migrants from non-European Community, or "other European"

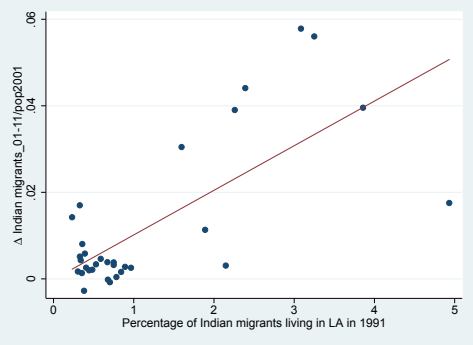
countries present in England and Wales in 1991. The "other European" classification includes Austria, Finland and Sweden who joined the EU in 1995, plus Norway and Switzerland, as well as eastern European countries.[20] Of the approximately 165,000 "other European" migrants, 70,000 were Polish, 12,000 were Hungarian and 8,500 were from Czechoslovakia. In the construction of our shift-share instrument, we are forced to use the settlement patterns of this "other Europe" group as a whole. Consequently, we might expect the relationship between prior settlement and recent inflows to be weaker than for Indian and Pakistani migrant inflows. In addition, the majority of Polish migrants present prior to 2004 arrived in England and Wales at the end of the Second World War. It is not obvious that we would expect the huge inflows of predominantly young Polish migrants who arrived after 2004 to settle in the same areas as pre-existing Polish migrants who would generally have been much older and retired.

Figure 4.12 presents the relationship between the proportion of migrants from country c present in local authority i in 1991 and the inflow of migrants from that country between 2001 and 2011 as a share of the 2001 local authority population. The top two panels present this relationship for Indian migrants within (a) and outside (b) London. The middle and bottom panels look at migrants from Pakistan and Poland respectively. The first thing to note is that the correlation between migrant inflows and 1991 settlement patterns is stronger for local authorities in London for all three countries of origin. In addition, as expected, the correlation is much higher, more than double, for Indian and Pakistani migrants than for Polish ones. This is unsurprising for

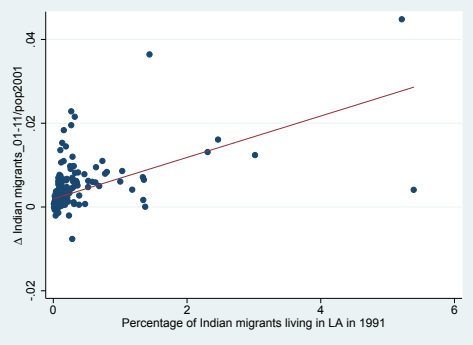
[20] 1991 Census data on the number of individuals by country of birth at the local authority level are not provided for every individual country of origin. For Europe, countries are aggregated into two groups: European Community and "other European" countries. We are therefore constrained to use these country groupings in the construction of our instrument.

the reasons listed above.

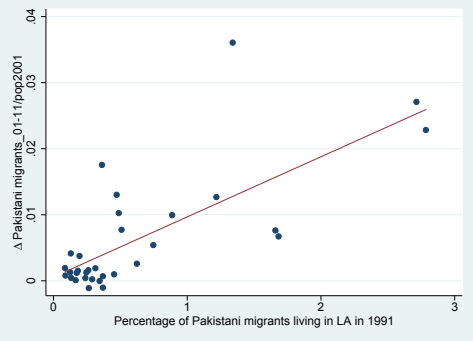
Figure 4.12: Correlation between prior settlement (1991) and migrant inflows (2001-2011) for India, Pakistan and Poland(Other Europe)



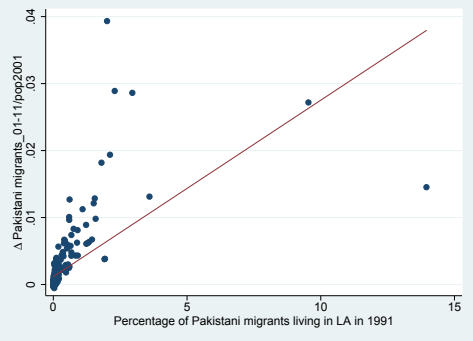
(a) India-London (corr=0.72)



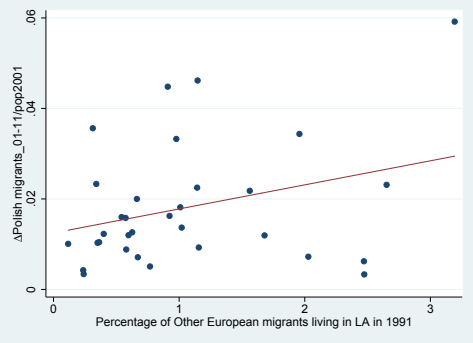
(b) India-not London (corr=0.55)



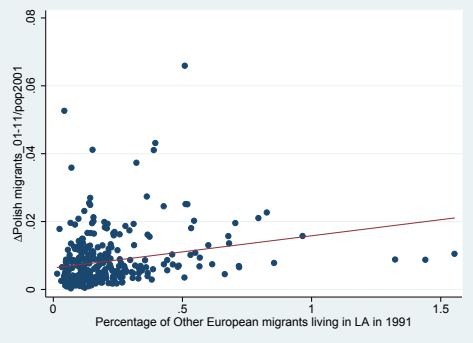
(c) Pakistan-London (corr=0.73)



(d) Pakistan-not London (corr=0.62)



(e) Poland-London (corr=0.31)



(f) Poland-not London (corr=0.23)

We do not have Polish settlement patterns in the 1991 Census so we use those of "Other Europe" because 70,000 out of 165,000 were Polish.

Thinking back to our description of the migration patterns in England and Wales presented in Section 4.2, we established that migrants arriving from the early 2000s onwards were more dispersed across the country. Relating this to

our instrument, this means that our IV results will be driven by local authorities with a strong relationship between current inflows and prior settlement patterns, such as those with a history of migration from the subcontinent. In contrast, the effects of migration on house prices in areas which experienced large inflows of predominantly European migrants for the first time will not be captured by this instrument. We might expect the effect of immigration on house prices to vary by migrant type for a number of reasons. First, we know that more recent, predominantly European migrants, tend to be more educated than other migrant groups, and also more likely to be in employment (Sumption and Somerville, 2010), suggesting a more positive effect may be likely. On the other hand, Clark and Drinkwater (2008) show that in the years immediately after accession, A8 migrants earned lower wages than other migrant groups, which could lead to a more negative effect via the income effect discussed in Section 4.3. Alternatively, natives may have different preferences regarding migrant groups of different ethnicities or cultures, and therefore native outmigration may be more likely to occur with inflows of certain types of migrants. We therefore have doubts that this instrument provides a reliable estimate of the true causal effect of migration on house prices in this instance.

4.8 Potential Explanations for Results

The results we have documented so far all suggest either no relationship, or that the relationship between migration and house prices is negative. In this section we relate these results back to the potential mechanisms through which immigration may affect house prices discussed in Section 4.3.1. First, we investigate whether there is any evidence of native outmigration as a response to migrant inflows, before then looking at alternative explanations relating to

changes in housing tenure and quality.

4.8.1 Native Outmigration

As discussed in Section 4.3, one potential explanation for this negative relationship is that natives may respond to inflows of migrants into their local authority by relocating to another area.

In order to examine whether natives are displaced as a result of migrant inflows, we follow Peri and Sparber (2011) in estimating the following model:

$$\Delta n_{it} = \beta_0 + \beta_1 \Delta m_{it} + \boldsymbol{\beta}_2 \mathbf{x}_{it-1} + \beta_3 \Delta pop_{it-1} + \delta_t + \phi_i + \varepsilon_{it} \tag{4.8.1}$$

where Δn_{it} is calculated as the change in the number of natives in local authority i between years $t-1$ and t as a share of the initial population ($\Delta N_{it}/pop_{t-1}$). The right-hand side of the equation is identical to our benchmark model presented in equation 4.5.1.

In column (1) of Table 4.10 we report the raw correlation, while in column (2) we report the full specification. We can see that the coefficients in both columns are close to -1, and that the addition of covariates and fixed effects makes no difference. The magnitude of this effect would suggest a one for one replacement of natives by migrants; a very large effect. As the APS data on the number of native and foreign individuals at the local authority district level are rounded to the nearest thousand, we may have concerns about greater levels of measurement error in local authorities with small numbers of migrants. In column (3) we therefore exclude local authorities with fewer than 3000 migrants. The results do not change.

Table 4.10: Native outmigration 2004-2015 using APS data

	(1)	(2)	(3)
Δm_{it}	-0.919^{***}	-0.950^{***}	-0.959^{***}
	(0.008)	(0.008)	(0.007)
Number of obs.	3569	3569	3168
Number of LA	338	338	300
LA covariates		Yes	Yes
Year FE		Yes	Yes
LA FE		Yes	Yes
R^2	0.846	0.907	0.920

Standard errors clustered at the local authority level are reported in parentheses. Column 2 contains the same local authority covariates as our benchmark model presented in Table 4.3. Column 3 excludes local authorities with small numbers of migrants (<3000 on average). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

To think further about the plausibility of these estimates, we need to consider the sampling frame of the APS and the implications that has for these results. The estimates presented in Table 4.10 are all very close to -1. We have concerns that the sampling frame of the LFS leads to the population of a local authority remaining fairly stable over time. Consequently, this would lead to a mechanical coefficient of -1, where an increase in one type of person necessarily leads to a reduction in another type.

The APS is constructed by combining waves 1 and 5 of the LFS each year plus sample boosts. Each wave 1 sample of the LFS comes from the small user sub file of the Postcode Address File (PAF). The PAF is sorted by postcode and then within that by address and then the sample is drawn from a random starting point and with a fixed interval. This geographical ordering implicitly stratifies the sample, ensuring a geographic spread of addresses. For the population of a local authority to change in the LFS requires one of the following: a change in the number of addresses in a local authority, a change in the weight of each respondent, or a change in the number of individuals in each household. Consequently, it seems likely that increases in population in

the sample will occur with a delay. In particular, we would expect the number of addresses in a local authority to be fixed in the short run.[21]

Given our concerns over the plausibility of our native displacement estimates using the annual APS data, we follow Sá (2015) in estimating an alternative measure of native outmigration using data from the LFS.[22] Individuals in the LFS are asked to report their local authority of residence one year previously, enabling us to calculate the number of individuals who left local authority i between $t-1$ and t as a share of the initial number of natives at $t-1$, and regress this on the inflow of migrants into their original local authority, Δm_{it}.[23] The results presented in Table 4.11 show a positive, statistically significant relationship between the inflow of migrants into an area and the share of its natives who are then displaced within the following year. The coefficient of 0.093^{***} is not dissimilar from the 0.111^{***} found by Sá (2015). An increase in the stock of immigrants equal to 1% of the local initial population increases the native outmigration rate by 0.093 percentage points.

Following our concerns over the suitability of using APS or LFS data to estimate the native outmigration response to migrant inflows, one solution is to use Census data instead. As the Census only provides us with decennial data, we are only able to estimate the total native displacement due to migration

[21] In Table 4.17 in the Appendix to this chapter, we conduct a placebo test to show that using LFS data for two irrelevant groups, males and females, an increase in the number of males as a share of the initial population leads to a one for one reduction in the number of females. It seems implausible that an increase in the number of males sampled would lead to a reduction in the number of females sampled, so we take this result as support for our supposition that this is in fact a mechanical result.

[22] The End User License version of the LFS only permits analysis at the Government Office Region level. We thank the UK Data Service for their assistance with access to the Secure Lab version of the LFS data which permits analysis at the local authority county level.

[23] We use LFS quarter 2 data from 2004-2013 because individuals were only asked their local authority of residence one year previously in this quarter for these years. We are only able to conduct this analysis at the local authority county, rather than local authority district level as this is the most disaggregated geographical level reproted in the LFS.

Table 4.11: Native outmigration 2004-2013 using LFS prior residency question

	(1)
Δm_{it}	0.093***
	(0.014)
Number of obs.	1530
Number of LA	170
R^2	0.732

Standard errors clustered at the local authority county level are reported in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

between 2001-2011, rather than displacement on an annual basis. Table 4.12 therefore presents the long term relationship between migrant inflows and native displacement. Again, we find a negative, statistically significant coefficient, suggesting that inflows of migrants into a local authority are associated with outflows of natives. The results which use the Census and the LFS recall data are consistent and much smaller than the spurious relationship found in Table 4.10 using the APS data. The estimated effect using the Census data is more than twice as large as the effect using the LFS recall data. This difference is likely to be explained by the longer time frame used in the Census as we might expect more movement over a longer period.

Table 4.12: Native outmigration 2001-2011 using Census data

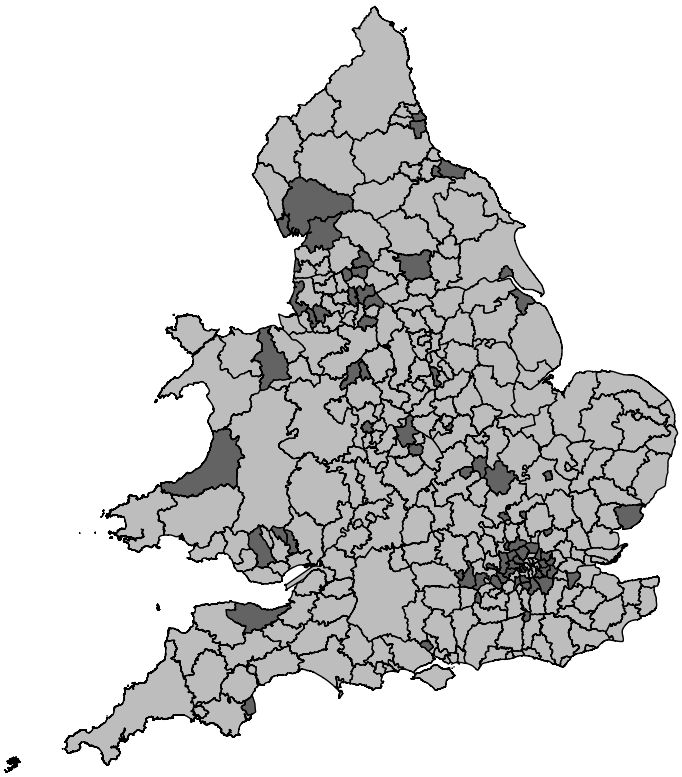
	(1)
Δm_{it}	−0.229***
	(0.047)
Number of obs.	338
Number of LA	338
R^2	0.094

Standard errors clustered at the local authority level are reported in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

Our findings using the LFS recall data and the Census data are consist-

ent, with both suggesting that an inflow of migrants into a local authority is associated with an outflow of natives. Nevertheless, these estimates cannot be interpreted as a causal relationship. Using Census data, in Figure 4.13 we see that between 2001-2011, 76 of the 338 local authorities saw a fall in their native populations. It is interesting to note that 21 of the 32 London boroughs are among them, as well as 10 in the wider south east and 14 in the north west. Within London, areas on the outskirts of London have seen outflows of natives, while more central areas such as Camden, Haringey, Hackney, Islington, Tower Hamlets, Southwark, Lambeth, Wandsworth, Westminster and Richmond have not. Havering on the eastern outskirts of the city is the exception to this pattern.

Figure 4.13: Local authorities which saw an outflow of natives 2001-2011



Shaded areas represent local authorities which saw an inflow of migrants and an outflow of natives between 2001 and 2011. Source: 2001 & 2011 Census

With regards to explaining the negative relationship she finds between migrant inflows and changes in house prices, Sá (2015) argues that natives, particularly those at the top of the wage distribution, are choosing to leave areas with large inflows of migrants, causing a negative income effect which leads to a fall in house prices in those areas. It is, however, not clear that this relationship is a causal one, particularly in light of the doubts over the validity of the shift-share instrument that we discussed in Section 4.7.

In a related study, Kaufmann and Harris (2015) investigate the phenomenon of "white flight" within the UK, particularly from London. It is important to note that they focus on white British individuals rather than our definition of natives which refers to all those born in the UK. Nevertheless, their findings are highly relevant because white British individuals make up a large proportion of all natives. They find that between 2001 and 2011, 620,000 white British individuals left London. This is consistent with what we have shown in Figure 4.13. Using individual data from the British Household Panel Survey and Understanding Society combined with Census data at the ward level, the authors investigate whether there is any evidence of "white flight" as a result of immigration. The authors find that white British individuals who do move tend to move to less diverse areas, but that they are no more likely to leave diverse areas than members of other ethnic groups. In addition, they look more closely at factors such as political preferences, English versus British nationality, education and class, factors which have previously been identified as potential indicators for attitudes towards immigration. Amongst other findings, they show that voters for the anti-immigration UKIP and BNP parties in more diverse neighbourhoods are no more likely to move away than other individuals. Their findings do not suggest this "white flight" is being caused by anti-immigration preferences.

Moreover, Easton (2013) uses Census data to show that outside of London, the majority of local authorities in England and Wales have seen an increase in white British individuals. Rural areas, particularly those in the east of England have seen the largest increases in white British individuals. One potential explanation for this could be native citizens "escaping to the country". Rather than being due to immigration, this could be due to individuals searching for a more relaxed pace of life, more space, or more rural surroundings in which to raise a family. This explanation would also be consistent with Sa's finding that it is natives at the top of the wage distribution who are moving away from immigrant dense neighbourhoods. Alternatively, the high cost of living relative to other parts of the country may also have contributed to the exodus of natives from London. While it seems clear that native British individuals are moving away from immigrant dense areas, there is no evidence that this is due to immigration itself.

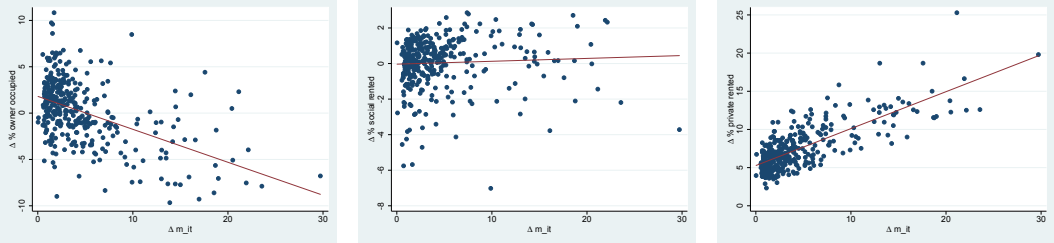
4.8.2 Housing Use

In addition to native outmigration, an alternative way through which immigration may negatively affect house prices is through changes in the housing stock, or in housing conditions. For instance, in Figure 4.10 we showed that migrants arriving in the UK between 2001 and 2011 were much less likely than either natives or previous migrants to own their own homes, with the majority in the private rental sector. An increase in demand for rental properties may encourage buy to let properties, which are often less well maintained than owner-occupied properties, which could therefore negatively affect house prices.

Using Census data, in Figure 4.14, we show that increases in a local au-

thority's migrant share between 2001-2011 are associated with an increase in the share of privately rented accommodation and a decrease in owner occupied properties. Interestingly, there is no relationship between migrant inflows and the proportion of social housing. In Figure 4.15 we also show that migrant inflows are positively correlated with increases in the number of persons per room. These findings are consistent with those of Braakmann (2017) and with the descriptive evidence we presented in Section 4.2 showing that recent migrants to the UK are more likely to live in rental accommodation. These estimates cannot be interpreted causally.[24]

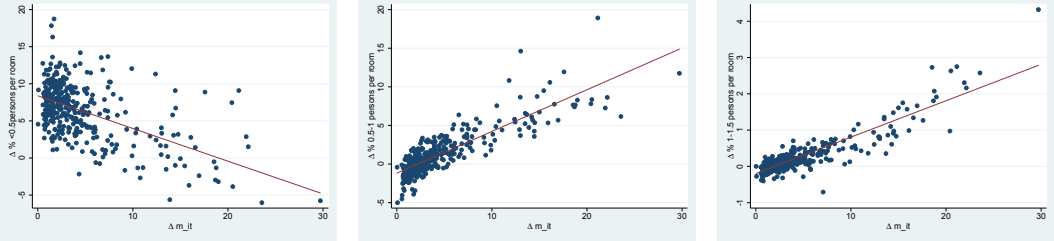
Figure 4.14: Relationship between migrant inflows and changes in housing tenure 2001-2011



(a) Owner occupied (b) Social rented (c) Private rented

Source: UK Census 2001 & 2011.

Figure 4.15: Relationship between migrant inflows and changes in the number of persons per room 2001-2011



(a) <0.5 (b) 0.5-1 (c) 1-1.5

Source: UK Census 2001 & 2011.

[24]Our results are not identical to Braakmann (2017) because we use post-2009 defined local authorities, whereas Braakmann (2017) uses pre-2009 definitions.

It is important to bear in mind that, as these findings use decennial Census data, they represent longer term changes in housing tenure and conditions. These findings are also consistent with native flight, as a change from owner-occupied to rental accommodation requires the owner-occupiers to move out.

4.9 Discussion of Results

As previously noted, this study is closely related to two other papers which also examine the relationship between immigration and house prices for England and Wales. In this section we therefore compare and contrast our findings with those of Sá (2015) and Braakmann (2017).

Beginning with our benchmark OLS results, we find no statistically significant relationship between the inflow of migrants into a local authority and the change in its house prices. In addition, we find no evidence of any effect for different types of housing or along different parts of the house price distribution.

Our benchmark OLS results differ from Sá (2015) who finds a negative, statistically significant relationship. It is important to note that, although the model we estimate in column (4) of Table 4.3 is very similar, we would not necessarily expect our results to be identical due to the different data sources, variable definitions, geographical level of analysis, and time period under investigation.

Sá (2015) pools quarterly LFS data to obtain estimates for the number of migrants in a local authority county, whereas we instead use aggregate migration figures released by the ONS. One advantage of these aggregate data is that they enable us to conduct our analysis at the more narrowly defined

local authority district level, in order to better control for unobserved local level characteristics. On the other hand, the main limitation is that migrant numbers are rounded to the nearest thousand. Consequently, we may have concerns that small changes from year to year may not be reflected in these figures. However, it is also possible that simply pooling LFS quarterly data may generate spurious changes in migrant numbers, so we cannot be sure that Sa's estimates are closer to the true effect. Furthermore, although Sá (2015) does find a statistically significant, negative effect, the magnitude of this effect is very small, -0.14, not hugely different from our coefficient of -0.01.

Braakmann (2017) instead uses Census data which provide a more accurate measure of changing migrant stocks. The disadvantage of using Census data is that they only permit analysis at ten year intervals. Braakmann (2017) therefore estimates the longer term relationship between migrant stocks and house prices, rather than year on year effects as we do in this study. Nevertheless, our OLS findings are consistent with Braakmann (2017) who also finds no evidence of any relationship between immigration and house prices at any part of the price distribution in his OLS specifications.

Turning now to our IV estimates, we report similar findings to Sá (2015). Our results suggest that a 1% increase in migrants is associated with a 2.4% fall in house prices, compared to Sa's estimate of a 1.7% fall. However, as discussed in Section 4.7, we have doubts over the suitability of this approach because the instrument does not pass the first stage for local authorities outside of London and we believe that the instrument fails to adequately capture the large inflows of A8 migrants. In contrast to our results, Sá (2015) finds that her instrument does not work for local authorities in London, and is instead driven by other local authorities. This result is puzzling, particularly in light of the greater dispersion of migrants across the country in recent years, coupled

with continuing large inflows of migrants into London that we documented in Section 4.2.1.

Sá (2015) proposes a series of additional potential explanations for the negative relationship between immigration and house prices. Her theoretical model predicts the existence of a negative relationship between immigration and house prices when natives dislike migration and when migration leads to a fall in native wages due to an income effect changing the composition of the local area. However, in practice, Sá (2015) finds no evidence of any statistically significant effect of immigration on wages at any part of the distribution. Moreover, Bell et al. (2013) find no evidence of increased crime as a result of inflows of EU migrants to the UK after the 2004 EU enlargement. As these migrants made up a significant proportion of inflows into the country during the period of interest, this suggests that an increase in crime was unlikely to be behind any negative relationship between migration and house prices. Furthermore, Sá (2015) also finds no evidence of any changes in housing quality as a result of immigration.

One of Sa's additional findings is that immigration further reduced house prices in areas where the migrants had lower levels of education. Sa notes that in 2010, 46.4% of immigrants in her LFS sample had less than GCSE level education or equivalent, although there are concerns over the quality of these data due to the increased likelihood of recording foreign qualifications incorrectly. The corresponding figure for natives was only 20.5%. We know that more recent EU migrants have on average higher levels of education than both native British citizens and previous groups of migrants. This result would therefore be consistent with our findings that estimates based on the historical migrant settlement patterns instrument are driven more so by areas with a history of migration from the subcontinent, rather than by areas which experienced large

inflows of new EU member state migrants. Again though, these results merely represent a correlation rather than a causal relationship.

When thinking about the relationship between migrant inflows and changes in house prices, it is important to consider what would have happened without large inflows of migrants, the so called unobserved counterfactual. In Section 4.2.1 we showed that more deprived areas saw larger migrant inflows over our period of interest. Given our difficulties in trying to establish the existence of a causal relationship, we are unable to rule out that any such negative relationship may simply reflect falling house prices in more deprived areas. We find a negative, statistically significant relationship both in our OLS postcode-area fixed effects specification for flats, and in our IV estimations. Both of these results are driven by local authorities in London. At first glance, a negative relationship between migrant inflows and changes in house prices for London may seem strange, given the higher prices and faster growth seen there on average. However, London does contain some of the most deprived neighbourhoods in England and Wales, and we have seen that there was also considerable native displacement from London towards more rural areas. Both of these factors could help to explain this finding.

4.10 Conclusion

In this chapter we have examined whether an increase in the share of migrants in a local area causes a change in house prices. Focusing on the case of England and Wales, which saw large increases in both migrants and house prices between 2004-2015, we exploited within local authority variation in the migrant share to identify the effects of migration on house prices. This chapter built on existing papers by conducting the analysis at the local authority

district level, enabling us to better account for unobserved local level characteristics. In addition, we exploited data on the postcode of each individual housing transaction in an attempt to better control for housing quality.

In our benchmark OLS specification we find no evidence of any relationship between the inflow of migrants into a local area and changes in house prices. The inclusion of postcode area fixed effects does not change the results, nor do we find any relationship for properties at different parts of the price distribution.

In order to address concerns over the endogeneity of migrant location with respect to changes in house prices, we constructed the commonly used shift-share instrumental variable based on historical migrant settlement patterns. In contrast to our OLS findings, our 2SLS results suggest that a migrant inflow equivalent to 1% of the population is associated with a fall in house prices of 2.4%. However, we have shown that this instrument fails to pass the first stage relevance test for local authorities outside of London. In addition, we have shown that estimates using this instrument are driven by particular local authorities with a strong relationship between recent inflows and prior settlement patterns, which may fail to adequately capture large inflows of predominantly European migrants in areas with previously low levels of migration.

The negative relationship we find in our 2SLS estimation can perhaps be explained by the fact that, in line with previous findings, we do find evidence of substantial native displacement from local authorities which experienced large inflows of migrants. However, there is no evidence that this is a causal relationship. Additional analysis shows that large numbers of native citizens have moved from urban to rural areas since the early 2000s, particularly away from London. Further work is needed to establish the causes of these settlement

changes.

Many of our results are not dissimilar to those in existing papers. However, we are not convinced by any causal interpretation of the results. Given the doubts over the suitability of the standard shift-share instrumental variable for the UK as a result of the major changes in migrant settlement patterns, finding a more appropriate instrument is an important task for future work. In addition, concerns over the quality of data on the number of migrants at the local authority level prevent us from reaching any firm conclusion on the true effects of immigration on house prices. Moreover, despite the undoubted importance of the relationship between immigration and house prices, having shown that the majority of new migrants in the UK tend to rent in the private sector, examining the effect of immigration on rental prices may arguably be a more pertinent research question, particularly in the short term. Due to data availability we are only able to examine the effect of immigration on the owner occupied sector of the housing sector. The collection of rental price data in the future would allow for a more comprehensive analysis of how immigration affects both the private rental and social housing sectors in addition to its effect on house prices.

Both our results, and those in the existing literature, raise important questions about the validity of the spatial correlations approach in the presence of spillovers. Papers which use a fairly large geographical area in their analysis tend to report a positive relationship between immigration and house prices, while those using more disaggregated data tend to find a negative relationship. This is also true for the UK, as in a robustness check, Sá (2015) found a positive relationship between immigration and house prices at the regional level, in contrast to her local authority county and our local authority district analysis. While the direct effects of migrant inflows into a local area are important, so to

are the indirect effects on other areas which subsequently receive inflows of individuals relocating from areas which received large migrant inflows. Without a clearer understanding of these settlement patterns and the scale of native outmigration, using the spatial correlations method to identify the local level effects of immigration is unlikely to provide informative results.

4.A Appendix

Table 4.13: OLS benchmark specification split by London and other LAs

	(1)	(2)
$\Delta m_{it}/Pop_{it-1}$	−0.081	0.002
	(0.069)	(0.029)
Employment rate	−0.113**	−0.010
	(0.051)	(0.021)
Benefits claimants	−0.731***	1.257***
	(0.213)	(0.179)
Dwelling stock	−0.192	−1.556***
	(0.404)	(0.152)
Crime rate per 100 persons	0.005**	0.005***
	(0.002)	(0.001)
$\Delta ln(pop)_{t-1}$	−0.595*	0.188
	(0.348)	(0.166)
Number of obs.	352	3,217
Number of LA	32	306
R^2	0.769	0.689

Dependent variable is the change in the log of the geometric mean house price. Standard errors clustered at the local authority level are reported in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

Table 4.14: Benchmark OLS specification using alternative dependent variables

	(1) Geometric	(2) Arithmetic	(3) HPI	(4) Geometric	(5) Arithmetic
$\Delta m_{it}/Pop_{it-1}$	−0.011	−0.055	−0.013	−0.028	−0.098*
	(0.027)	(0.047)	(0.023)	(0.029)	(0.050)
Number of obs.	3569	3569	3569	3569	3569
Number of LA	338	338	338	338	338
Year FE	Yes	Yes	Yes	Yes	Yes
LA FE	Yes	Yes	Yes	Yes	Yes
Population weighted				Yes	Yes
R^2	0.684	0.518	0.831	0.700	0.533

Dependent variables: column 1 - change in log of geometric mean house price (benchmark specification replicated for ease of comparison); column 2 - change in log of arithmetic mean house price; column 3 - change in log of HPI; column 4 and 5 are identical to columns 1 and 2 respectively except that the regressions are weighted by the 2001 local authority population. Standard errors clustered at the local authority level are reported in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

Table 4.15: Number of LA postcode combinations present in each year by housing type

Years	Detached	Semi-detached	Terraced	Flat
1	1,962	1,903	1,632	985
2	638	562	485	321
3	375	272	215	227
4	288	192	161	220
5	230	153	165	207
6	211	129	123	240
7	177	161	121	255
8	198	137	134	319
9	217	173	171	317
10	294	202	202	423
11	432	398	384	776
12	6,887	7,562	7,585	5,290
Total	11,909	11,844	11,378	9,580

Table 4.16: Number of observations in each house type-year-LA postcode cell used to calculate price means

Housing type	Obs.	Mean no. obs in each cell	Std. dev	Min.	Max.
Detached	2,430,357	23.59	25.49	1	339
Semi-detached	2,979,191	27.82	27.02	1	286
Terraced	3,358,429	31.63	35.22	1	659
Flat	2,179,568	24.46	39.59	1	1337

Table 4.17: Placebo test to illustrate sampling frame issues with survey data

	(1) Yr & LA FE
$\Delta Male_{it}$	-0.982^{***}
	(0.005)
Number of obs.	1530
Number of LA	170
R^2	0.931

Dependent variable: $\Delta Female_{it}$. Standard errors clustered at the local authority level are reported in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

Chapter 5

Conclusion

In this thesis we have investigated some of the wider effects of immigration on host countries and their native citizens. The study was motivated by the increasing salience of migration and migration policy in politics and the media, and by the importance of gaining a clearer understanding of how immigration affects a host country over and above the commonly studied labour market effects. Each chapter uses a different empirical strategy in order to establish the causal effects of immigration on a particular aspect of the host country. Chapter 2 examines the link between migration and trade flows. In Chapter 3 we study the relationship between immigration and the success of an anti-immigration political party. Chapter 4 investigates the effect of immigration on house prices. We summarise our findings below.

In Chapter 2 we investigate the causal link between migration and trade flows, exploiting the large inflows of migrants into the UK as a result of the 2004 EU enlargement. Using a difference-in-differences estimation strategy, we provide evidence that UK imports from the accession countries increased relative to UK trade with the rest of the world, but that there was no effect

for exports. Furthermore, using product level data, we show that this effect was driven by differentiated import goods. The lack of any effect for exports is unsurprising as we would expect the formation of networks and the sharing of information to require time.

This chapter adopts a more macroeconomic approach to investigating the relationship between migration and trade. The major drawback of our difference-in-differences estimation strategy is that we cannot rule out that the model may be picking up other effects in addition to the migration effect. Another concern is that our lack of findings for the export channel may simply be due to the fact that this macroeconomic level approach may mask any heterogeneity in the effects. This is likely to be particularly important with regards to the information channel looking at how migrants can reduce trade frictions. In order to gain a more nuanced understanding of the pro-trade effect of migration, future work should aim to exploit increasingly available firm level data. This would enable further exploration of the types of migrants which help to boost trade, as well as which sectors may benefit the most in terms of increased trade from having migrant workers.

In Chapter 3 we examine whether the proportion of migrants in a local area affects the success of an anti-immigration political party. We focus on the case of Sweden, a country which saw large inflows of migrants, many of whom were refugees, from non-OECD countries in the 1980s and 1990s. To address endogeneity concerns, we exploit a refugee placement policy which aimed to disperse refugees across the entire country, enabling us to create an instrument based on the number of refugees contracted to arrive in each municipality. We do not find any evidence that the refugee placement policy had an impact on the anti-immigration party's vote share, but we do find evidence that a more general increase in the migrant share was associated with an increase in their

vote share, and that this effect was driven by voters living in major urban areas.

In light of the current debate surrounding the reception and integration of refugees in Europe, our findings have potentially important policy implications. In the case of Sweden, a country with no previously established far-right, anti-immigration party at that time, we find no evidence that the introduction of refugees into local areas with little prior experience of migration, led to increased support for an anti-immigration party. On the other hand, we do find some evidence of increased anti-immigration party support in urban areas, as some refugees subsequently relocated to these areas in order to look for work. These findings suggest that dispersal policies have the potential to reduce anti-immigration support, but that considerations must also be given to how refugees will be integrated into the labour market after a period of initial welfare state support. It is however important to recognise that the success of any such dispersal policy in reducing or preventing support for anti-immigration parties will depend on the specific circumstances of the country involved. The major drawback of this study is our inability to adequately separate out the effects of refugees and migrants more generally. Identifying the effects of different types of migration, both in this specific area of the literature, and more broadly in immigration research remains an important topic for future research.

In Chapter 4 we study the relationship between immigration and house prices. Focusing on the case of England and Wales, we exploit variation in migrant inflows across local authority districts to identify the effects of migration on changes in house prices. We build on existing studies by examining these effects at the narrower local authority district level, in addition to using data on the postcode of each individual housing transaction in an attempt to

better control for housing quality. We find no evidence of any relationship between the inflow of migrants into a local area and changes in house prices at any part of the price distribution. In addition we show that the commonly used shift-share instrumental variable based on historical settlement patterns is not a suitable way of addressing endogeneity concerns in this instance.

In line with previous findings, we do find evidence of substantial native displacement from local authorities which experienced large inflows of migrants. However, there is no evidence that this is a causal relationship. Understanding the changing settlement patterns of both migrants and natives in England and Wales is an important topic for future research. It is clear that since the early 2000s there have been huge changes in the settlement patterns of both natives and migrants in England and Wales, yet little is understood about the causes of these changes. Exploiting longitudinal data will be important in order to gain more of an insight into these changing patterns and their causes. Without a clearer understanding of these settlement patterns, using the spatial correlations method to identify the local level effects of immigration is unlikely to provide informative results.

While we find no evidence that migrants increase house prices in a local area, we have also shown that the majority of new migrants in the UK tend to rent in the private sector. Examining the effect of immigration on rental prices would therefore be an interesting avenue for future research, data permitting.

The major challenge in each of the three essays, and in the immigration literature more generally, is how best to address the endogeneity of migrant location. In this thesis we have implemented three different estimation techniques with varying degrees of success. Arguably the refugee dispersal policy in Chapter 3 provides the cleanest identification of causal effects. Identifying

causal effects for the UK remains more challenging, mainly due to the poor quality of UK migration data.

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