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XARXA DE REFERÈNCIA EN ECONOMIA APLICADA

The Effects of Immigration on NHS Waiting Times

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Abstract

This paper analyzes the effects of immigration on waiting times for the National Health Service (NHS) in England. Linking administrative records from Hospital Episode Statistics (2003-2012) with immigration data drawn from the UK Labour Force Survey, we find that immigration reduced waiting times for outpatient referrals and did not have significant effects on waiting times in accident and emergency departments (A&E) and elective care. The reduction in outpatient waiting times can be explained by the fact that immigration increases natives' internal mobility and that immigrants tend to be healthier than natives who move to different areas. Conversely, we observe higher outpatient waiting times in places to which native internal migrants have moved. Finally, we find evidence that immigration increased waiting times for outpatient referrals in more deprived areas outside of London. The increase in average waiting times in more deprived areas is concentrated in the years immediately following the 2004 EU enlargement and disappears in the medium term (e.g., 3 to 4 years).

Keywords: Immigration, waiting times, NHS, access to health care, welfare
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1 Introduction

The impact of immigration on the welfare of host-country residents has long been a contentious topic. In the UK, a majority of the public has been opposed to more immigration since at least the 1960s, and most people perceive the costs of immigration to be greater than the benefits (Blinder, 2012). The EU enlargement of May 1, 2004, exacerbated this debate as citizens of eight new member states (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia), commonly referred to as the A8, were granted immediate unrestricted rights to work in the country. The UK was one of only three EU countries, including Ireland and Sweden, that opened its labor market to A8 citizens immediately upon accession, a decision that led to a substantial immigrant inflow to the UK.

Previous papers have analyzed the effect of immigration in the UK on public finances (Dustmann et al., 2010; Dustmann and Frattini, 2014), labor markets (Dustmann et al., 2013), the housing market (Sá, 2015) and crime (Bell et al., 2013), among others. We know less about the effects of immigration on the National Health Service (NHS). Residents of the UK, including immigrants, have free access to the NHS. This free access has resulted in speculation that immigrants may increase the demand for NHS services disproportionately and that some immigrants move to the UK with the explicit purpose of abusing the health care system. These arguments and the potential health care costs associated with immigration have resulted in the introduction of an NHS surcharge for non-EU citizens applying for a UK visa.

Despite the intense political debate on the impact of immigration on the NHS, research on this topic has been limited by the paucity of data. Using longitudinal data from the British Household Panel Survey, Wadsworth (2013) finds that immigrants generally use hospital and general practice services at the same rate as those born in the UK. Steventon and Bardsley (2011) provide evidence suggesting that the belief that immigrants use more secondary care than British natives may be unfounded. Although these are valuable findings, these studies do not provide information on the impact of immigration on NHS efficiency. Waiting times are an important measure of the quality and productivity of a public health care system (Castelli et al., 2007; Gaynor et al., 2012a; Propper et al., 2008a). This paper aims to provide insights on this impact by examining NHS waiting times.

Waiting times function as a rationing mechanism in the NHS and play a role similar to a price (Lindsay and Feigenbaum, 1984). Research suggests that waiting times are one of the leading factors of patients' dissatisfaction with the NHS (Appleby, 2012; Sitzia and Wood, 1997; Propper, 1995). Postponing treatment delays the associated benefits and can have negative effects on patient health (Siciliani and Iversen, 2012; Cullis et al., 2000). Average waiting times for some NHS services were considerably high during the 2000s, and British politicians have suggested that increased immigration was a key factor contributing to NHS waiting times.

Between 1993 and 2013, the number of foreign-born UK residents more than doubled from 3.8 million to approximately 7.8 million (Rienzo and Vargas-Silva, 2012). This increase in the stock of immigrants is likely to have directly increased the demand for health care services. Immigration also affects the demographic composition and population morbidity rates, two factors that have key repercussions for health care demand. These effects of immigration are likely to vary significantly by location, as there is substantial variation across local areas in both the share of immigrants and NHS capacity.

Using a basic theoretical framework, this paper investigates the effects of immigration on waiting times in the NHS. We consider waiting times in outpatients (referrals), elective care (inpatients) and A&E.[1] We exploit a unique dataset created by merging administrative records and survey data. To the best of our knowledge, no studies have directly examined the impact of immigration on NHS waiting times. The purpose of this paper is to fill this gap in the literature.

Following previous studies on the effects of immigration in the UK (Sá, 2015; Bell et al., 2013), we analyze the correlation between spatial variation in the immigrant inflows and waiting times in England. We use immigration data at the local authority level drawn from the special license access version of the UK Labour Force Survey (LFS), obtained via an agreement with the Office of National Statistics (ONS). To study the effects of immigration on waiting times in the NHS, we merge this information with administrative records drawn from the Hospital Episodes Statistics (HES) provided by the Health and Social Care Information Centre (HSCIC) and extracted at the lower super output area (LSOA) level.

[1]The patient journey usually begins in primary care and can begin with a diagnostic procedure (outpatients), before entering the secondary care system for either an opinion, diagnosis, treatment or procedure. Outpatients are patients who are not hospitalized overnight but who visit a hospital, clinic, or associated facility for diagnosis or treatment. Elective care is planned care. An elective procedure is one that is advantageous to the patient but it is not urgent.

As waiting times are not based on socioeconomic status, they are usually viewed as an equitable rationing mechanism in publicly funded health care systems. However, research provides evidence of marked inequalities in waiting times across socioeconomic status (Cooper et al., 2009; Laudicella et al., 2012; Propper et al., 2007). Thus, we also analyze differences in our results based on the level of deprivation of the LSOA in order to explore differences in the impact of immigration in different areas.

To address the concern that immigration may be endogenous to the demand for health services and correlated with unobserved determinants of NHS waiting times, we used an instrumental variable approach exploiting the fact that historical concentrations of immigrants are a good predictor of current immigrant inflows. By including local-area and year fixed effects and controlling for local time-varying characteristics, we can reasonably assume that past immigrant concentrations are uncorrelated with current unobserved shocks that could be correlated with demand for health care services.

Although the political debate has mostly focused on the possible effects of immigration on A&E, we find no evidence of significant effects on waiting times in A&E. While the coefficient is positive, the point-estimate is small and not precisely estimated. On the other hand, we find a reduction in waiting times for outpatient care. In particular, we show that an increase in the stock of immigrants equal to 10% of the local initial population leads to a 19% reduction in outpatient waiting times. Finally, immigration is positively associated with inpatient waiting times, but the effects are smaller in absolute value (+2%) and not-precisely estimated.

To investigate the mechanisms underlying the negative effect of immigration on waiting times, we analyze the effects of immigration on native mobility, average morbidity in the population and health care supply. Consistent with previous studies, our results indicate that immigration increases natives' likelihood of moving to different local authorities. The analysis also confirms that recent cohorts of immigrants are relatively young and healthy upon arrival ("healthy immigrant effect"), suggesting that the increase in demand may have been less than predicted by the NHS (Sá, 2015; Wadsworth, 2013; Steventon and Bardsley, 2011). These effects on mobility and population composition are likely to explain the observed reduction in waiting times. Meanwhile, the results suggest that the supply of health care is not affected by immigration.

Finally, we find that waiting times increased in areas that native internal migrants moved into and that immigration increased the average waiting time for outpatients living in deprived areas outside of London in the period immediately following the 2004 EU enlargement. Our findings suggest that the short-term increase in outpatient waiting times in deprived areas in response to immigration can be explained by both the lower mobility of incumbent residents in these areas and the higher morbidity observed among immigrants moving into more deprived areas.

This paper is organized as follows. Section 2 presents the theoretical framework. Section 3 provides a discussion of the empirical specification, the identification strategy and the data. Section 4 presents the main results of the paper and a battery of robustness checks. Section 5 discusses the potential mechanisms explaining the main findings. We then illustrate the heterogeneity of the results across England in section 6. Concluding remarks are given in section 8.

2 Theoretical framework

We illustrate the relationship between immigration and waiting times using a basic model of the demand and supply of health care services. Our model builds on Lindsay and Feigenbaum (1984); Windmeijer et al. (2005); Martin et al. (2007); Siciliani and Iversen (2012), and we extend the model to explicitly incorporate the effects of immigration. Unless admitted through A&E, all patients are referred by their GP to access NHS care. If patients receive a referral, they join the waiting list for outpatient care. The specialist can decide whether the patient needs elective hospital care, in which case the patient is placed on the waiting list for hospital admission.

Patients can alternatively seek private care or receive no care at all if the waiting time becomes too long. The demand for NHS care will depend on the expected waiting time and on various demand shifters, such the health needs of the population (e.g., morbidity), the proportion of elderly patients, the overall size of the population, and other variables that may affect both the supply and demand of health care services (e.g., the quality of NHS care, the level of competition).

The sign of the effect of immigration on waiting times is ambiguous. An increase in the number of immigrants will affect demand and supply through its effects on demand shifters, patients' and managers' expected waiting time, and the supply of health care personnel. The

effect on waiting times will tend to be positive if the increase in the immigrant population is not offset by an increase in the supply. In the short term, managers may be constrained by the annual budget-setting process. Moreover, as managers forecast waiting times depend on the predicted change in population based on previous observations, unexpected immigration inflows may result in excess demand. As such, the supply may not adjust immediately because of differences between predicted and actual inflows or because of budget constraints. By contrast, the effect could be negative if the supply increases more than the actual demand for health care services. This may occur if immigration leads natives to move to and/or seek care in different areas or in the private sector and if immigrants have a lower incidence of morbidities or, more generally, a lower demand for health care services. If natives with higher incomes are more likely to move (or seek private care) as a response to immigration inflows, one may expect the negative effect of native out-migration on waiting times to be amplified in less deprived areas. One may instead expect larger positive effects of immigration on waiting times in areas where the demand for health care services is less elastic (higher mobility costs) or in areas that attract less healthy immigrants.

Following Siciliani and Iversen (2012), we can describe the demand and supply function in the following way:

$$Y_i^d = \alpha_0 + \alpha_1 w_i + \alpha_2 x_i^d + \alpha_3 z_i + e_i^d \tag{1}$$

$$Y_i^s = \beta_0 + \beta_1 w_i + \beta_2 x_i^s + \beta_3 z_i + e_i^s \tag{2}$$

where Y_i^d and Y_i^S are the demand and supply of health care in area i and w_i is the waiting time. Under the equilibrium assumption Y_i^d=Y_i^S, we can write the waiting time as a function of demand and supply shifters:

$$w_i = \gamma_0 + \gamma_1 x_i^d + \gamma_2 x_i^s + \gamma_3 z_i + e_i \tag{3}$$

where

$\gamma_0 = \frac{\alpha_0 - \beta_0}{\beta_1 - \alpha_1}$, $\gamma_1 = \frac{\alpha_2}{\beta_1 - \alpha_1}$, $\gamma_2 = \frac{-\beta_2}{\beta_1 - \alpha_1}$, $\gamma_3 = \frac{\alpha_3 - \beta_3}{\beta_1 - \alpha_1}$.

We can adapt this framework to analyze the effects of immigration as an exogenous shock to

the demand for health care services. Formally,

$$w_{it} = \lambda_0 + \lambda_1 IMM_{it} + \lambda_2 X_{d,it} + \lambda_3 X_{s,it} + \lambda_4 Z_{it} + \mu_i + \eta_t + e_{it} \quad (4)$$

where w_{it} is the average waiting time in local area i, λ_1 captures the effect of an increase in the number of immigrants living in local area i on waiting times, λ_2 (λ_3) are the parameters associated with a vector of variables controlling for other demand (supply) shifters, λ_4 captures the effects of variables affecting both the supply and demand for health care services, and μ_i and η_t are the health local area and time fixed effects.

3 Data and Empirical Specification

3.1 *Data*

Data on waiting times are extracted from the HES database provided by the HSCIC. This database includes patients treated by the publicly funded NHS in England. The HES database is a record-based system that covers all NHS trusts in England, including acute hospitals, primary care trusts and mental health trusts and independent sector treatment centres (ISTCs).[2]

We extracted data on waiting times and basic population demographics from the HES at the LSOA level. LSOAs were designed to improve the reporting of small-area statistics and are constructed from groups of output areas. England is divided into 32,483 LSOAs with a minimum population of 1,000 inhabitants and a maximum of 3,000 inhabitants.

The HES dataset provides counts and time waited for all patients referred or admitted to a hospital (inpatients, outpatients and A&E). For outpatients and inpatients, we restrict the analysis to first admissions.[3] Data on waiting times for outpatients and elective care are available for the entire period under analysis (2003-2012), while we have data on A&E only since 2007. Waiting times for outpatients are defined as the number of days that a patient waits from the referral date to the appointment with the specialist; waiting times for elective care are defined as the period between the date of the decision to admit and the date of actual admission. For the

[2] ISTCs provide services to NHS patients but are owned and run by organisations outside the NHS. They were introduced in England in 2003, primarily to help the NHS reduce waiting times for planned operations and diagnostic tests.

[3] We exclude data on delivery from the analysis.

A&E department, waiting times are defined as the minutes from a patient's arrival in the A&E room and the decision of transfer, admission or discharge the patient. We calculate the average waiting time for outpatients, elective care and A&E by the LSOA of patients' residence. Note that in England, to access an NHS specialist, individuals must obtain a referral from their GP. Until 2015, although patients had the right to choose a GP practice, for most people, this choice was limited to a practice near where they lived, as the GP surgeries could refuse to register patients who resided outside the practice boundaries.[4] Until 2006, patients had no choice in their hospital when seeking a referral to see a specialist; the GP would decide for the patient. Since January 2006, NHS patients can choose between 5 hospitals. However, the evidence suggests that patients have strong preferences for short distances and that, on average, patients did not travel any farther and were not less likely to choose the closest hospital after the 2006 reform (Gutacker et al., 2015; Gaynor et al., 2012b). As noted by Dixon and Robertson (2011), despite the increased choice and the provision of information on differences in the quality of care between hospitals, patients tend to be loyal to their local providers. For instance, Beckert et al. (2012) show that, on average, patients traveled just over 12 km for a hip operation in 2008-2009. One drawback of using administrative records from the HES dataset is that we cannot distinguish patients based on the country of birth. Thus, we are not able to distinguish whether the effects of immigration are different for natives and immigrants.

In addition, we use data at the primary care trust (PCT) level from the HES and HSCIC databases on the supply side, including information on the number of GPs, the number of GP practices, the number of specialists, the ratio of occupied beds in the PCT hospitals, the annual NHS expenditure and the number of doctors with a foreign degree. Using these variables, we can partially account for time-varying changes in the NHS supply at the PCT level. PCTs were largely administrative bodies responsible for commissioning primary, community and secondary health services from providers until 2013. As of October 1, 2006, there were 152 PCTs in England, with an average population of just under 330,000 per trust. After these changes, approximately 70% of PCTs were coterminous with local authorities having social service responsibilities, which facilitated joint planning. PCTs were replaced by clinical commissioning groups on March 31,

[4]Since January 5, 2015, all GP practices in England are free to register new patients who live outside their practice boundary area. See also `http://www.nhs.uk/choiceintheNHS/Yourchoices/GPchoice/Pages/ChoosingaGP.aspx`.

2013, as part of the Health and Social Care Act of 2012. Our control variables are all extracted at the LSOA or PCT level depending on their availability.

We use information on the immigrant population by local authority and year drawn from the special license of the UK LFS between 2003 and 2012. We define immigration based on country of birth and pool quarters for each year. The LFS is the largest household survey in the UK and consists of a sample of approximately 40,000 households (100,000 individuals) per quarter. Even with its large size, concerns could arise regarding the accuracy with which this survey measures the size of the immigrant stock at smaller geographical levels (even when data are pooled across quarters for a given year). Therefore, as a robustness check, we also use data from NINO registrations of overseas nationals from the Department for Work and Pensions (see Section 4.4 and the Data Appendix).

The merged sample includes 32,483 LSOAs, 141 local authorities, 150 PCTs, and 16 regions of residence in England. Each LSOA belongs to a given PCT and a given local authority. In our sample, 127 PCTs (90%) are coterminous with local authorities.

Table 1 presents the summary statistics on waiting times, the immigrant share of the population and a vector of variables affecting the demand and supply of health care services. For the 2003-2012 period, the average waiting time for outpatients was 47 days, while that for inpatients was 70 days. The average waiting time for A&E was 52 minutes.

The native population of the UK has remained relatively stable for the last decade. In contrast, the foreign-born population increased continuously over the same period, with a sharp increase in individuals born in other EU countries. Figure 1 shows the growth in the foreign-born share of the population of England between 2003 and 2012. During that period, the foreign-born share of the working-age population increased from 9% to 13%. The EU expansion induced a sharp increase in the number of recent immigrants–defined as foreign-born people who have been living in the UK for 5 years or less–from 2% to 4% of the population (Rienzo and Vargas-Silva, 2012). Another indicator of the growth in the migrant population is the trend in new immigrant GP registrations. As shown in Figure 2, new immigrant GP registrations as a share of the total population in England increased from 0.9% in 2004 to 1.15% in 2010.

Waiting times decreased for outpatients and elective care between 2003 and 2012 and for A&E between 2007 and 2012, as reported in Figure 3. This outcome is partly the result of NHS policies

implemented during this period. The NHS Plan in 2000 shifted the focus from the size of the waiting list to the maximum waiting times experienced by patients. In particular, the government adopted an aggressive policy of targets. The maximum wait for inpatient and day-case treatment was reduced from 18 to 6 months, while the maximum wait for an outpatient appointment was reduced from 6 to 3 months. Targets were coupled with the release of information on waiting times at the hospital level and strong sanctions for poorly performing hospital managers. These changes led to a significant reduction in the percentage of patients waiting at various points of the distribution of waiting times (Propper et al., 2008b). Indeed since 2008, patients have the right to a maximum 18 week waiting time from referral to consultant. The formal introduction of waiting time targets of 18 weeks for 90% of in-patients and 95% of outpatients was introduced in 2008, right in the middle of the our sample period. The 18 week waiting time target was adopted by individual hospital providers gradually adopted over the entire period. Waiting times went down in 2008 and remained relatively stable onward, although there has been an increase in waiting times for elective care since 2008 (see Figure 3 and Appleby et al. (2014)).[5]

Finally, we also use data on health status, self-reported disability and health care use from the Labor Force Survey, Understanding Society and General Household Survey (see the Data Appendix).

3.2 *Identification Strategy*

To identify the effect of immigration on NHS waiting times, we exploit variation over time in the share of immigrants living in a local authority between 2003 and 2012. Our specification follows recent studies analyzing the impact of immigration (Orrenius and Zavodny, 2015; Smith, 2012; Giuntella and Mazzonna, 2015). In our baseline specification, we estimate the following model:

$$w_{it} = \alpha + \beta S_{lt} + X'_{it}\gamma + Z'_{pt}\lambda + \mu_p + \eta_t + \epsilon_{it}, \tag{5}$$

where w_{it} is the average waiting time (for outpatients, elective care, or A&E) in LSOA i belonging to the PCT p at time t; S_{lt} is the share of immigrants in local authority l at time t; X'_{it} is a

[5]For a more detailed analysis of recent trends in NHS waiting times, see also the 2014 Department of Health Report: https://www.nao.org.uk/wp-content/uploads/2014/01/NHS-waiting-times-for-elective-care-in-England.pdf.

vector of time-varying LSOA characteristics (index of deprivation and rural indicator); Z'_{pt} is a vector of time-varying characteristics at the PCT level, and μ_p and η_t are PCT and year fixed effects, respectively; and ϵ_{it} captures the residual variation in waiting times. Using LSOA fixed effects we do not have enough variation to identify the effects of immigration.[6] To capture time-invariant characteristics that may be correlated with both waiting times and immigration inflows we control for PCT fixed effects. PCTs are the health administrative areas responsible for commissioning primary, community, and secondary health services from providers. Time-varying LSOA characteristics include an Index of Deprivation (we use dummies for each decile of the index) and an indicator for rural status, the share of women, and the share of over 65 in the LSOA population. PCT time-varying characteristics include ratio of occupied hospital beds to population, number of GPs per capita, number of GP practices per capita, number of health consultants per capita, health expenditure per capita, incidence of most common diseases. We also check the sensitivity of our result to the inclusion of LSOA population.

The capacity of the nearest hospital is likely to determine the average waiting time in a given LSOA. LSOAs served by the same hospitals would therefore share common determinants of waiting times. Thus, to control for potential confounders, we include nearest NHS trust fixed effects instead of PCT fixed effects as a robustness check.

In the estimations we show results using the contemporaneous value for the share of immigrants living in a local authority. However, as a robustness check, we consider lagged values of the share of immigrants (see Appendix).

The use of geographical variation in the share of immigrants (often called an "area approach") has been criticized by scholars (e.g., Borjas et al., 1996; Borjas, 2003) for two main reasons. First, natives may respond to the impact of immigration on a local area by moving to other areas. This is important in our study because healthier natives may be more likely to migrate. Following Borjas et al. (1996), we test the robustness of our results to a change in the geographical unit using a higher level of aggregation. Furthermore, we analyze the effects of immigration on native internal mobility and examine whether waiting times were affected by native internal inflows across local authorities.

[6] It is worth noting that the point-estimates obtained using LSOA fixed effects are not-significantly different from those presented in the main tables, but the standard errors increase by one order of magnitude. Results are available upon request.

The second critique of the area approach is that immigrants might endogenously cluster in areas with better economic conditions. In our case, pull factors that attract more immigration, such as economic growth, may lead to a downward bias in the effect of interest based on the well-known negative (short-run) correlation between the economic cycle and health (Ruhm, 2000). Furthermore, the presence of measurement error in the immigration share is likely to introduce attenuation bias, further exacerbated by the use of a large number of local area fixed effects (Wooldridge, 2002; Aydemir and Borjas, 2011). To address these concerns, we adopt an instrumental variable approach. Following Altonji and Card (1991), Card (2001), Bell et al. (2013) and Sá (2015), we use an instrumental variable based on a "shift share" of national levels of immigration into local authorities to impute the supply-driven increase in immigrants in each local authority.

In practice, we exploit the fact that immigrants tend to locate in areas that have higher densities of immigrants from their own country of origin, and we distribute the annual national inflow of immigrants from a given source country across the local authorities using the distribution of immigrants from a given country of origin in the 1991 UK Census. Using the distribution of immigrants in 1991, we reduce the risk of endogeneity because annual immigration inflows across local authorities might be driven by time-varying characteristics of the local authority that are associated with health outcomes.[7]

Specifically, let us define F_{ct} as the total population of immigrants from country c residing in England in year t and $s_{cl,1991}$ as the share of that population residing in local authority l in year 1991. Following a common approach in the literature (see for instance Orrenius and Zavodny (2015); Foged and Peri (2016)), we then construct $\hat{F}_{cit}$, the imputed population from country c in local authority l in year t, as follows:

$$\hat{F}_{clt} = s_{cl,1991} * \Delta F_{c,t} + F_{cl,1991} \tag{6}$$

[7]Table A.1 illustrates the changes in stocks and shares of immigrant between the 1991 and the 2011 UK Census for the main source countries. The top ten countries of birth of migrants according to the 2011 Census (England and Wales) are: India (694,000), Poland (579,000), Pakistan (482,000), Ireland (407,000), Germany (274,000), Bangladesh (212,000), Nigeria (191,000), South Africa (191,000), USA (177,000) and Jamaica (160,000). However, considering the % growth since the 2001 Census for these countries it is easy to see that Poland has dominated the inflow of migrants during the last decade: India (52%), Poland (897%), Pakistan (56%), Ireland (-13%), Germany (12%), Bangladesh (38%), Nigeria (120%), South Africa (44%), USA (23%) and Jamaica (10%).

and the imputed total share of immigrants as follows:

$$\hat{S}_{lt} = \sum_{c} \hat{F}_{clt} / P_{l,1991} \tag{7}$$

where $P_{l,1991}$ is the total population in local authority l as of 1991. Thus, the predicted number of new immigrants from a given country c in year t who choose to locate in local authority l is obtained by redistributing the national inflow of immigrants from country c based on the distribution of immigrants from country c across local authorities as of 1991. Summing data for all countries of origin, we obtain a measure of the predicted total immigrant inflow in local authority l in year t. The variation of $\hat{S}_{lt}$ is driven only by changes in the imputed foreign population (the denominator is held fixed at its 1991 value) and is used as an instrument for the actual share of immigrants in local authority l at time t (S_{lt}). In practice, we consider nine foreign regions of origin: Africa, Americas and Caribbean, Bangladesh and Pakistan, India, Ireland, EU-15, Poland, and rest of the world.

One potential threat to the validity of this approach is that the instrument cannot credibly address the resulting endogeneity problem if the local economic shocks that attracted immigrants persist over time. However, this problem is substantially mitigated by including PCT fixed effects and by controlling for time-varying characteristics at the LSOA and PCT levels; thus, we can reasonably assume that past immigrant concentrations are not correlated with current unobserved local shocks that might be correlated with health. Under the assumption that the imputed inflow of immigrants is orthogonal to the local specific shocks and trends in labor market conditions after controlling for PCT and year fixed effects and time-varying characteristics of LSOAs and PCTs, the exclusion restriction holds.[8]

[8]The exclusion restriction assumption may be also violated if individuals respond to expected immigration flows based on current stocks. For instance, an individual living in an area with a high concentration of Polish immigrants may expect a large inflow of Polish after the 2004 EU enlargement, and, hence change their healthcare utilization for non-emergency conditions.

4 Results

4.1 *Waiting Times for Outpatients*

Table 2 presents the main results on the effects of immigration on waiting times for outpatients. In column 1, we report the OLS estimate controlling for year and PCT fixed effects. The coefficient is negative and statistically significant. An increase in the stock of immigrants equal to 10% of the initial local authority's population (approximately 1 standard deviation, see Table 1) decreases the average waiting time for outpatients by approximately 3 days (6% relative to the mean of the dependent variable). It is worth noting that the share of immigrants in the population has a large standard deviation (mean of 11.75 and s.d. of 10.99, see Table 1). The coefficient becomes non-significant when we include LSOA and PCT time-varying characteristics (column 2). Including the LSOA population (column 3) does not substantially change the results, suggesting that the negative association between immigration and waiting times is not correlated with changes in the LSOA size.[9].

To account for the endogeneity of the immigrant distribution across local authorities, we then estimate a 2SLS regression using the typical shift-share instrumental variable approach explained above. In the first-stage regression, the F-statistic (17.11) is above the weak instrument threshold. The difference between OLS and IV estimates may be explained by the fact that fixed effects estimates are susceptible to attenuation bias due to measurement error (Wooldridge, 2002; Aydemir and Borjas, 2011). Furthermore, pull factors that attract more immigration, such as economic growth, may lead to a downward bias in the effect of interest based on the well-known negative (short-run) correlation between the economic cycle and health (Ruhm, 2000).

Column 4 presents the second-stage estimates including only year and PCT fixed effects. The coefficient diminishes by approximately 30% when including LSOA and PCT time-varying characteristics (column 5) but is still negative and significant, suggesting that an increase in the stock of immigrants equal to 10% of the initial local authority's population would reduce the average waiting time for outpatients by approximately 9 days (19% relative to the mean of the dependent variable). Propper (1995) estimated that patients would be willing to pay GBP 80 (in

[9]Note that including the local authority population rather than the LSOA population yields similar results(coef. -0.933, std. err. 0.460)

1991 prices)–roughly GBP 150 in 2013 prices–for a reduction of one month in waiting times. If disutility from the waiting list were linear, one could estimate that a 10-day reduction in waiting time would be equivalent to GBP 37.5 in 2013 prices. Again, including population size (column 6) does not change the results. Overall, these results suggest that immigration was associated with a reduction in the average waiting time for outpatients.

4.2 *Waiting Times in Elective Care*

In Table 3, we examine the effects of immigration on waiting times for elective care. The OLS estimate reported in column 2, which includes LSOA time-varying characteristics, year and PCT fixed effects, suggests that immigration is negatively associated with waiting time for elective care. An increase of 10 percentage points in the immigration share is associated with a 5-day reduction in the average waiting time for elective care (a 7% reduction relative to the average waiting time for elective care observed in the sample). However, the 2SLS estimate presented in column 4 is positive and non-significant, and the point estimate suggests a relatively small effect (+2% relative to the mean). The fact that waiting times for elective care were subject to performance management that lowered waiting times across England may explain the lack of significant effects of immigration on waiting times for elective care.[10]

4.3 *Waiting Times in A&E*

Table 4 illustrates the effects of immigration on waiting times for A&E. Unfortunately, at the LSOA level, we have information only for the years 2007-2012. There is no evidence that immigrants have an effect on A&E waiting times. The OLS estimates are negative and non-significant. The 2SLS estimate (column 4) is positive but is estimated imprecisely. The point estimates are small (waiting times are reported in minutes). One possible explanation for the lack of effects on *A&E* is that it is more "transient" immigrants who have not registered with a GP and would be more likely to use *A&E* for non-urgent care. However, these results should be interpreted with caution because the analysis does not include the 2003-2006 period, in which immigration from A8 countries to the UK surged.

[10] See for instance Ham (2014).

4.4 Robustness Checks

4.4.1 Alterative Specifications

As a robustness check, we replicate the analysis using nearest NHS trust fixed effects instead of PCT fixed effects. The coefficient of our preferred estimate is smaller, but not statistically different, than the one reported in Table 2. The results suggest that an increase in the stock of immigrants equal to 10% of the initial local authority's population would reduce the average waiting time for outpatients by approximately 6 days, a reduction of 13% relative to the mean of the dependent variable (see Table A.2 in the appendix for details). We confirm non-significant effects for elective care and A&E.

In addition, we test the robustness of our results on outpatient waiting times to a change in the geographical unit using a higher level of aggregation. Consistent with previous analyses by Borjas (2006) and Sá (2015), we find no evidence that immigration has a negative effect on waiting times when waiting times are aggregated at the regional level (see Table A.3). While point estimates are not precise and the standard errors are very large because the sample is much smaller, the point estimate is much smaller than that presented in Table 2. A likely explanation of this result is that intra-region native mobility is causing diffusion of the effects of immigration within a region. Immigration may decrease waiting times at the local level, but the outflow of natives in response to immigration may increase waiting times in other local areas (we explore this mechanism in Section 5). Results for elective care and A&E are not significant and largely imprecise.

4.4.2 Alternative Measures of Waiting Times

In our baseline model we use average annual waiting times as the dependent variable. We also explore the results using the logarithm of waiting times and this does not change the main results (see Table A.3 in the appendix). As waiting time vary importantly during the year, with greatest pressure being felt during the winter months, waiting times for any individual provider are likely to be skewed. For this reason, as our data are drawn from individual episodes we also consider median waiting times as an alternative dependent variable. Using median waiting times, we confirm that immigration did not increase waiting times, and if anything, we confirm

the reduction in outpatient waiting times (see Table A.5).

We also considered as an alternative outcome the proportion of patients seen within the 18 weeks target (see Table A.6). The formal introduction of waiting time targets of 18 weeks for 90% of in-patients and 9% of outpatients was introduced in 2008, but the 18 week waiting time target was gradually adopted by individual hospital providers over the entire period analyzed in this study. Our coefficients are less precisely estimated when using this alternative outcome. However, we confirm that –if anything– an increase in the share of immigrants (a 10 percentage point increase) was associated with a 20% reduction in the share of patients waiting more than 18 weeks for outpatient treatments. We confirm a positive but non-significant effect on waiting times for elective care.

4.4.3 Alternative Measures of Immigration: Data, Lagged Values, and Placebo Test

Using the LFS to compute the stock of immigrants living in a local authority is subject to measurement error because in some local authorities, the share of immigrants in the LFS sample is low. Measurement error can result in substantial attenuation bias. Although using an instrumental variable based on census data and national-level inflows substantially mitigates this concern, as underlined by Sá (2015), we further check the robustness of our results using data from NINO registrations to overseas nationals from the Department for Work and Pensions.

Overseas nationals seeking to work, claim benefits or claim tax credits in the UK need a NINO. Thus, NINOs registrations of foreign nationals constitute an alternative source of information on immigrant inflows across local authorities. The main advantage of using NINOs data is that they are based on administrative records and provide a good measure of employment-driven migration (Lucchino et al., 2012). However, NINOs provide information only for the point and time of registration. Immigrants may change residence over time or leave the UK and return without having to re-register for a new NINO. We compute the stock of immigrants living in different local authorities using the 2001 Census data as a base for the initial stock of immigrants by the local authority and the NINOs data (available since 2002) to compute the evolution of the stock of immigrants by local authorities in the period under study (2003-2012). We replicate the main results presented in Tables 2-4 and find very similar results, thus confirming the negative

effect on waiting times for outpatients and the non-significant effects on waiting times for elective care and $A\&E$ (see Table A.7 for details).

We also tested the sensitivity of our results to using lagged values of immigration. Overall, the results confirm our baseline estimates. In the Appendix, we report estimates obtained using the share of immigrants in a local authority at $t-3$ as our main covariate of interest (see Table A.8).

In addition, to test for the concern of potential reverse causality (e.g., areas characterized by high waiting times at time t receiving higher immigrant inflows at a later date), we examined the effect of the change in immigration between 2004 and 2012 on waiting times as of 2003 and found no evidence of any significant effect.

4.4.4 Other Outcomes: Mortality Rates, Readmission Rates, and Number of GP Referrals

The focus of this study is on waiting times. However, we also investigated the effects of immigration on other measures of performance of the NHS (see Table A.9). In particular, we examined the effect of immigration on re-admissions and mortality rates. We find no evidence that immigration had any significant impact on local authority re-admission rates and LSOA mortality rates.[11]

A relevant concern could be that immigration affected the referral behavior of GPs. While we cannot directly investigate how GPs change their behavior in response to immigration, we find no evidence that the number of GP referrals changed significantly in areas with higher share of immigrants.

5 Potential Mechanisms

In what follows, we focus on the analysis of the mechanisms underlying the result found on outpatient waiting times.

The model presented above suggests that immigration may reduce waiting times by two main channels. Immigration may increase native internal mobility (see Sá (2015)). If immigration leads

[11] Readmission rates measure the percentage of emergency admissions of people who returned to hospital as an emergency within 30 days of the last time they left hospital after a stay. Admissions for cancer and obstetrics are excluded as they may be part of the patient's care plan.

natives to move to different local authorities, the population size in the local authority may not change, and the health care demand may not increase. Moreover, natives may also seek care in the private sector, thus decreasing the pressure on local authorities where immigration is surging. At the same time, recent immigrant cohorts are relatively young and healthy upon arrival because of the "healthy immigrant effect" (Kennedy et al., 2014), suggesting that these immigrants may demand less care than what the NHS predicted (Wadsworth, 2013; Steventon and Bardsley, 2011). If immigrants are healthier and/or less likely to seek care, then waiting times may decrease even if the supply did not adjust.

To understand the possible mechanisms behind the negative effect of immigration on waiting times, we examine how immigration affected internal mobility and morbidity rates with respect to local authorities in England.

5.1 *Native mobility*

Hatton and Tani (2005) and Sá (2015) analyze the effects of immigration on native mobility in the UK. Hatton and Tani (2005) find that for every 10 immigrants arriving in a region, 3.5 natives leave and move to other regions. Using the UK LFS and focusing on the working-age population, Sá (2015) finds even larger effects, suggesting a 1-to-1 immigrant-native displacement. In Table 5, we replicate the same analysis of Sá (2015) focusing on the population 15 years of age and older.[12] As we are interested in the effects of immigration on the NHS, it is important for us to consider the effects on the elderly, who represent an important share of the demand for health care services.

Exploiting LFS information on residence in the previous year, we analyze the response of the native population to immigration in our examination of in-migration and out-migration rates. Following Sá (2015), we classify natives as having moved out of local authority l if they lived in local authority i in the previous year $(t-1)$ and currently, in year t, live in a different local authority. We then define the out-migration rate as the number of natives who moved out of local authority l divided by the native population of local authority l in year t. Similarly, we classify natives as having moved into local authority l if they live there in year t and were living in a different local authority in the previous year. We compute the in-migration rate as the ratio of

[12]Information on the local authority of residence in the year before the interview is available in the LFS since 2004.

the the number of natives who moved into local authority l to the native population of l in year $t-1$. The out-migration rate is simply the difference between the out-migration and in-migration rates.

To examine the effect of immigration on native out-migration, in-migration and net out-migration rates, we estimate the following equation:

$$mobility_{lt} = \beta \Delta FB_{lt} / Pop_{lt-1} + \phi_t + \rho_l + \epsilon_{lt} \tag{8}$$

The dependent variables ($mobility_{lt}$) are the native out-migration, in-migration or net out-migration rate. The coefficient β captures the change in mobility rates generated by an increase in foreign-born (FB) population equal to 1% of the local authority population (Pop_{lt-1}). ϕ_t and ρ_l are respectively year and local authority fixed effects. As the mobility of natives is affected by many factors that may also be correlated with the immigrant inflow in a local area, we follow Sá (2015) adopt the same instrumental variable approach used in previous section.

Overall, our results are in the same direction as those obtained by Sá (2015) and, if anything, suggest an even larger displacement of natives. An increase in the stock of immigrants equal to 1% of the local initial population increases the native out-migration rate by 16 percentage points and the native in-mobility rate by 6.2 percentage points. As a result, native net out-migration rate increases by 9.7 percentage points.[13] These results confirm that immigration leads natives to move to different areas. This also explains why we find no differences in the effect of immigration on waiting times when we include population size as a control variable.

Native out-migration in response to immigration may increase demand for health care services in the local areas to which natives move. As shown in Table 6 (column 1), an increase of 1 percentage point in the native population relative to the resident population in the previous year increases the average waiting time for outpatients by approximately 6 days (13% more relative to the mean of the dependent variable). The coefficient diminishes when we include LSOA time-varying characteristics (column 2) and does not change substantially when we control for population size. The effect of native out-migration on waiting times for elective care and A&E is

[13]Consistent with these results, our findings indicate that an increase in the share of immigrants living in a local authority has no significant effects on the local authority population size.

insignificant (not reported).[14]

5.2 *Immigration and Health*

As returns on migration are higher for healthier individuals, immigrants are likely to self-select migration based on health, along with other dimensions (e.g., education, Palloni and Morenoff (2001); Jasso et al. (2004); Giuntella (2013)). Kennedy et al. (2014) show that this is particularly true for less educated immigrants, who have much better health outcomes than the average native person with low education.

The LFS contains questions on whether individuals had a health problem lasting more than 12 months and whether they have any disability (self-reported)[15], and whether they had days off work because they were sick or injured in the reference week. Unsurprisingly, we find a positive and significant correlation between the incidence of individuals reporting health problems and disability and waiting times across Englands local authorities. For instance, an increase of 10 percentage points in the share of individuals reporting health problems is associated with a 9.3% increase in average waiting times for outpatients (results are available upon request). By changing the demographic composition of the population living in a local area, immigration may affect the share of individuals reporting health problems and disability and thus affect waiting times. To investigate this potential mechanism, in Table 7, we analyze immigrant-native differences in health using individual data from the LFS (2003-2012).

Panel A shows that foreign-born individuals are significantly less likely to report any health problem. In particular, the raw difference reported in column 1 shows that immigrants in England are 8 percentage points less likely to report a health problem lasting more than a year than natives. This is equivalent to a 25% difference with respect to the mean of the dependent variable in the sample (32%). The difference becomes smaller when we account for age, education, gender and year fixed effects, indicating a difference of 4.6 percentage points equivalent to 15% of the mean (column 2). The coefficient remains stable when we include local authority fixed effects (column 3). In Panel B, we illustrate the difference in the likelihood of reporting any disability. On average, immigrants are 4.4 percentage points less likely to report any disability (column 1).

[14]For this analysis, we use the same instrumental strategy adopted in the previous sections.

[15]We include both individuals who have a long-term disability that substantially limits their day-to-day activities and those who have a long-term disability that affects the kind or amount of work that they can do.

The coefficient reduces to 2.8 percentage points when we account for sociodemographic characteristics, year fixed effects (column 2), and local authority fixed effects (column 3), revealing a 12% difference with respect to the incidence of disability in the sample (22%). Immigrants are also less likely to take time off because of health problems. The conditional difference reported in column 3 of Panel C shows that foreign-born individuals are 17% less likely to be absent from work because of health problems than their UK-born counterparts. If we restrict the native sample to individuals who resided in a different local authority in the previous year we find that immigrants tend to be healthier than native internal migrants (see Table A.10 in the appendix). The fact that immigrants are healthier than native internal migrants in a context where immigration has significant effects on internal mobility can explain the lack of a significant increase in the demand for health care services and thus of waiting times. Consistent with previous literature on the healthy immigrant effect, the advantage is larger among recent cohorts of immigrants (columns 3-6).

These results are also confirmed when we use data from the Understanding Society survey (2009-2014). The Understanding Society data suggest that immigrants are less likely to report having a poor health status, any health limitation, or a disability (see Table A.11 in the appendix for details). This is particularly true for immigrants who arrived in England after 2000. The health immigrant advantage still remains when we control for sociodemographic characteristics such as gender, age, education, marital status, occupational category, region of residence, rural status, and year fixed effects. Given these findings, it is unsurprising that immigrants are less likely to use health care services than natives.

Using the same Understanding Society sample, we also illustrate differences between immigrants and natives in their health care use (see Table A.12). Consistent with previous findings by Wadsworth (2013) and Steventon and Bardsley (2011), we find that recent immigrants are significantly less likely than natives to have consulted a GP and to have received treatment as outpatients or inpatients. Again, the results hold when we control for sociodemographic characteristics.[16] We obtain similar results using the General Household Survey (see Table A.13).

[16] Dustmann and Frattini (2014) estimate that immigrants from the European Economic Area (EEA), particularly immigrants from countries that joined the EU in 2004, made a positive fiscal contribution. Our results suggest that their estimates may be downward biased because they estimate the proportion of health services expenditure attributable to each group based on the groups age structure, yet we show that immigrants are healthier than natives in their same age group even after controlling for socioeconomic status and education.

5.3 Immigration and the Supply of Health Care

Thus far, we have focused on the effects of immigration on the demand for care and waiting times. However, immigration may also induce a rightward shift in supply, as many doctors and nurses come to the UK from overseas, increasing the supply of health care personnel. In this section, we analyze how immigration affects the supply of health care services by focusing on the number of GPs, the number of GPs who graduated abroad, specialists, GP practices, the ratio of occupied hospital beds to the population, and average NHS expenditure.

The results presented in Table 8 reveal no evidence of a significant association between immigration and the health care supply across England. As the NHS supply may not adjust immediately to immigration, we also replicate the same estimates using a model with long differences (between years t and t-3) and confirm the lack of any significant effect on the supply side at the local level.[17] Consistent with these results, using data on individual occupations from the LFS 2003-2012, we find no evidence of a significant relationship between immigration and the proportion of health care personnel (professionals and clerical staff) and nurses in the population. Furthermore, when including the number of GPs, health care professionals and nurses in our main regression on waiting times, we find that the coefficient is not substantially affected.[18]

While the NHS is strongly dependent on foreign-trained doctors and foreign health care professionals, the lack of a significant association between immigration and the supply of health care may have several explanations. First, the large majority of immigrants do not work in the NHS, and this could affect the correlation between the share of immigrants and the staff size across local authorities. Indeed, using LFS data (2003-2012), we estimate that only 7% of the working-age immigrant population works in professional health care occupations, including medical doctors, dentists, pharmacists, nurses and midwives. Second, the vast majority of foreign-born health care professionals are concentrated in a few areas (e.g., London, Oxford), as local authorities with the highest provision of doctors and nurses are those with major cities/urban centers along

[17] The results are available upon request.

[18] Immigrants represent a large and growing share of care workers in the UK who provide home care services for elderly natives (Shutes, 2011). While home care workers are unlikely to have any direct effect on waiting times, they may affect population access to NHS health care services by increasing early diagnosis and patient mobility. To verify whether our main result is partially explained by the increase in home care workers induced by immigration, we include the share of foreign-born home care workers as a control when analyzing the effect of immigration on waiting times. The coefficient is only marginally higher–and not statistically different–than that found in our baseline specification. The results are available upon request.

with medical schools and teaching hospitals (Yar et al., 2006; Shutes, 2011). Third, many new immigrants working in the NHS could be substituting for natives or other immigrants and may not necessarily increase the supply of NHS staff. It is also important to note that an increase in the number of GPs or practitioners may not necessarily reduce waiting times (Silvester et al., 2004; Devlin et al., 2002). Previous studies analyzing the association between waiting lists and supply measures such as the number of consultants, the number of beds and hospital expenditure have found no clear pattern (Cullis et al., 2000). Finally, there is evidence that while NHS increased the number of qualified doctors and nurses during the 2002-2012 period, the productivity of consultants specialists decreased over this period (Bohmer and Imison, 2013).

6 The Heterogeneous Impact of Immigration Across Local Authorities

The extent of immigrant health selectivity is likely to differ among local authorities in England. Figure 4 shows that both natives and immigrants in more deprived areas are more likely to report health problems lasting more than 12 months and disabilities. Unsurprisingly, Table A.14 shows that individuals living in areas with an Index of Multiple Deprivation (IMD) above the median are, on average, less healthy than those living in less deprived areas.[19] In particular, immigrants in deprived areas tend to be less favorably selected (see columns 5 and 6).

There is evidence that migrants moving to less deprived areas are healthier than migrants who move to more deprived locations, thus increasing health inequalities across areas (Norman et al., 2005). This suggests that the effects of immigration on waiting times may be very different in deprived areas, particularly as these are areas where the supply tends to be more inelastic, where the population faces higher mobility costs, and where waiting times tend to be longer (Laudicella et al., 2012).

In Table 9, we explore this further by estimating the impact of immigration on outpatient waiting times based on the level of deprivation of the area.[20] The results show that the negative effect on waiting times for outpatients is driven by less deprived areas. Columns 1-5 report the estimates of the main effect for LSOAs in the different quintiles of the IMD distribution. The table

[19] Note that we exclude the health domain from the computation of the IMD score. The IMD score was calculated in 2003, 2007, and 2010 by the ONS. Thus, some local areas change their ranking over time.

[20] We replicate Table 10 for waiting times in elective care and A&E but find no evidence of significant effects even when restricting the analysis to deprived areas outside of London.

shows that the negative effect is largest (in absolute value) in the LSOAs in the less deprived areas (Q1) and lowest in the more deprived areas (Q5), with the coefficient decreasing monotonically along the IMD distribution.[21]

We also investigate whether there are any specific short-term effects of immigration in deprived areas and whether the results are affected by the inclusion of London, the region that has the largest concentration of immigrants and the largest health care supply in England. We find that the results are affected by the exclusion of London and the focus on more deprived areas of England before 2008. In particular, columns 4-5 of Table 10 show that immigration had a heterogeneous impact across England and that, at least in the first years following the 2004 EU enlargement, immigration increased the average waiting time in deprived areas outside of London. Column 4 shows that in the first three years after the 2004 EU enlargement, an increase of 10 percentage points in the share of immigrants living in a local authority increased waiting times by approximately 14 days (a 25% increase relative to the mean of the dependent variable) when we restrict the analysis to local authorities with an IMD above the median. The effect becomes even larger (20 days, + 38% of the mean of the dependent variable) when limit the sample to the 4 highest deciles of the IMD. With the estimates of Propper (1995) on the cost of waiting time, an average increase of 20 days in waiting time would be equivalent to GBP 100 (in 2013 prices) per patient.

As shown in Figure 4 and Table A.14, deprived areas attract immigrants with worse health status. One of the factors contributing to the higher morbidity of immigrants moving into more deprived areas may be the greater presence of non-economic immigrants. Previous studies have shown that refugees and asylum seekers have worse health than economic migrants (Chiswick et al. (2008)). In the UK, most asylum seekers are assigned to local areas by the UK government based on space and logistical considerations. However, as noted by Bell et al. (2013), asylum seekers are disproportionately sent to deprived areas. Using data from the Home Office Immigration Statistics confirms this result in Figure 5.

In Table A.15, we show that a larger number of asylum seekers in a local authority is associated with higher waiting times. Columns 1 and 2 report OLS estimates including PCT and year

[21] Note that in Table 9, we include region fixed effects rather than PCT fixed effects, as the smaller sample size of each quintile does not allow us to have sufficient identification power when using PCT fixed effects.

fixed effects (column 2). Columns 3 and 4 repeat this analysis for asylum seekers in dispersal accommodation. The coefficient is positive but becomes non-significant when we include year fixed effects. The sign of this relationship between the share of asylum seekers and the average waiting time for outpatients is confirmed when using asylum seekers in dispersal accommodation to instrument for the total number of asylum seekers in an area (column 5), as in (Bell et al., 2013). Again, the coefficient is not precisely estimated when we include year fixed effects (column 6), and the estimated effect is relatively small: one standard deviation in the share of asylum seekers is associated with an approximately 1% increase in waiting times relative to the mean of the dependent variable. However, these results suggest that the larger presence of asylum seekers in deprived areas may contribute to the increase in waiting times shown in Table 10.

7 Conclusion

Immigrants' free access to the NHS and the perceived associated health care costs have generated much debate in the UK and have even resulted in the introduction of a fee for non-EU citizens to access NHS services. While previous papers have analyzed the effect of immigration to the UK on welfare use and documented differences in health care use between foreign-born individuals and natives, we know less about the effects of immigration on NHS waiting times, which is one of the most pressing issues for the NHS system.

This article contributes to the previous literature by estimating the effects of immigration on NHS waiting times in England. We find that immigration has reduced waiting times for outpatient referrals. An increase of 10 percentage points in the share of migrants living in a local authority would reduce waiting times by 9 days on average. We find no evidence that immigration affects waiting times in A&E and in elective care. This result is likely to be driven by two key factors. First, migrants tend to be young and healthy upon arrival (healthy immigrant effect) and are likely to have a smaller impact on the demand for NHS services. Second, the arrival of immigrants increases the likelihood of natives moving and accessing health services in a different local authority. Thus, the effects of immigration on the demand for health care services are dispersed throughout the country (via internal migration).

We also observe a positive impact of immigration on outpatient waiting times in the years

immediately following the 2004 EU enlargement in the more deprived areas outside of London. This effect is partly explained by the fact that less healthy immigrants tend to move into more deprived areas, thereby increasing the demand for NHS services in those areas. Another driving factor is the lower mobility of natives in deprived areas, particularly among those with health problems.

Our results suggest that if funding mechanisms do not fully reflect changes in population need and less healthy immigrants are more concentrated in areas where the native born population is also less healthy and less mobile, then any negative impact of immigration will be concentrated in these areas. While this clearly goes beyond the scope of this paper, it is worth noting that this may in turn lead to increase support for more restrictive migration policies in these areas. Finally, our study focuses on a relatively short period of time and thus can only capture short and medium-run effects. As the health of immigrants converges to that of natives over time, immigrants may demand more health care services. Future research may shed light on the long-run effects of immigration on the demand for health care services and the performance of the receiving health care system.

References

Altonji, J. G., Card, D., 1991. The effects of immigration on the labor market outcomes of less-skilled natives. In: Immigration, trade and the labor market. University of Chicago Press, pp. 201–234.

Appleby, J., 2012. Public satisfaction with the NHS and its services. Headlines from the British Social Attitudes Survey. London: The King's Fund.

Appleby, J., Thompson, J., Jabbal, J., 2014. How is the NHS performing? The King's Fund Quarterly Monitoring Report.

Aydemir, A. B., Borjas, G. J., 2011. Attenuation bias in measuring the wage impact of immigration. Journal of Labor Economics 29 (1), 69–112.

Beckert, W., Christensen, M., Collyer, K., 2012. Choice of nhs-funded hospital services in England*. The Economic Journal 122 (560), 400–417.

Bell, B., Fasani, F., Machin, S., 2013. Crime and immigration: Evidence from large immigrant waves. Review of Economics and Statistics 21 (3), 1278–1290.

Blinder, S., 2012. UK public opinion toward immigration: Overall attitudes and level of concern. Centre on Migration, Policy and Society Briefing Paper. Available at http://www. migrationobservatory. ox. ac. uk/sites/files/migobs/Public% 20Opinion-Overall% 20Attitudes% 20and% 20Level% 20of% 20Concern. pdf.

Bohmer, R. M., Imison, C., 2013. Lessons from England's health care workforce redesign: no quick fixes. Health Affairs 32 (11), 2025–2031.

Borjas, G. J., 2003. The labor demand curve is downward sloping: Reexamining the impact of immigration on the labor market. The Quarterly Journal of Economics 118 (4), 1335–1374.

Borjas, G. J., 2006. Native internal migration and the labor market impact of immigration. Journal of Human Resources 41 (2), 221–258.

Borjas, G. J., Freeman, R. B., Katz, L. F., 1996. Searching for the effect of immigration on the labor market. The American Economic Review 86 (2), 246–251.

Card, D., 2001. Immigrant inflows, native outflows, and the local labor market impacts of higher immigration. Journal of Labor Economics 19 (1), 22–64.

Castelli, A., Dawson, D., Gravelle, H., Jacobs, R., Kind, P., Loveridge, P., Martin, S., O'Mahony, M., Stevens, P. A., Stokes, L., et al., 2007. A new approach to measuring health system output and productivity. National Institute Economic Review 200 (1), 105–117.

Chiswick, B. R., Lee, Y. L., Miller, P. W., October 2008. Immigrant selection system and immigrant health. Contemporary Economic Policy 26 (4), 1074–3529.

Cooper, Z. N., McGuire, A., Jones, S., Le Grand, J., 2009. Equity, waiting times, and NHS reforms: retrospective study. BMJ 339.

Cullis, J. G., Jones, P. R., Propper, C., 2000. Waiting lists and medical treatment: analysis and policies. Handbook of Health Economics 1, 1201–1249.

Devlin, N., Harrison, A., Derrett, S., 2002. Waiting in the nhs: Part 1a diagnosis. Journal of the Royal Society of Medicine 95 (5), 223–226.

Dixon, A., Robertson, R., 2011. Patient choice of hospital.

Dustmann, C., Frattini, T., 2014. The fiscal effects of immigration to the UK. The Economic Journal 124 (580), F593–F643.

Dustmann, C., Frattini, T., Halls, C., 2010. Assessing the fiscal costs and benefits of A8 migration to the UK. Fiscal Studies 31 (1), 1–41.

Dustmann, C., Frattini, T., Preston, I. P., 2013. The effect of immigration along the distribution of wages. The Review of Economic Studies 80 (1), 145–173.

Foged, M., Peri, G., 2016. Immigrants' effect on native workers: New analysis on longitudinal data. American Economic Journal: Applied Economics 8 (2), 1–34.

Gaynor, M., Laudicella, M., Propper, C., 2012a. Can governments do it better? Merger mania and hospital outcomes in the English NHS. Journal of Health Economics 31 (3), 528–543.

Gaynor, M., Propper, C., Seiler, S., 2012b. Free to choose? reform and demand response in the English National Health Service. NBER Working Paper (18574).

Giuntella, O., 2013. Why does the health of immigrants deteriorate? Evidence from birth records. IZA Discussion Paper 7588.

Giuntella, O., Mazzonna, F., 2015. Do immigrants improve the health of natives? Journal of Health Economics 43, 140–153.

Gutacker, N., Siciliani, L., Moscelli, G., Gravelle, H., 2015. Do patients choose hospitals that improve their health? CHE Research Paper 111.

Ham, C., 2014. Reforming the nhs from within. Beyond hierarchy, inspection and markets, Kings Fund, London.

Hatton, T. J., Tani, M., 2005. Immigration and inter-regional mobility in the UK, 1982–2000*. The Economic Journal 115 (507), F342–F358.

Jasso, G., Massey, D. S., Rosenzweig, M. R., Smith, J. P., 2004. Immigrant health: Selectivity and acculturation. The Institute for Fiscal Studies Working Paper 4 (23), 1–46.

Kennedy, S., Kidd, M. P., McDonald, J. T., Biddle, N., 2014. The healthy immigrant effect: Patterns and evidence from four countries. Journal of International Migration and Integration 16 (2), 317–332.

Laudicella, M., Siciliani, L., Cookson, R., 2012. Waiting times and socioeconomic status: evidence from England. Social Science & Medicine 74 (9), 1331–1341.

Lindsay, C. M., Feigenbaum, B., 1984. Rationing by waiting lists. The American Economic Review 75 (3), 404–417.

Lucchino, P., Rosazza-Bondibene, C., Portes, J., 2012. Examining the relationship between immigration and unemployment using National Insurance Number Registration Data. NIESR Discussion Paper No. 386.

Martin, S., Rice, N., Jacobs, R., Smith, P., 2007. The market for elective surgery: Joint estimation of supply and demand. Journal of Health Economics 26 (2), 263–285.

Norman, P., Boyle, P., Rees, P., 2005. Selective migration, health and deprivation: a longitudinal analysis. Social Science & Medicine 60 (12), 2755–2771.

Orrenius, P. M., Zavodny, M., 2015. Does immigration affect whether us natives major in science and engineering? Journal of Labor Economics 33 (S1), S79–S108.

Palloni, A., Morenoff, J. D., 2001. Interpreting the paradoxical in the Hispanic paradox. Annals of the New York Academy of Sciences 954 (1), 140–174.

Propper, C., 1995. The disutility of time spent on the United Kingdom's National Health Service waiting lists. Journal of Human Resources, 677–700.

Propper, C., Burgess, S., Gossage, D., 2008a. Competition and quality: Evidence from the NHS internal market 1991–9. The Economic Journal 118 (525), 138–170.

Propper, C., Damiani, M., Leckie, G., Dixon, J., 2007. Impact of patients' socioeconomic status on the distance travelled for hospital admission in the English National Health Service. Journal of Health Services Research & Policy 12 (3), 153–159.

Propper, C., Sutton, M., Whitnall, C., Windmeijer, F., 2008b. Did'targets and terror'reduce waiting times in England for hospital care? The BE Journal of Economic Analysis & Policy 8 (2).

Rienzo, C., Vargas-Silva, C., 2012. Migrants in the UK: An overview. Migration Observatory Briefing, COMPAS, University of Oxford, Oxford.

Ruhm, C. J., 2000. Are recessions good for your health? The Quarterly Journal of Economics 115 (2), 617–650.

Sá, F., 2015. Immigration and house prices in the UK. The Economic Journal 125 (587), 1393–1424.

Shutes, I., 2011. Social care for older people and demand for migrant workers. The Migration Observatory, Centre on Migration, Policy and Society, University of Oxford.

Siciliani, L., Iversen, T., 2012. Waiting times and waiting lists. The Elgar Companion to Health Economics, 259.

Silvester, K., Lendon, R., Bevan, H., Steyn, R., Walley, P., 2004. Reducing waiting times in the nhs: is lack of capacity the problem? Clinician in Management 12 (3), 105–111.

Sitzia, J., Wood, N., 1997. Patient satisfaction: a review of issues and concepts. Social Science & Medicine 45 (12), 1829–1843.

Smith, C. L., 2012. The impact of low-skilled immigration on the youth labor market. Journal of Labor Economics 30 (1), 55–89.

Steventon, A., Bardsley, M., 2011. Use of secondary care in England by international immigrants. Journal of Health Services Research & Policy 16 (2), 90–94.

Wadsworth, J., 2013. Mustn't grumble: Immigration, health and health service use in the UK and Germany. Fiscal Studies 34 (1), 55–82.

Windmeijer, F., Gravelle, H., Hoonhout, P., 2005. Waiting lists, waiting times and admissions: an empirical analysis at hospital and general practice level. Health Economics 14 (9), 971–985.

Wooldridge, M., 2002. Econometric Analysis of Cross Section and Panel Data. The MIT Press, Cambridge, MA.

Yar, M., Dix, D., Bajekal, M., 2006. Socio-demographic characteristics of the healthcare workforce in England and Wales–results from the 2001 census. Health Statistics Quarterly 32, 44–55.

Table 1: Summary Statistics, 2003-2012

	Mean	Std
Waiting times (LSOA-level, Source: NHS, HES)		
Waiting time for Outpatients (Days)	47.06	(16.61)
Waiting time for Elective (Days)	69.82	(39.51)
Waiting time for A&E (minutes)	51.98	(64.56)
LSOA characteristics		
Log total population	7.35	(0.15)
Share of Women over 60	0.12	(0.05)
Share of Men over 65	0.07	(0.03)
Share of Women	0.51	(0.03)
Rural Index (1-8)	5.30	(0.86)
IMD score	21.54	(15.61)
Supply Characteristics (PCT-level, Source: NHS, ONS)		
GPs per 1k pop	0.94	(0.17)
Specialists per 1k pop	0.16	(0.03)
Ratio of occupied hospital beds to population	0.82	(0.19)
NHS expenditure per capita , (000s)	1.11	(0.59)
Incidence of Disease ((PCT-level, per 1000, , Source: HES, ONS)		
Stroke	16.61	(3.88)
Coronary disease	37.28	(8.57)
Hypertension	138.25	(18.60)
Diabetes	39.14	(7.11)
Pulmonary Disease	15.19	(4.80)
Epilepsy	6.32	(1.04)
Hypothyroidism	26.60	(6.20)
Cancer	9.43	(4.17)
Mental Health	7.00	(2.13)
Ventricular Disfunction	5.30	(0.86)
Immigration(LA-level, Source: LFS)		
Share of Immigrants (LFS)	11.75	(10.99)
Observation	287,092	287,092

Notes - Data are drawn from the Hospital Episodes Statistics, the UK Labor Force Survey, and the UK ONS.

Table 2: Immigration and Waiting Times (days) in the NHS (Outpatients), 2003-2012

	(1) OLS	(2) OLS	(3) OLS	(4) 2SLS	(5) 2SLS	(6) 2SLS
Share of Immigrants	-0.324*	-0.163	-0.164	-1.575**	-0.933**	-0.935**
	(0.178)	(0.158)	(0.158)	(0.701)	(0.461)	(0.461)
Year f.e.	YES	YES	YES	YES	YES	YES
PCT f.e.	YES	YES	YES	YES	YES	YES
LSOA time-varying characteristics	NO	YES	YES	NO	YES	YES
LSOA population	NO	NO	YES	NO	NO	YES
Observations	287,092	287,092	287,092	287,092	287,092	287,092
Mean of Dep. Var.	47.12	47.12	47.12	47.12	47.12	47.12
Std. Dev. of Dep. Var.	16.65	16.65	16.65	16.65	16.65	16.65
First-Stage F				17.11	16.07	16.05

Notes - The dependent variable is the average waiting time for outpatient services (in days). Data on average waiting times for outpatient services are drawn from the Hospital Episodes Statistics. Data on immigrant distribution across Local Authorities are drawn from the UK Labor Force Survey. Time-varying LSOA characteristics include an Index of Deprivation (we use dummies for each decile of the index) and an indicator for rural status, the share of women, and the share of over 65 in the LSOA population. PCT time-varying characteristics include ratio of occupied hospital beds to population, number of GPs per capita, number of GP practice per capita, number of health consultants per capita, health expenditure per capita, incidence of most common diseases. Columns 3 and 6 include LSOA size. Standard errors are clustered at the Local Authority level.

Table 3: Immigration and Waiting Times (days) in the NHS (Elective Care - Inpatients), 2003-2012

	(1) OLS	(2) OLS	(3) OLS	(4) 2SLS	(5) 2SLS	(6) 2SLS
Share of Immigrants	-0.103	-0.477*	-0.475*	0.204	0.203	0.208
	(0.317)	(0.261)	(0.262)	(0.597)	(0.596)	(0.597)
Year f.e.	YES	YES	YES	YES	YES	YES
PCT f.e.	YES	YES	YES	YES	YES	YES
LSOA time-varying characteristics	NO	YES	YES	NO	YES	YES
LSOA population	NO	NO	YES	NO	NO	YES
Observations	287,092	287,092	287,092	287,092	287,092	287,092
Mean of Dep. Var.	69.88	69.88	69.88	69.88	69.88	69.88
Std. Dev. of Dep. Var.	39.36	39.36	39.36	39.36	39.36	39.36

Notes - The dependent variable is the average waiting time for inpatients (in days). Data on average waiting times for elective care are drawn from the Hospital Episodes Statistics. Data on immigrant distribution across Local Authorities are drawn from the UK Labor Force Survey. Time-varying LSOA characteristics include an Index of Deprivation (we use dummies for each decile of the index) and an indicator for rural status, the share of women, and the share of over 65 in the LSOA population. PCT time-varying characteristics include ratio of occupied hospital beds to population, number of GPs per capita, number of GP practice per capita, number of health consultants per capita, health expenditure per capita, incidence of most common diseases Columns 3 and 6 include LSOA size. Standard errors are clustered at the Local Authority level.

Table 4: Immigration and Waiting Times (minutes) in the NHS (A&E), 2007-2012

	(1) OLS	(2) OLS	(3) OLS	(4) 2SLS	(5) 2SLS	(6) 2SLS
Share of Immigrants	-0.780	-0.522	-0.522	1.772	1.203	1.203
	(1.151)	(0.978)	(0.978)	(1.295)	(1.147)	(1.147)
Year f.e.	YES	YES	YES	YES	YES	YES
PCT f.e.	YES	YES	YES	YES	YES	YES
LSOA time-varying characteristics	NO	YES	YES	NO	YES	YES
LSOA population	NO	NO	YES	NO	NO	YES
Observations	145,028	145,028	145,028	145,028	145,028	145,028
Mean of Dep. Var.	55.30	55.30	55.30	55.30	55.30	55.30
Std.Dev. of Dep. Var.	65.53	65.53	65.53	65.53	65.53	65.53

Notes - The dependent variable is the average waiting time in A&E (in minutes). Data on average waiting times for A&E are drawn from the Hospital Episodes Statistics. Data on immigrant distribution across Local Authorities are drawn from the UK Labor Force Survey. Time-varying LSOA characteristics include an Index of Deprivation (we use dummies for each decile of the index) and an indicator for rural status, the share of women, and the share of over 65 in the LSOA population. PCT time-varying characteristics include ratio of occupied hospital beds to population, number of GPs per capita, number of GP practice per capita, number of health consultants per capita, health expenditure per capita, incidence of most common diseases Columns 3 and 6 include LSOA size. Standard errors are clustered at the Local Authority level.

Table 5: Immigrant Inflows and Native Internal Mobility (LFS, 2004-2012)

	(1) OLS	(2) 2SLS	(3) OLS	(4) 2SLS	(5) OLS	(6) 2SLS
Dependent Variable:	Out-migration rate	Out-migration rate	In-migration rate	In-migration rate	Net out-migration rate	Net out-migration rate
$\Delta FBit/Pop_{it-1}$	0.119***	0.159***	0.053***	0.062***	0.066***	0.097***
	(0.014)	(0.027)	(0.016)	(0.019)	(0.022)	(0.033)
Observations	1,269	1,269	1,269	1,269	1,269	1,269
Mean of Dep. Var.	0.033	0.033	0.030	0.030	0.003	0.003
Std. Dev. of Dep. Var.	0.056	0.056	0.042	0.042	0.048	0.048
First-Stage F		25.36		25.36		25.36

Notes - Data are drawn from the UK Labor Force Survey. Information on past year residence is available only since 2004. All the regressions include year and local authority fixed effects and the standard errors are clustered at the Local Authority level.

Table 6: Native Internal Mobility and Waiting Times for Outpatients (days), 2004-2012

	(1) 2SLS	(2) 2SLS	(3) 2SLS
Dependent Variable:	Waiting Time	Waiting Time	Waiting Time
Net native migration	5.689***	3.219***	3.227***
	(1.716)	(1.138)	(1.138)
Year f.e.	YES	YES	YES
PCT f.e.	YES	YES	YES
LSOA time-varying characteristics	NO	YES	YES
LSOA population	NO	NO	YES
Observations	258,458	258,458	258,458
Mean of Dep. Var.	45.71	45.71	45.71
Std. Dev. of Dep. Var.	15.64	15.64	15.64
First-Stage F	12.52	11.91	11.91

Notes - The dependent variable is the average waiting time for outpatient services (in days. Data on average waiting times for outpatient services are drawn from the Hospital Episodes Statistics. Data on immigrant distribution across Local Authorities are drawn from the UK Labor Force Survey. Information on past year residence is available only since 2004. Time-varying LSOA characteristics include an Index of Deprivation (we use dummies for each decile of the index) and an indicator for rural status, the share of women, and the share of over 65 in the LSOA population. PCT time-varying characteristics include ratio of occupied hospital beds to population, number of GPs per capita, number of GP practice per capita, number of health consultants per capita, health expenditure per capita, incidence of most common diseases. Columns 3 includes LSOA size. Standard errors are clustered at the Local Authority level.

Table 7: Immigrant-Native Differences in Health, (LFS, 2004-2012)

	(1)	(2)	(3)
Panel A: Any health issue			
Foreign born	-0.075***	-0.046***	-0.049***
	(0.001)	(0.001)	(0.001)
Observations	1,596,154	1,551,640	1,551,640
Mean of Dep.Var.	0.317	0.319	0.319
Std. Dev. of Dep. Var.	(0.465)	(0.466)	(0.466)
Panel B: Any disability			
Foreign born	-0.039***	-0.024***	-0.029***
	(0.001)	(0.001)	(0.001)
Observations	1,583,195	1,538,633	1,538,633
Mean of Dep.Var.	0.220	0.222	0.223
Std. Dev. of Dep. Var.	(0.414)	(0.416)	(0.416)
Panel C: Absent at work due to illness or injury			
Foreign born	-0.003***	-0.002***	-0.004***
	(0.001)	(0.001)	(0.000)
Observations	983,229	938,668	938,668
Mean of Dep.Var.	0.023	0.023	0.023
Std. Dev. of Dep. Var.	(0.152)	(0.151)	(0.151)
Socio-demographic characteristics	NO	YES	YES
Year f.e.	NO	YES	YES
Local authority f.e.	NO	NO	YES

Notes - Sociodemographic characteristics include gender, dummies for age, education, occupation (1-digit). Robust standard errors are reported in parentheses.

Table 8: Immigration and NHS Supply, 2003-2012

Dependent Variable:	(1) 2SLS Overall expenditure	(2) 2SLS Expenditure per capita	(3) 2SLS Ratio of occupied beds	(4) 2SLS # Practice	(5) 2SLS # Practice per capita	(6) 2SLS # GP	(7) 2SLS #GP per capita	(8) 2SLS #consultant	(9) 2SLS # consultant per capita	(10) 2SLS # GP graduated abroad
Share of Immigrants	-0.004	-0.006	0.000	0.368	-0.000	1.818	-0.003	0.711	0.007	-0.054
	(0.011)	(0.007)	(0.003)	(0.321)	(0.000)	(2.426)	(0.003)	(3.816)	(0.012)	(0.257)
Observations	1,290	1,290	1,290	1,290	1,290	1,290	1,290	1,290	1,290	1,290
Mean of Dep. Var.	12.68	1.226	0.814	57.52	0.170	340.1	0.953	253.4	0.827	48.20
Std. Dev. of Dep. Var.	0.646	0.546	0.218	25.71	0.0408	206.0	0.217	206.1	0.706	25.98
First-Stage F	11.83	11.83	11.83	11.83	11.83	11.83	11.83	11.83	11.83	17.82

Notes - Data on per capita expenditure, share of occupied beds, practices, consultants and GPs are drawn from the Hospital Episodes Statistics and are at the PCT level. Data on immigrant distribution across Local Authorities are drawn from the UK Labor Force Survey. All estimate include PCT and year fixed effects. Standard errors are clustered at the Local Authority level.

Table 9: Immigration and Waititing Times (in days) for Outpatients by Index of Multiple Deprivation (IMD) quintiles, 2003-2012

	(1) 2SLS Q1	(2) 2SLS Q2	(3) 2SLS Q3	(4) 2SLS Q4	(5) 2SLS Q5
Share of Immigrants	-0.893	-0.730***	-0.669***	-0.549***	-0.277
	(0.543)	(0.234)	(0.213)	(0.201)	(0.193)
Region f.e	YES	YES	YES	YES	YES
Year f.e.	YES	YES	YES	YES	YES
Observations	57,491	57,513	57,632	57,352	57,104
R-squared	0.319	0.344	0.374	0.428	0.475
Mean of Dep. Var.	45.69	46.24	47.29	48.19	48.22
Std. Dev. of Dep. Var.	15.17	16.40	16.75	17.33	17.34
First-Stage F	9.44	14.29	13.39	33.07	72.14

Notes - Data on average waiting times for outpatient services are drawn from the Hospital Episodes Statistics. Data on immigrant distribution across Local Authorities are drawn from the UK Labor Force Survey. Time-varying LSOA characteristics include an Index of Deprivation (we use dummies for each decile of the index) and an indicator for rural status, the share of women, and the share of over 65 in the LSOA population. PCT time-varying characteristics include hospital beds' availability, number of GPs per capita, number of GP practice per capita, number of health consultants per capita, health expenditure per capita, incidence of most common diseases. Columns 3 and 6 include LSOA size. Standard errors are clustered at the Local Authority level.

Table 10: Immigration and Waiting Times (days) for Outpatients, by Index of Multiple Deprivation (IMD)

	(1) 2SLS Overall 2003-2012	(2) 2SLS Overall 2003-2007	(3) 2SLS Outside London 2003-2007	(4) 2SLS Outside London 2003-2007 More Deprived Areas (6-10)	(5) 2SLS Outside London 2003-2007 More Deprived Areas(7-10)
Share of Immigrants	-0.935**	-0.818***	0.479	1.499*	2.085*
	(0.461)	(0.317)	(0.350)	(0.788)	(1.143)
Year f.e.	YES	YES	YES	YES	YES
PCT f.e.	YES	YES	YES	YES	YES
LSOA time-varying	YES	YES	YES	YES	YES
characteristics	YES	YES	YES	YES	YES
LSOA	YES	YES	YES	YES	YES
population					
Observations	287,092	144,476	122,067	57,146	44,964
Mean of Dep. Var.	47.12	54.26	51.49	52.03	52.01
Std. Dev. of Dep. Var.	16.65	17.27	15.40	16.04	16.27
First-Stage F	16.05	28.72	54.54	20.60	14.09

Notes - The dependent variable is the average waiting time for outpatient services (in days). Data on average waiting times for outpatient services are drawn from the Hospital Episodes Statistics. Data on immigrant distribution across Local Authorities are drawn from the UK Labor Force Survey. LSOA characteristics include: an Index of Deprivation, ratio of occupied hospital beds to population, density of GP practices, number of specialists and GPs, Rural Index, share of women, share of over 65, LSOA incidence of most common diseases and LSOA size. Standard errors are clustered at the Local Authority level.

Appendix A

Table A.1: Top ten foreign countries of birth in 1991 Census (England and Wales)

Top ten foreign countries of birth in 1991 Census	Number in 1991	Number in 2011	Share of all migrants in 1991 Census	Share of all migrants in 2011 Census
Ireland	569,000	407,000	16%	5%
India	400,000	694,000	11%	9%
Pakistan	225,000	482,000	6%	6%
Germany	202,000	274,000	6%	4%
Jamaica	142,000	160,000	4%	2%
USA	131,000	177,000	4%	2%
Kenya	111,000	138,000	3%	2%
Bangladesh	104,000	212,000	3%	3%
Italy	87,000	134,000	2%	2%
Cyprus	77,000	N/A	2%	N/A

Table A.2: Immigration and Waiting Times (days) in the NHS (Outpatients), Nearest NHS Trust fixed-effects, 2003-2012

	(1) OLS	(2) OLS	(3) OLS	(4) 2SLS	(5) 2SLS	(6) 2SLS
Share of Immigrants	-0.081	-0.113	-0.114	-0.295***	-0.595***	-0.596***
	(0.056)	(0.088)	(0.088)	(0.088)	(0.183)	(0.184)
Year f.e.	YES	YES	YES	YES	YES	YES
Nearest NHS Trust f.e.	YES	YES	YES	YES	YES	YES
LSOA time-varying characteristics	NO	YES	YES	NO	YES	YES
LSOA population	NO	NO	YES	NO	NO	YES
Observations	287,092	287,092	287,092	287,092	287,092	287,092
Mean of Dep. Var.	47.12	47.12	47.12	47.07	47.12	47.12
Std. Dev. of Dep. Var.	16.65	16.65	16.65	16.61	16.65	16.65

Notes - The dependent variable is the average waiting time for outpatient services (in days). Data on average waiting times for outpatient services are drawn from the Hospital Episodes Statistics. Data on immigrant distribution across Local Authorities are drawn from the UK Labor Force Survey. Time-varying LSOA characteristics include an Index of Deprivation (we use dummies for each decile of the index) and an indicator for rural status, the share of women, and the share of over 65 in the LSOA population. PCT time-varying characteristics include ratio of occupied hospital beds to population, number of GPs per capita, number of GP practice per capita, number of health consultants per capita, health expenditure per capita, incidence of most common diseases. Columns 3 and 6 include LSOA size. Standard errors are clustered at the Local Authority level.

Table A.3: Immigration and Outpatients Waiting Times, Regional Analysis, 2003-2012

	(1) 2SLS	(2) 2SLS
Share of Immigrants	-0.194	-0.316
	(0.188)	(0.251)
Year f.e.	YES	YES
Regional time-varying characteristics	YES	YES
Regional Population	NO	YES
Observations	160	160
Mean of Dep. Var.	45.42	45.42
Std. Dev. of Dep. Var.	10.69	10.69
First-Stage F	396.1	324.6

Notes - The dependent variable is the average waiting time for outpatient services (in days). Data on average waiting times for outpatient services are drawn from the Hospital Episodes Statistics. Data on immigrant distribution across Local Authorities are drawn from the UK Labor Force Survey. Standard errors are clustered at the regional level.

Table A.4: Immigration and Waiting Times (logs) in the NHS Outpatients, Elective and *A&E*

	(1) 2SLS Outpatients in days	(2) 2SLS Elective care in days	(3) 2SLS *A&E* in minutes
Share of Immigrants	-0.016**	0.001	0.005
	(0.008)	(0.006)	(0.021)
Observations	287,092	287,092	145,028
Year f.e	YES	YES	YES
PCT f.e	YES	YES	YES
LSOA time-varying characteristics	YES	YES	YES
Mean of Dep. Var.	3.823	4.177	3.635
Std. Dev. of Dep. Var.	0.315	0.385	0.878

Notes - The dependent variable is the logarithm of the average waiting time in Outpatients (in days), Elective (in days) and *A&E* (in minutes). Data on average waiting times are drawn from the Hospital Episodes Statistics. Data on immigrant distribution across Local Authorities are drawn from the UK Labor Force Survey. Time-varying LSOA characteristics include an Index of Deprivation (we use dummies for each decile of the index) and an indicator for rural status, the share of women, the share of over 65 in the LSOA population, and the LSOA population. PCT time-varying characteristics include ratio of occupied hospital beds to population, number of GPs per capita, number of GP practice per capita, number of health consultants per capita, health expenditure per capita, incidence of most common diseases. Standard errors are clustered at the Local Authority level.

Table A.5: Immigration and Median Waiting Times (t), 2003-2012

Dependent Variable:	(1) 2SLS Waiting Time Outpatients in days	(2) 2SLS Waiting Time Elective Care in days	(3) 2SLS Waiting Time A&E in minutes
Share of Immigrants $(t-3)$	-0.356*	0.723	0.375
	(0.196)	(0.482)	(0.289)
Observations	287,092	287,092	145,028
LSOA time-varying characteristics	YES	YES	YES
Year f.e.	YES	YES	YES
PCT f.e.	YES	YES	YES
Mean of Dep. Var.	29.36	37.22	18.60
Std. Dev. of Dep. Var.	8.92	17.56	52.47

Notes - Data on average waiting times are drawn from the Hospital Episodes Statistics. Data on immigrant distribution across Local Authorities are drawn from the Labor Force Survey. Time-varying LSOA characteristics include an Index of Deprivation (we use dummies for each decile of the index) and an indicator for rural status, the share of women, the share of over 65 in the LSOA population, and the LSOA population. PCT time-varying characteristics include ratio of occupied hospital beds to population, number of GPs per capita, number of GP practice per capita, number of health consultants per capita, health expenditure per capita, incidence of most common diseases. Standard errors are clustered at the Local Authority level.

Table A.6: Immigration and Proportion of Patients Waiting more than 18 weeks, 2003-2012

Dependent Variable:	(1) 2SLS Waiting Time Outpatients	(2) 2SLS Waiting Time Elective Care
Share of Immigrants	-0.001	0.0017
	(0.001)	(0.002)
Observations	287,092	287,092
Mean of Dep. Var.	0.036	0.141
Std. Dev. of Dep. Var.	(0.028)	(0.095)
LSOA time-varying characteristics	YES	YES
Year f.e.	YES	YES
PCT f.e.	YES	YES

Notes - Data on average waiting times are drawn from the Hospital Episodes Statistics. Data on immigrant distribution across Local Authorities are drawn from the Labor Force Survey. Time-varying LSOA characteristics include an Index of Deprivation (we use dummies for each decile of the index) and an indicator for rural status, the share of women, the share of over 65 in the LSOA population, and the LSOA population. PCT time-varying characteristics include ratio of occupied hospital beds to population, number of GPs per capita, number of GP practice per capita, number of health consultants per capita, health expenditure per capita, incidence of most common diseases. Standard errors are clustered at the Local Authority level.

Table A.7: Immigration and Waiting Times, NINOs Data, 2003-2012

Dependent Variable:	(1) 2SLS Waiting Time Outpatients	(2) 2SLS Waiting Time Elective Care	(3) 2SLS Waiting Time A&*E*
Share of Immigrants	-1.191** (0.560)	0.137 (0.738)	1.172 (1.198)
Observations	287,092	287,092	145,028
LSOA time-varying characteristics	YES	YES	YES
Year f.e.	YES	YES	YES
PCT f.e.	YES	YES	YES
Mean of Dep. Var.	47.12	69.88	55.30
Std. Dev. of Dep. Var.	16.65	39.36	65.53

Notes - Data on average waiting times are drawn from the Hospital Episodes Statistics. Data on immigrant distribution across Local Authorities are drawn from the Statistics on Natioanl Insurance Number (UK Department for Work and Pensions). Time-varying LSOA characteristics include an Index of Deprivation (we use dummies for each decile of the index) and an indicator for rural status, the share of women, the share of over 65 in the LSOA population, and the LSOA population. PCT time-varying characteristics include ratio of occupied hospital beds to population, number of GPs per capita, number of GP practice per capita, number of health consultants per capita, health expenditure per capita, incidence of most common diseases. Standard errors are clustered at the Local Authority level.

Table A.8: Immigration $(t-3)$ and Waiting Times (t), 2003-2012

Dependent Variable:	(1) 2SLS Waiting Time Outpatients in days	(2) 2SLS Waiting Time Elective Care in days	(3) 2SLS Waiting Time A&E in minutes
Share of Immigrants $(t-3)$	-0.973** (0.483)	0.886 (0.895)	1.639 (1.212)
Observations	287,092	287,092	145,028
LSOA time-varying characteristics	YES	YES	YES
Year f.e.	YES	YES	YES
PCT f.e.	YES	YES	YES
Mean of Dep. Var.	47.12	69.88	55.30
Std. Dev. of Dep. Var.	16.65	39.36	65.53

Notes - Data on average waiting times are drawn from the Hospital Episodes Statistics. Data on immigrant distribution across Local Authorities are drawn from the Labor Force Survey. Time-varying LSOA characteristics include an Index of Deprivation (we use dummies for each decile of the index) and an indicator for rural status, the share of women, the share of over 65 in the LSOA population, and the LSOA population. PCT time-varying characteristics include ratio of occupied hospital beds to population, number of GPs per capita, number of GP practice per capita, number of health consultants per capita, health expenditure per capita, incidence of most common diseases. Standard errors are clustered at the Local Authority level.

Table A.9: Immigration and NHS: Other Outcomes, 2003-2012

	(1) Mortality Rate per 1,000	(2) Readmission Rate	(3) # GPs Referrals Rate (per 1,000)
	LSOA	LA	LSOA
	2SLS	2SLS	2SLS
Share of Immigrants	-0.003	0.047	2.663
	(0.007)	(0.0345)	(2.6119)
Observations	254,749	263,438	287,092
Mean of Dep. Var.	4.69	10.936	313.84
Std. Dev. of Dep. Var.	3.03	1.209	181.56
LSOA time-varying characteristics	YES	YES	YES
Year f.e.	YES	YES	YES
PCT f.e.	YES	YES	YES

Notes - Data on mortality rates, readmissions, and GP referrals are drawn from Hospital Episode Statistics. Data on immigrant distribution across Local Authorities are drawn from the Labor Force Survey. Time-varying LSOA characteristics include an Index of Deprivation (we use dummies for each decile of the index) and an indicator for rural status, the share of women, the share of over 65 in the LSOA population, and the LSOA population. PCT time-varying characteristics include ratio of occupied hospital beds to population, number of GPs per capita, number of GP practice per capita, number of health consultants per capita, health expenditure per capita, incidence of most common diseases. Standard errors are clustered at the Local Authority level.

Table A.10: Immigrant-Native Internal Migrants Differences in Health, (LFS, 2004-2012)

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Any health issue						
Foreign born	-0.038***	-0.051***				
	(0.005)	(0.004)				
Foreign born			-0.106***	-0.072***		
arrived after 2000			(0.005)	(0.003)		
Foreign born					-0.131***	-0.084***
arrived after 2004					(0.005)	(0.003)
Observations	166,078	162,869	96,854	95,655	62,649	62,401
Mean of Dep. Var.	0.185	0.186	0.121	0.122	0.105	0.105
Std. Dev. of Dep. Var.	0.388	0.389	0.327	0.327	0.307	0.307
Panel B: Any disability						
Foreign born	-0.026***	-0.039***				
	(0.004)	(0.003)				
Foreign born			-0.080***	-0.057***		
arrived after 2000			(0.004)	(0.003)		
Foreign born					-0.101***	-0.069***
arrived after 2004					(0.004)	(0.003)
Observations	165,192	161,979	95,816	94,615	61,634	61,385
Mean of Dep. Var.	0.138	0.139	0.0850	0.0854	0.0711	0.0711
Std. Dev. of Dep. Var.	0.344	0.346	0.279	0.279	0.257	0.257
Panel C: Absent at work due to illness or injury						
Foreign born	-0.001	-0.004*				
	(0.002)	(0.002)				
Foreign born			-0.004	-0.006***		
arrived after 2000			(0.002)	(0.002)		
Foreign born					-0.006**	-0.006***
arrived after 2004					(0.002)	(0.002)
Observations	109,582	106,369	63,004	61,803	39,494	39,245
Mean of Dep. Var.	0.0216	0.0214	0.0200	0.0200	0.0186	0.0185
Std. Dev. of Dep. Var.	0.145	0.145	0.140	0.140	0.135	0.135
Sociodemographic characteristics	NO	YES	NO	YES	NO	YES
Year f.e.	NO	YES	NO	YES	NO	YES
Local authority f.e.	NO	YES	NO	YES	NO	YES

Notes - We restrict the sample of natives to individuals who were living in a different local authority in the previous year. Standard errors (in prentheses) are clustered at the local authority level. Regressions include year and local authority fixed effects. Sociodemographic characteristics include gender, dummies for age, education occupation (1-digit).

Table A.11: Immigrant Health Advantage, (Understanding Society, 2009-2014)

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Poor health, waves 1-4						
Foreign born	-0.047***	-0.047***				
	(0.007)	(0.007)				
Foreign born			-0.134***	-0.134***		
came after 2000			(0.007)	(0.007)		
Foreign born					-0.144***	-0.144***
came after 2004					(0.008)	(0.008)
Observations	67,584	67,584	62,711	62,711	61,565	61,565
Sociodemographic Controls	NO	YES	NO	YES	NO	YES
Mean of Dep. Var.	0.193	0.193	0.190	0.190	0.192	0.192
Std. Dev. of Dep. Var.	0.394	0.394	0.393	0.393	0.394	0.394
Panel B: Disability, waves 1-4						
Foreign born	-0.127***	-0.127***				
	(0.009)	(0.009)				
Foreign born			-0.256***	-0.256***		
came after 2000			(0.010)	(0.010)		
Foreign born					-0.276***	-0.276***
came after 2004					(0.011)	(0.011)
Observations	67,649	67,649	62,770	62,770	61,623	61,623
Sociodemographic Controls	NO	YES	NO	YES	NO	YES
Mean of Dep. Var.	0.359	0.359	0.360	0.360	0.365	0.365
Std. Dev. of Dep. Var.	0.480	0.480	0.480	0.480	0.481	0.481
Panel C: Any health limitation, waves 1-4						
Foreign born	-0.018***	-0.018***				
	(0.005)	(0.005)				
Foreign born			-0.066***	-0.066***		
came after 2000			(0.005)	(0.005)		
Foreign born					-0.074***	-0.074***
came after 2004					(0.006)	(0.006)
Observations	67,672	67,672	62,791	62,791	61,643	61,643
Sociodemographic characteristics	NO	YES	NO	YES	NO	YES
Mean of Dep. Var.	0.114	0.114	0.112	0.112	0.113	0.113
Std. Dev. of Dep. Var.	0.318	0.318	0.316	0.316	0.317	0.317

Notes - Data are drawn from waves 1-4 of the Understanding Society. Sociodemographic characteristics include controls for gender, dummies for age, education occupation (1-digit), employment status, income, region, an index of rural status, and year fixed effects. Robust standard errors are reported in parentheses.

Table A.12: Immigrant-Native Differences in Health Care Use, (Understanding Society, 2009-2014)

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Inpatient days, waves 1-4						
Foreign born	-0.001	-0.001				
	(0.002)	(0.002)				
Foreign born			-0.010***	-0.010***		
came after 2000			(0.003)	(0.003)		
Foreign born					-0.013***	-0.013***
came after 2004					(0.003)	(0.003)
Observations	67,672	67,672	62,791	62,791	61,643	61,643
Sociodemographic Controls	NO	YES	NO	YES	NO	YES
Mean of Dep. Var.	0.0196	0.0196	0.0190	0.0190	0.0191	0.0191
Std. Dev. of Dep. Var.	0.160	0.160	0.157	0.157	0.158	0.158
Panel B: Hospital services use, wave 4						
Foreign born	-0.002	-0.002				
	(0.015)	(0.015)				
Foreign born			-0.037**	-0.037**		
came after 2000			(0.018)	(0.018)		
Foreign born					-0.051**	-0.051**
came after 2004					(0.020)	(0.020)
Observations	4,551	4,551	3,178	3,178	2,816	2,816
Sociodemographic Controls	NO	YES	NO	YES	NO	YES
Mean of Dep. Var.	0.483	0.483	0.459	0.459	0.457	0.457
Std. Dev. of Dep. Var.	0.500	0.500	0.498	0.498	0.498	0.498
Panel C: Doctor services use, wave 4						
Foreign born	0.020*	0.020*				
	(0.011)	(0.011)				
Foreign born			-0.020	-0.020		
came after 2000			(0.014)	(0.014)		
Foreign born					-0.026	-0.026
came after 2004					(0.016)	(0.016)
Observations	4,551	4,551	3,178	3,178	2,816	2,816
Sociodemographic characteristics	NO	YES	NO	YES	NO	YES
Mean of Dep. Var.	0.846	0.846	0.821	0.821	0.821	0.821
Std. Dev. of Dep. Var.	0.361	0.361	0.383	0.383	0.384	0.384

Notes - Data for Panel A are drawn from waves 1-4 of the Understanding Society. Data for Panel B and c are drawn from wave 4 of the Understanding Society. Sociodemographic characteristics include controls for gender, dummies for age, education occupation (1-digit), employment status, income, region, an index of rural status and year fixed effects. Robust standard errors are reported in parentheses.

Table A.13: Immigrant-Native Differences in Health Care Use, (General Household Survey, 2000-2006)

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Consulted doctor last 2 wks (exc.hosp)						
Foreign born	0.007*	0.007*				
	(0.004)	(0.004)				
Foreign born			-0.049***	-0.028***		
came after 2000			(0.007)	(0.007)		
Foreign born					-0.069***	-0.048***
came after 2004					(0.012)	(0.012)
Observations	137,273	137,273	128,494	128,494	127,121	127,121
Sociodemographic Controls	NO	YES	NO	YES	NO	YES
Mean of Dep. Var.	0.153	0.153	0.152	0.152	0.152	0.152
Std.Err. of Dep. Var.	0.360	0.360	0.359	0.359	0.359	0.359
Panel B: NHS GP consultations last 2 wks						
Foreign born	0.004	0.006				
	(0.005)	(0.005)				
Foreign born			-0.067***	-0.044***		
came after 2000			(0.009)	(0.009)		
Foreign born					-0.086***	-0.065***
came after 2004					(0.013)	(0.014)
Observations	137,273	137,273	128,494	128,494	127,121	127,121
Sociodemographic Controls	NO	YES	NO	YES	NO	YES
Mean of Dep. Var.	0.168	0.168	0.167	0.167	0.167	0.167
Std.Err. of Dep. Var.	0.470	0.470	0.468	0.468	0.469	0.469
Panel C: NHS GP consultations last year						
Foreign born	0.103	0.168				
	(0.124)	(0.128)				
Foreign born			-1.744***	-1.140***		
came after 2000			(0.225)	(0.230)		
Foreign born					-2.228***	-1.682***
came after 2004					(0.350)	(0.356)
Observations	137,275	137,275	128,497	128,497	127,122	127,122
Sociodemographic Controls	NO	YES	NO	YES	NO	YES
Mean of Dep. Var.	4.366	4.366	4.332	4.332	4.349	4.349
Std.Err. of Dep. Var.	12.22	12.22	12.18	12.18	12.20	12.20
Panel D:Hospital Outpatient Attend - last 3 months						
Foreign born	-0.015***	-0.010***				
	(0.003)	(0.004)				
Foreign born			-0.050***	-0.019***		
came after 2000			(0.007)	(0.007)		
Foreign born					-0.063***	-0.033***
came after 2004					(0.012)	(0.012)
Observations	137,287	137,287	128,506	128,506	127,132	127,132
Sociodemographic characteristics	NO	YES	NO	YES	NO	YES
Mean of Dep. Var.	0.144	0.144	0.145	0.145	0.145	0.145
Std.Err. of Dep. Var.	0.351	0.351	0.352	0.352	0.352	0.352

Notes - Data are drawn from the General Household Survey (GHS, 2000-2006). Sociodemographic characteristics include controls for gender, dummies for age, education, income, region and an index of rural status and an indicator for missing information on income.

Table A.14: Health Across Less and More Deprived Areas in England, (LFS, 2003-2012)

Dependent variable:	(1) Any health issue All	(2) Any health issue All	(3) Any health issue UK-born	(4) Any health issue UK-born	(5) Any health issue Foreign-born	(6) Any health issue Foreign-born
Highly deprived areas	0.016***	0.010***	0.021***	0.011***	0.023***	0.015**
	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.006)
Sociodemographic Controls	NO	YES	NO	YES	NO	YES
Year F.E.	YES	YES	YES	YES	YES	YES
Local authority F.E.	YES	YES	YES	YES	YES	YES
Mean of Dep.Var.	0.302	0.319	0.326	0.329	0.242	0.244
Std.Err.	(0.459)	(0.466)	(0.469)	(0.470)	(0.429)	(0.429)
Observations	1,596,291	1,551,777	1,392,313	1,351,754	203,841	199,886

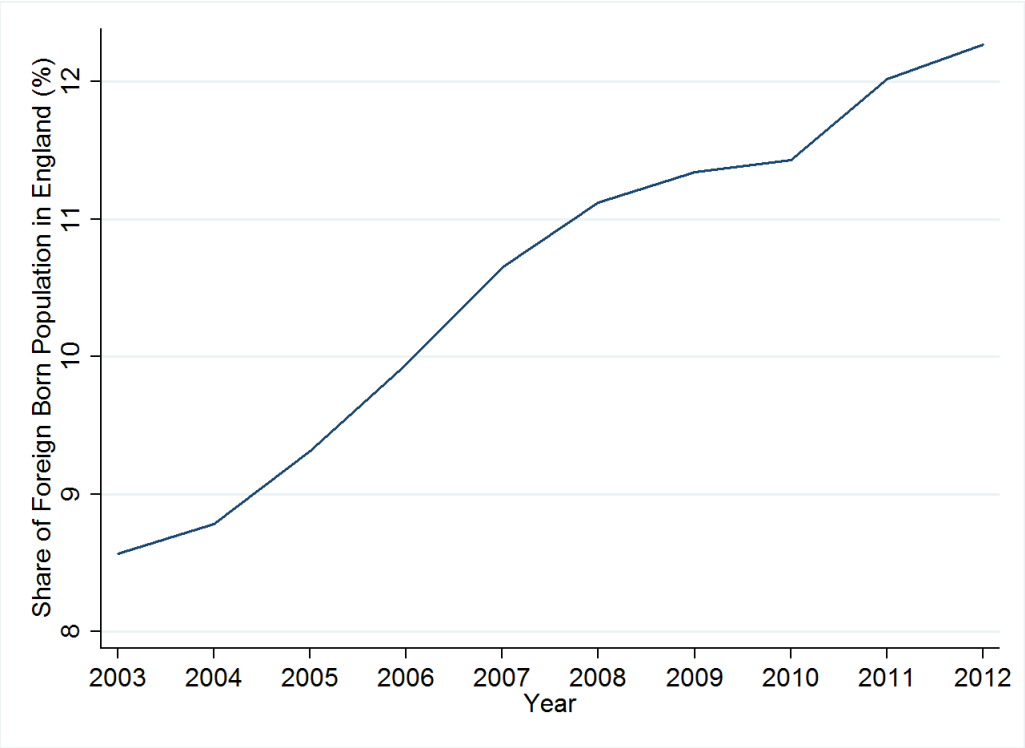
Notes - All estimates include year and local authority fixed effects. Sociodemographic characteristics include gender, age (dummies), education (dummies), occupation (1-digit, dummies). Standard errors in parentheses are clustered at the local authority level. Robust standard errors are reported in parentheses.

Table A.15: Asylum Seekers and Waiting Times for Outpatients, 2003-2012

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) 2SLS	(6) 2SLS
Share of Asylum Seekers in a Local Authority	80.421*** (9.077)	24.499*** (7.397)			68.646*** (12.180)	3.985 (13.322)
Share of Asylum Seekers in Dispersal Accommodation			76.776*** (13.963)	3.733 (12.548)		
PCT f.e.	YES	YES	YES	YES	YES	YES
Year f.e.	NO	YES	NO	YES	NO	YES
Observations	293,382	293,382	293,382	293,382	293,382	293,382
First-Stage F					1529	627.2

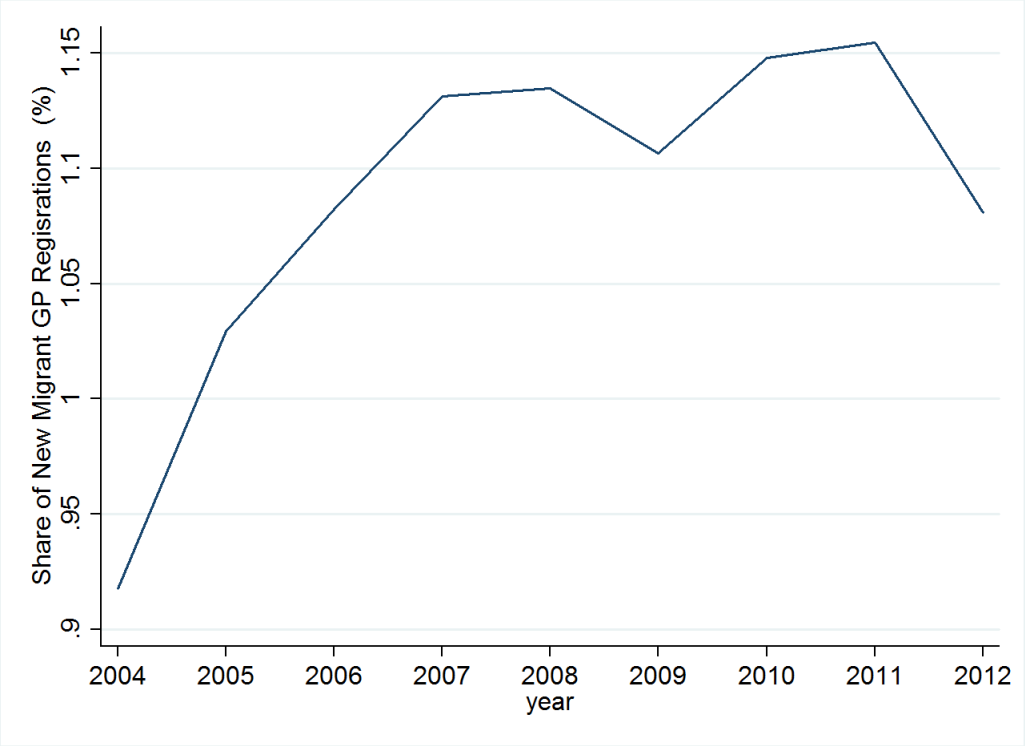
Notes - The dependent variable is the average waiting time for outpatient services (in days). Data on average waiting times for outpatient services are drawn from the Hospital Episodes Statistics. Data on asylum seekers are drawn from Home Office, Immigration Statistics (2003-2012). Standard errors (in parentheses) are clustered at the local authority level.

Figure 1: Foreign-born share of the population in England



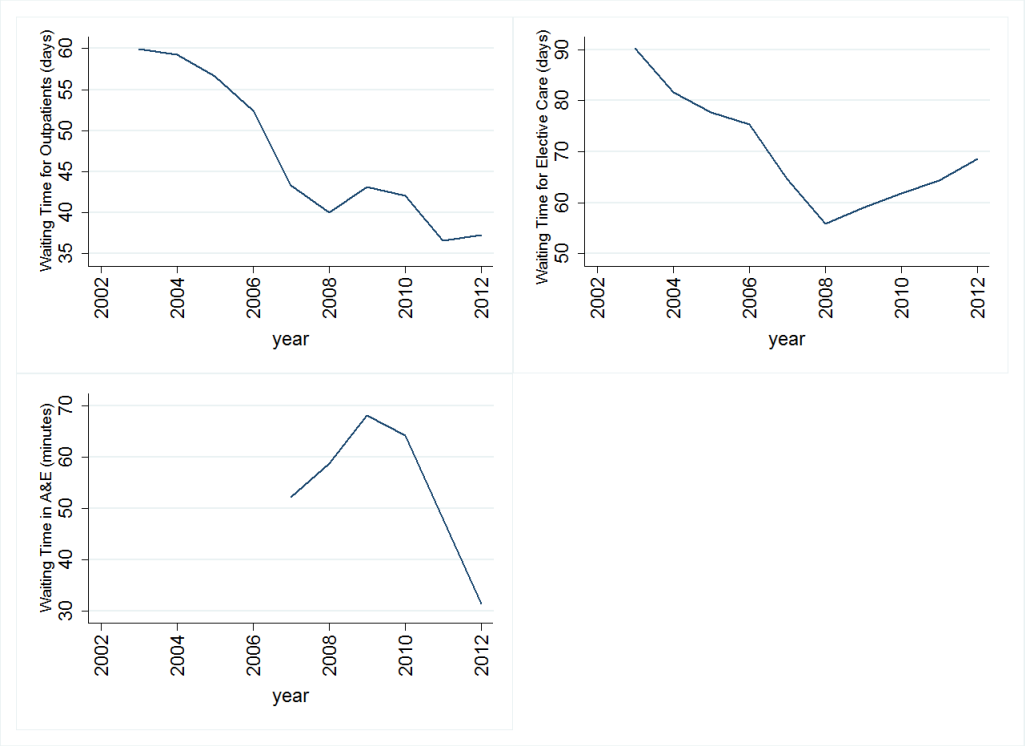
Notes - Data are drawn from the UK Labor Force Survey (2003-2012).

Figure 2: Annual number of new immigrant registrations with a GP as share of total population



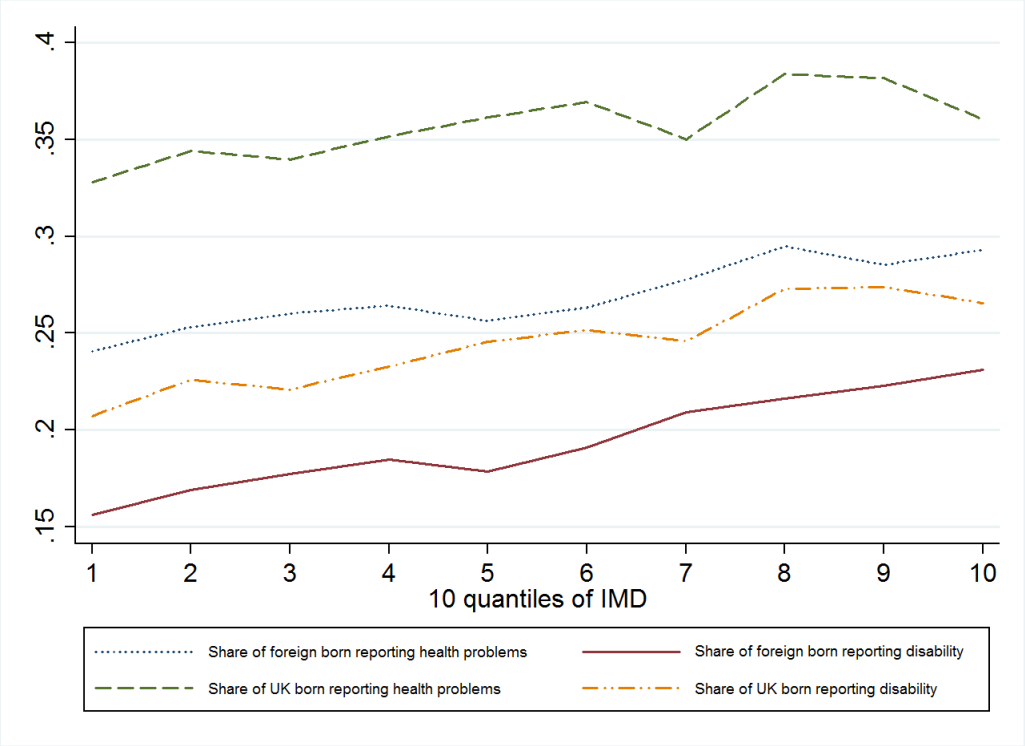
Notes - Source: Patient Register Data Service (2004-2012).

Figure 3: Waiting Times in the NHS (2003-2012)



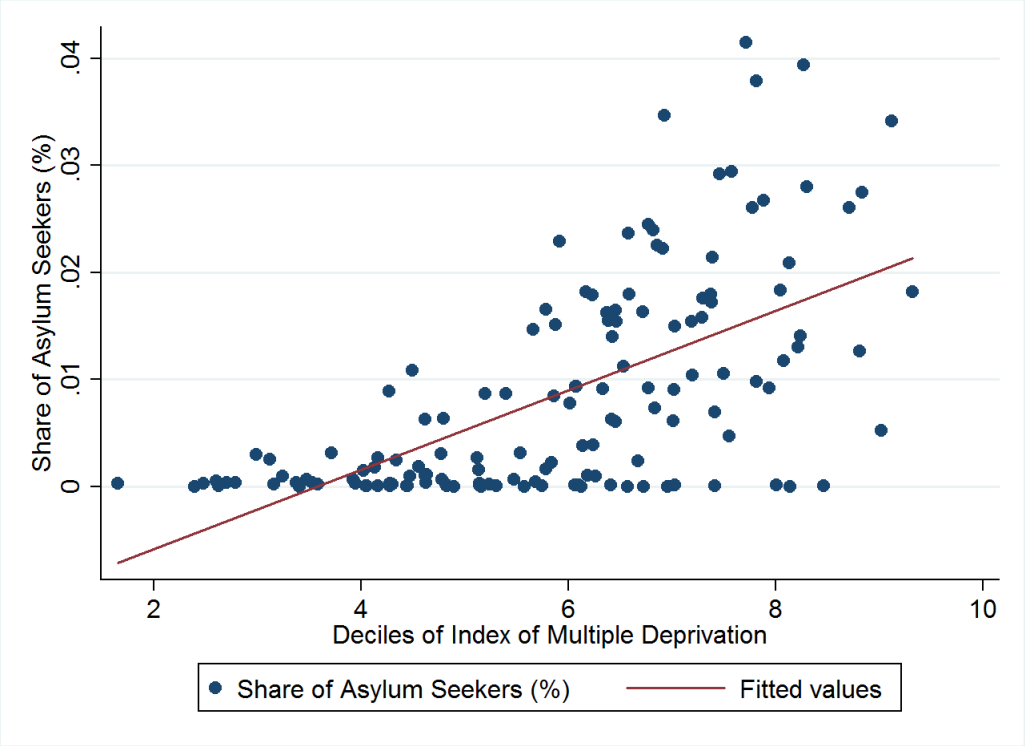
Notes - Data on average waiting times for outpatient services are drawn from the Hospital Episodes Statistics.

Figure 4: Health by migrant status and Index of Multiple Deprivation (IMD) in England (2003-2012)



Notes - Data are drawn from the UK Labor Force Survey.

Figure 5: Share of asylum seekers in the population by Index of Multiple Deprivation (IMD) in England (2003-2012)



Notes - Data are drawn from the UK Home Office (2003-2012).

Appendix B

Data Sources:

UK Labour Force Survey (LFS, 2003-2012): the LFS is a quarterly survey of employment and labour markets in the UK. We use the special license version of the survey which includes local authority level information. Source: Office for National Statistics.

National Insurance Number (NINO) registration of overseas nationals (2002-2012): NINOs are used to record contributions and taxes of individuals. The NINO is also necessary for most benefit claims. Source: Department for Work and Pensions.

Asylum seeker statistics (2003-2012): this reports the number of asylum seekers in each local authority receiving Government support (Section 95). It includes asylum seekers in dispersal and non-dispersal accommodation. Source: Home Office.

Hospital Episode Statistics (HES, 2003-2012): it is a records-based system that covers all NHS trusts in England, including acute hospitals, primary care trusts and mental health trusts.

Source: Health and Social Care Information Centre.

Understanding Society (US, 2009-2014): it is the largest panel survey in the world, supporting social and economic research. Its sample size is 40,000 households from around the UK. Source: Understanding Society project.

General Household Survey (GHS, 2002-2006): it is a multi-purpose continuous survey carried out by the collecting information on a range of topics from people living in private households in Great Britain. Source: Office for National Statistics.

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Deconstructing Shocks and Persistence in OECD Real Exchange Rates
(Juny 2008)

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Sanromá, E. (IEB)**; Ramos, R.** (AQR-IREA); Simón, H.
Portabilidad del capital humano y asimilación de los inmigrantes. Evidencia para España
(Juliol 2008)

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Basher, S. A.; Carrión, J. Ll. (AQR-IREA)
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Teruel-Carrizosa, M. (GRIT), **Segarra-Blasco, A.** (GRIT)
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Bilotkach, V., **Fageda, X.** (PPRE-IREA), **Flores-Fillol, R.**
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Albalate, D. (PPRE-IREA), **Gel, G.** (PPRE-IREA)
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Calonge, S. (CREB)**; Tejada, O.**
"A theoretical and practical study on linear reforms of dual taxes"
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"Exploring Determinants of Urban Motorcycle Accident Severity: The Case of Barcelona"
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Borrell, J. R. (PPRE-IREA)**; Fernández-Villadangos, L.** (PPRE-IREA)
"Assessing excess profits from different entry regulations"
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Sanromá, E. (IEB)**; Ramos, R.** (AQR-IREA), **Simon, H.**
"Los salarios de los inmigrantes en el mercado de trabajo español. ¿Importa el origen del capital humano?"
(Abril 2009)

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Jiménez, J. L.; Perdiguero, J. (PPRE-IREA)
"(No)competition in the Spanish retailing gasoline market: a variance filter approach"
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Álvarez-Albelo,C. D. (CREB)**, Manresa, A.** (CREB)**, Pigem-Vigo, M.** (CREB)
"International trade as the sole engine of growth for an economy"
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"The Black Box of Business Dynamics"
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"The antecedents and innovation consequences of organizational search: empirical evidence for Spain"
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"Competition between TV Platforms"
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"Inter-regional redistribution through infrastructure investment: tactical or programmatic?"
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Álvarez-Albelo, C. D. (CREB), **Hernández-Martín, R.**
"The commons and anti-commons problems in the tourism economy"
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García-López, M. A. (GEAP)
"The Accessibility City. When Transport Infrastructure Matters in Urban Spatial Structure"
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"Language knowledge and earnings in Catalonia"
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"Like milk or wine: Does firm performance improve with age?"
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"Why do educated mothers matter? A model of parental help"
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Miguélez, E. (AQR-IREA); **Gómez-Miguélez, I.**
"Singling out individual inventors from patent data"
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Moreno-Torres, I. (ACCO, CRES & GiM-IREA)
"Generic drugs in Spain: price competition vs. moral hazard"
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Segarra, A. (GRIT)
"R&D cooperation between Spanish firms and scientific partners: what is the role of tertiary education?"
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"Does grade retention affect achievement? Some evidence from PISA"
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Arespa, M. (CREB)
"Macroeconomics of extensive margins: a simple model"
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González-Val, R. (IEB), **Olmo, J.**
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"The Innovation and Imitation Dichotomy in Spanish firms: do absorptive capacity and the technological frontier matter?"
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Borrell, J. R. (GiM-IREA), **Jiménez, J. L.**, **García, C.**
"Evaluating Antitrust Leniency Programs"
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Ferri, A. (RFA-IREA), **Guillén, M.** (RFA-IREA), **Bermúdez, Ll.** (RFA-IREA)
"Solvency capital estimation and risk measures"
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Perdiguero, J. (GiM-IREA), **Borrell, J.R.** (GiM-IREA)
"Driving competition in local gasoline markets"
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D'Amico, G., **Guillen, M.** (RFA-IREA), Manca, R.
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"Quantitative analysis of image factors in a cultural heritage tourist destination"
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"What underlies localization and urbanization economies? Evidence from the location of new firms"
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Muñiz, I. (GEAP), **Calatayud, D.**, **Dobaño, R.**
"Los límites de la compacidad urbana como instrumento a favor de la sostenibilidad. La hipótesis de la compensación en Barcelona medida a través de la huella ecológica de la movilidad y la vivienda"
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Arqué-Castells, P. (GEAP), **Mohnen, P.**
"Sunk costs, extensive R&D subsidies and permanent inducement effects"
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Boj, E. (CREB), **Delicado, P.**, **Fortiana, J**., **Esteve, A.**, **Caballé, A.**
"Local Distance-Based Generalized Linear Models using the dbstats package for R"
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"What about people in European Regional Science?"
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"Informality and overeducation in the labor market of a developing country"
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"(Endogenous) occupational choices and job satisfaction among recent PhD recipients: evidence from Catalonia"
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"Financial constraints and the failure of innovation projects"
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Teixidó-Figueras, J. (GRIT), **Duró, J. A.** (GRIT)
"The building blocks of international ecological footprint inequality: a regression-based decomposition"
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Salcedo-Sanz, S., **Carro-Calvo, L.**, **Claramunt, M.** (CREB), **Castañer, A.** (CREB), **Marmol, M.** (CREB)
"An Analysis of Black-box Optimization Problems in Reinsurance: Evolutionary-based Approaches"
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Alcañiz, M. (RFA), **Guillén, M.** (RFA), **Sánchez-Moscona, D.** (RFA), **Santolino, M.** (RFA), **Llatje, O., Ramon, Ll.**
"Prevalence of alcohol-impaired drivers based on random breath tests in a roadside survey"
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"Returns to Foreign Language Skills in a Developing Country: The Case of Turkey"
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"The Impact of Cooperation on R&D, Innovation andProductivity: an Analysis of Spanish Manufacturing and Services Firms"
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"Are we living longer but less healthy? Trends in mortality and morbidity in Catalonia (Spain), 1994-2011"
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Teixidó-Figueres, J. (GRIT), **Duro, J. A.** (GRIT)
"Spatial Polarization of the Ecological Footprint distribution"
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Cristobal-Cebolla, A.; Gil Lafuente, A. M. (RFA), **Merigó Lindhal, J. M.** (RFA)
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"Are we wasting our talent? Overqualification and overskilling among PhD graduates"
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"The environmental effects of changing speed limits: a quantile regression approach"
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2015

XREAP2015-01
Bolance, C. (Riskcenter-IREA); **Bahraoui, Z.** (Riskcenter-IREA), **Alemany, R.** (Risckcenter-IREA)
"Estimating extreme value cumulative distribution functions using bias-corrected kernel approaches"
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"Bilingual Schooling and Earnings: Evidence from a Language-in-Education Reform"
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Caminal, R., Di Paolo, A. (AQR-IREA)
Your language or mine?
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Choi, H. (AQR-IREA)**, Choi, A.** (IEB)
When one door closes: the impact of the hagwon curfew on the consumption of private tutoring in the Republic of Korea

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(Novembre 2015)

2016

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Castañer, A. (CREB, XREAP); **Claramunt, M M.** (CREB, XREAP), **Tadeo, A.**, **Varea, J.** (CREB, XREAP)
Modelización de la dependencia del número de siniestros. Aplicación a Solvencia II
(Setembre 2016)

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García-Quevedo, J. (IEB, XREAP); **Segarra-Blasco, A.** (GRIT, XREAP), **Teruel, M.** (GRIT, XREAP)
Financial constraints and the failure of innovation projects
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XREAP2016-03
Jové-Llopis, E. (GRIT, XREAP); **Segarra-Blasco, A.** (GRIT, XREAP)
What is the role of innovation strategies? Evidence from Spanish firms
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Albalate, D. (GiM-IREA, XREAP); **Rosell, J.** (GiM-IREA, XREAP)
Persistent and transient efficiency on the stochastic production and cost frontiers – an application to the motorway sector
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Jofre-Monseny, J. (IEB, XREAP), **Silva, J. I.**, **Vázquez-Grenno, J.** (IEB, XREAP)
Local labor market effects of public employment
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Garcia-López, M. A. (IEB, XREAP), **Hemet, C.**, **Viladecans-Marsal, E.** (IEB, XREAP)
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XREAP2016-07
Vayá, E. (AQR-IREA, XREAP)**, García, J. R.** (AQR-IREA, XREAP)**, Murillo, J.** (AQR-IREA, XREAP)**, Romaní, J.** (AQR-IREA, XREAP)**, Suriñach, J.** (AQR-IREA, XREAP)**,**
Economic impact of cruise activity: the port of Barcelona
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Ayuso, M. (Riskcenter, XREAP)**, Guillen, M.** (Riskcenter, XREAP)**, Nielsen, J. P.**
Improving automobile insurance ratemaking using telematics: incorporating mileage and driver behaviour data
(Desembre 2016)

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Ruíz, A. (GEAP, XREAP), **Matas, A.** (GEAP, XREAP), **Raymond, J. Ll.**
How do road infrastructure investments affect the regional economy? Evidence from Spain
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2017

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Bernardo, V. (GiM-IREA, XREAP); **Fageda, X.** (GiM-IREA, XREAP)
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XREAP2017-02
Di Paolo, A. (AQR-IREA, XREAP); **Tansel, A.**
Analyzing Wage Differentials by Fields of Study: Evidence from Turkey
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XREAP2017-03
Melguizo, C. (AQR-IREA, XREAP); **Royuela, V.** (AQR-IREA, XREAP)
What drives migration moves across urban areas in Spain? Evidence from the great recession
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Forecasting compositional risk allocations
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