

Local-level immigration and life satisfaction: The EU enlargement experience in England and Wales

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Abstract

The 2004 European Union enlargement resulted in an unprecedented wave of 1.5 million workers relocating from Eastern Europe to the UK. We study the links between this migrant inflow and life satisfaction of native residents in England and Wales. Combining the British Household Panel Survey with the Local Authority level administrative data from the Worker Registration Scheme, we find that higher levels of local immigration were associated with a decrease in life satisfaction among older, unemployed and lower-income people, and with an increase in life satisfaction among younger, employed, higher-income and better educated people. These findings are driven by the initial ‘migration shock’ – the inflows that occurred in the first two years after the enlargement. Overall, our study highlights the importance of local-level immigration in shaping the life satisfaction of receiving populations. We also argue that our results help explain the socio-demographic patterns observed in the UK Brexit vote.

Keywords: Immigration, life satisfaction, spatial correlation approach, United Kingdom, 2004 EU enlargement.

1. Introduction

On June 23, 2016, the United Kingdom (UK) held a historic referendum in which citizens voted, 52% to 48%, to leave the European Union (EU). The outcome of this vote has sent shockwaves around the world and is likely to change the course of British and European politics for years to come. It is widely recognized that immigration played a major role in the decision of the UK to leave the EU: immigration was a dominant theme in the pre-referendum debate and remains a key issue as the UK prepares its exit from the bloc (Gietel-Basten, 2016; Alfano et al., 2016). Specifically, the proponents of Brexit argued that the levels of immigration to the UK from other EU countries have become too high; exiting the EU would enable the country to control immigration from the EU. Slogans such as ‘immigrants take our jobs’ and ‘take back control of our borders’ have resonated well with the UK general public, for whom immigration has indeed become one of the biggest worries (*The Economist*, 2015).

However, for some time scholars have been pointing that immigration has few, if any, adverse effects on the labor markets of migrant-receiving countries (Constant, 2014; Peri, 2014). Such findings, coupled with mounting worries over immigration levels, raise a question: in what ways does immigration affect the well-being of people in migrant-receiving countries – beyond the realm of the labor markets? In this paper, we explore the effects of immigration on the subjective well-being of local residents – a relationship that has so far received little attention in both the literature and public debate.

There are several reasons why it is important to study the effects of immigration on subjective well-being. First, subjective well-being, captured often (but not exclusively) by life

satisfaction and happiness, is a more integrated representation of individual utility and can reflect a broad range of real and perceived effects of immigration on individual welfare. This argument is in line with the increasing acceptance, in both academic and policy circles, of subjective well-being as a key variable to measure individual welfare and societal progress, and guide policymaking (OECD, 2013; Office for National Statistics, 2013; Sgroi et al., 2017). Second, it has been shown that higher levels of *subjective* well-being have *objective* benefits: happier and more life-satisfied people are healthier, more productive and creative (De Neve et al., 2013; Oswald et al., 2015); this means that happy people are an asset for society and it is crucial to understand whether factors such as immigration increase or reduce happiness. Third, the politicians' prospects of being re-elected may depend directly on how happy the voters are (Liberini et al., 2017; Ward, 2015). Politicians willing to get re-elected may, therefore, be interested in how immigration affects voters' subjective well-being.

To answer our research question – whether immigration affects the subjective wellbeing of residents in a host country – we focus on a recent immigration wave to the UK. Following the 2004 enlargement of the European Union, the UK opened its labor market to citizens of the new EU member states (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia – also known as the accession or A8 countries). The resulting migrant inflow was the “biggest peacetime movement [of people] in European history”.¹ Between

¹ This quote is from the evidence submitted by David Goodhart to the HM Government Review of the Balance of Competences between the United Kingdom and European Union: Single Market, Free Movement of Persons (2014, 28). Available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/335088/SingleMarketFree_MovementPersons.pdf

2004 and 2011, 1.5 million East Europeans started working in the UK.² In 2015, Poles – the largest group among the A8 migrants – became the largest foreign-born group in the UK, overtaking Indians, the Irish, Pakistani and Bangladeshi.

It has been shown that this unexpectedly large inflow of A8 migrants had no adverse effect on either UK wages or unemployment (Gilpin et al., 2006; Lemos and Portes, 2013; Lemos, 2014).³ However, it has also been claimed that A8 immigrants have disadvantaged the UK's low-skilled and young workers (Sumption and Somerville, 2010; MigrationWatch, 2012), strained the provision of local public services⁴ as well as been subject to exploitation and unfair treatment (Jayaweera and Anderson, 2008; BBC, 2013). These reports, even if not always generalizable to the whole A8 migrant population, have received wide media coverage. Coupled with the extent of the A8 migration and the frustration over the EU internal labor mobility rules, they have contributed to the rising anti-immigration and anti-EU sentiment in the UK, fueled support for the far-right political parties (Geddes, 2014; Lawless, 2015) and, ultimately, Brexit.

² Only the UK, Ireland and Sweden opened their labor markets upon enlargement. Other 'old' EU members introduced transitional arrangements limiting immediate inflows of the 'new' Europeans. Ireland received more migrants than any other EU country *in relative terms*: between 2004 and 2007 the share of East European migrants in Ireland's population increased from 1.07% to 4.09%. Similar figures for the UK are 0.20% and 1.00% and for Sweden, 0.26% and 0.46% (Brücker and Damelang, 2009).

³ It has also been shown that A8 migration contributed to the UK public finances (Dustmann et al., 2010) and may have reduced crime (Bell et al., 2013).

⁴ Rhys et al. (2009) found that higher East European inflows were associated with lower public service performance, especially in communities with no prior experience of dealing with such migrants.

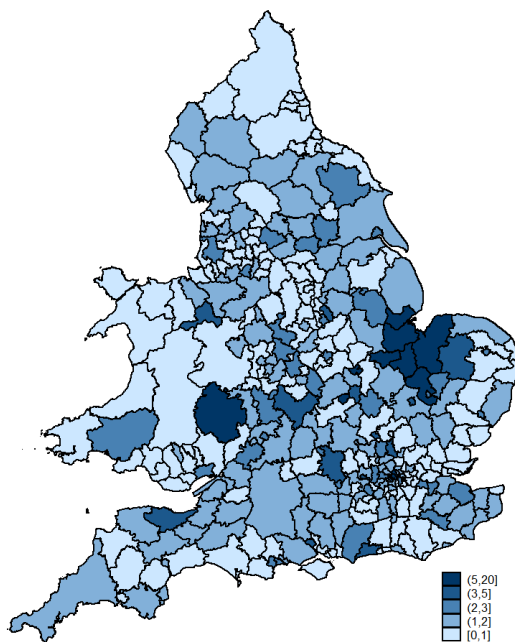
We believe that the 2004 enlargement and the ensuing migrant inflows to the UK represent an instructive laboratory for the examination of the effects of immigration on the subjective well-being of local residents. Due to the sheer contribution of the new member states to the EU population (it increased by 20%) and the fact that only three countries – the UK, Ireland and Sweden – opened their borders to the new Europeans immediately upon accession, the 2004 enlargement has often been considered a natural experiment (Constant, 2012; Elsner, 2013; Lemos and Portes, 2013, Kahanec et al., 2016).⁵ In the context of our study, it is, for example, highly unlikely that the large and fast inflows of East Europeans were *driven* by the subjective well-being (or their expected change) of the UK residents; in other words, we can by and large exclude the possibility of reverse causality – one potential source of endogeneity.

Besides being fast and unexpectedly large, the A8 migration to the UK was also geographically unevenly distributed (Figure 1). The demand for jobs in the geographically-concentrated, ‘migrant-intensive’ industries, such as agriculture, food processing and manufacturing, meant that that some UK communities were affected by the East European migration much more than others. Our identification strategy relies on this uneven geographical distribution of A8 immigration. In particular, we relate the local-level intensity of A8 migration to the changes in people’s life satisfaction over time. To capture the local-level migration intensity, we use data from the Worker Registration Scheme (WRS), which documented, between 2004 and 2011, the number of A8 workers starting a job in the UK at the local authority level. To capture changes in individual life satisfaction, we use the British

⁵ Lemos and Portes (2013: 299) argue that the post-enlargement immigration to the UK “corresponds more closely to an exogenous supply shock than most migration shocks studied in the literature”.

Household Panel Survey (BHPS). Since the BHPS follows the same people over time, we can estimate fixed effects regression models that take account of the potentially confounding impact of time-invariant individual characteristics.

Figure 1. Geographical distribution of A8 migration in England and Wales, 2004-2008, % of local population



Source: Worker Registration Scheme and authors' calculations.

Our paper contributes to the nascent literature on the effects of immigration and diversity on the subjective well-being of native populations (Betz and Simpson, 2013; Longhi, 2014; Akay et al., 2014; Akay et al., 2017), the detailed review of which we provide in the next section, as well as to the broader, rapidly growing literature on subjective well-being and migration.⁶ We also add to the literature studying the relative importance of individual and

⁶ See Simpson (2013) for an overview, Ivlevs (2015) for a review of the effects of subjective well-being on the emigration decision, Nikolova and Graham (2015) for a review of the effects of international migration on

regional variation in subjective well-being, as well as the regional and local-level determinants of it. While some studies have found that, after controlling for individual-level factors, the role of geography in explaining well-being is limited (Ballas and Tranmer, 2012), others have found that the regional dimension matters (Aslam and Corrado, 2012; Pittau et al., 2010; Pierewan and Tampubolon, 2014) and that contextual characteristics, such as the neighborhood levels of social support and socio-economic deprivation, can be important determinants of subjective well-being (Shields et al., 2009; Howley et al., 2015; Tselios et al., 2015). Our findings support the importance of the regional dimension in explaining subjective well-being and suggest that local-level immigration inflows are an important predictor of the changes in individual life satisfaction.

The remainder of the article is organized as follows. Section 2 reviews the related literature and outlines the channels through which immigration may affect the subjective well-being of receiving populations. Section 3 presents the data and estimation approach. Section 4 reports the results, while section 5 discusses them in more detail and concludes.

2. Immigration and subjective well-being: related literature and conceptual channels

migrants' subjective well-being, and Nowok et al. (2013) and Iammarino and Marinelli (2011) for the effect of internal migration on migrants' well-being.

Our study is most closely related to the nascent literature on the effects of immigration and diversity on the subjective well-being of receiving populations. This subsection provides a brief overview of its main extant contributions.

Betz and Simpson (2013) study the relationship between the country-level immigrant flows and individual happiness in 26 European countries. Their analysis draws on the five waves (2002-2010) of the European Social Survey, which allows controlling for year and country, but not for individual fixed effects (the European Social Survey consists of repeated country cross-sections). They report a positive association between the recent (one-year lagged) immigration flows and the happiness of natives. Two-year lagged immigration has a smaller positive effect, and the effect of longer-term immigration flows is insignificant.

While the analysis of Betz and Simpson (2013) draws on the country-level variation in immigrant flows, Longhi (2014) focuses on a single country (UK) and studies the relationship between life satisfaction and diversity (by country of birth, ethnicity and religion) at a geographically much more disaggregated level. Merging the 2009-10 wave of the Understanding Society survey with the local-authority-level diversity statistics from the 2011 UK Census, Longhi (2014) finds that people living in more diverse communities are less satisfied with life. The result, however, is statistically significant only for the white British population; the life satisfaction of the non-white British and the foreign-born is not affected by diversity.

Next, Akay et al. (2014) study the impact of immigration on the life satisfaction of natives in Germany. Relating changes in the share of immigrants in Germany's 96 regions to changes in individual life satisfaction over 11 years (1998-2009), Akay et al. (2014) uncover a positive

relationship between immigration and life satisfaction of natives. This effect is highest in regions with intermediate levels of immigrant assimilation and appears to be driven by satisfaction with dwelling and leisure. An important distinction from Betz and Simpson (2013) and Longhi (2014) is that Akay et al. (2014) use panel data (German Socio-Economic Panel Survey), which allows them to control for unobserved individual-level heterogeneity.

Finally, Akay et al. (2017), using the same context, dataset and methodology as Akay et al. (2014), find that the local-level ethnic diversity, measured with the population register information on the nationalities of immigrants, increases the life satisfaction of natives. Importantly, the results are driven by the younger and mid-age respondent groups, while no statistically significant relationship between immigrant diversity and subjective wellbeing is found for older respondents (age 50+).

Our study adopts a methodology similar to Akay et al. (2014) and Akay et al. (2017), although we exploit a more disaggregated spatial variation in immigration rates (320 local authority districts of England and Wales) and concentrate on the effects on life satisfaction of a specific migration wave (A8 migration). We hypothesise that the A8 immigration may have affected the subjective well-being of UK residents through a number of channels: by increasing concerns about labour market competition and provision of public services (note that, even in the absence of real effects, people may still think immigration is harmful) and disrupting local ways of life through increased diversity.

We are also interested in how immigration affects life satisfaction of different groups of people, such as younger and older residents, the employed and unemployed, as well as people with lower and higher levels of education and income. One reason to focus on different

subgroups is that immigration may affect their well-being differently. For example, one could argue that younger and more educated people are more supportive of diversity, which is brought along by immigration, while the unemployed are more concerned about labor market competition and older people about the effects of immigration on the provision of public services (for example, health services). Another reason to focus on subgroups is the demographic composition of the Brexit referendum vote. It has been shown, for example, that older and less educated voters in particular were more likely to vote ‘Leave’ (Becker et al., 2016; Goodwin and Heath, 2016; Rosenbaum, 2017) and, relative to their younger counterparts, older people place a higher importance on the issue of immigration as the UK negotiates its way out of the EU (Bulman, 2017). Our findings will show whether immigration-induced changes in subjective well-being are congruent with these voting and policy preference patterns. Finally, studying how life satisfaction responds to immigration across demographic groups is policy relevant because some groups, such as the elderly, are more likely to vote and may thus have a greater say over the formation of immigration policy.

3. Data and methods

3.1 BHPS and life satisfaction

The individual-level data used in the empirical analysis are from the British Household Panel Survey (BHPS) – a nationally representative survey of the adult population (16+) of more than 5,000 households (containing approximately 10,000 individuals) in Great Britain,

sampled in 1991 and followed annually until 2008/2009.⁷ The BHPS contains individual and household-level information on demographic characteristics, income, education and training, employment, as well as values and opinions on social and political matters. Importantly for our study, a series of questions on health and subjective well-being are also included in the survey.

Information on life satisfaction was collected during BHPS waves 6-10 (1996-2000) and 12-18 (2002-2008/2009). In particular, individuals were asked to record on a 7-point Likert scale, ranging from ‘not satisfied at all’ to ‘completely satisfied’, how dissatisfied or satisfied they are with their life overall. The answers to this question form the dependent variable in our analysis.

3.2 Worker Registration Scheme and local migrant flows

The Worker Registration Scheme (WRS), in operation between May 2004 and April 2011, was introduced by the British Government to monitor the inflows of the nationals of the eight East European states which joined the EU in 2004. Workers had to register for their first job taken in the UK (if working for more than one month), and re-register if they changed employer within the first 12 months; no further registration was necessary after one year of uninterrupted employment in the UK. The registration fee for the first job was £50 (eventually rising to £90), while re-registrations were free. The self-employed were exempt from registering.

⁷ The BHPS was succeeded in 2009 by “Understanding Society: the UK Household Longitudinal Survey”. See <https://www.understandingsociety.ac.uk/> for more details.

The WRS provides information on the nationality, gender and age of migrants, as well as their occupation, sector of employment, hours of work and hourly pay while taking up employment in the UK. Crucially for our study, information is also available on the spatial (Local Authority District level; henceforth, LAD level) distribution of migrant registrations. Using the WRS statistics, we construct our regressor of interest – the A8 migrant inflow rate at the LAD level, which we express as total A8 migrant inflows as a percentage of the LAD population.⁸ The LAD level WRS data are available for an aggregated time period between May 2004 and December 2005 (20 months) and for each year from 2006 until the end of the scheme (2011). Considering the A8 inflows as one big migration wave, we will use the aggregate 2004-2005 registrations to capture the inflows that occurred at the very beginning of this wave – the ‘migration shock’. The registrations from 2006 onwards will help identify longer-term effects, when migration becomes more established and natives have time to adapt to it. To combine the BHPS with the WRS data, the A8 migrant inflow rate for each LAD is matched with the LAD identifier that is available in the BHPS for each household and survey year. In our analysis, we focus on the period 2003-2008, assigning the value of zero to the migrant inflow rate in 2003⁹ and excluding year 2004 from our analysis due to the aggregated nature of the WRS data in 2004-2005.

⁸ Population for each LAD and year is available from the UK Office for National Statistics (ONS) as a mid-year estimate (see <https://www.nomisweb.co.uk/>).

⁹ Note that there are no other data on the LAD-level inflows of A8 nationals that we could use for 2003. We, however, acknowledge that assigning the value of zero to the A8 pre-enlargement inflows may result in artificially inflated measures of immigration and biased estimates if there was sizeable immigration from A8 countries to the UK before 2004. To check this, we have compared the number of national insurance number (NINo) registrations of A8 nationals before and after the enlargement (these data, sourced from the UK Department of Work and Pensions, are available from 2002 onwards, for the UK as a whole). The number of the A8 nationals’ NINo registrations was 9,518 in

At the outset, we want to outline the strengths and limitations of the WRS data. First, WRS data represent a rare example of UK local-level immigration statistics based on actual inflows rather than estimates. Unlike many other countries, the UK does not keep a formal register of where immigrants live (especially immigrants coming from the EU). Hence, most official immigration statistics are estimates based on 10-year censuses and country-level population surveys, which would have provided us with imprecise data, particularly at the local authority level.

Second, not all migrants registered with the scheme – partly because there were no sanctions for non-compliance, partly because of the fee (McCollum, 2012). However, there were also incentives to register: workers could access certain benefits, such as the Housing Benefit, the Council Tax Benefit and Tax Credits, only if they have registered with the scheme. To check how well the WRS data relate to data from other official data sources on immigration, we

2002, 16,868 in 2003 and then grew rapidly to 68,651 in 2004, 236,428 in 2005, 276,449 in 2006, 334,625 in 2007, and 230,879 in 2008. The annual post-enlargement inflows from A8 countries, as captured by NINo registrations, were thus 10-20 times larger after the enlargement (2005-08) than before it (2002-03). This is consistent with the view that the post-enlargement A8 immigration was large and fast, and, to a certain extent, justifies our use of zero inflows in 2003. As a further robustness check, we have used the LAD-specific and total A8 inflows for 2004-05 (based on our WRS data) to calculate the inflow proportion that corresponds to each LAD for these years. Then, we multiplied this proportion with the total NINo registrations for 2003 (16,868) and estimated an inflow for each LAD for 2003. By dividing the resulting number with the LAD population for 2003, we finally ended up with an estimate of the inflow rate for each LAD in 2003. We then re-estimated all our models, after having substituted the zeros in 2003 with this estimated inflow rate for each LAD. The results were very similar to the ones reported in this paper.

have used the 2001 and 2011 Population Censuses for a simple exercise. Specifically, we have estimated a local-authority level regression, whereby the absolute change in the number of people born in Poland between 2001 and 2011 (taken from the censuses) is regressed on the cumulative WRS immigrant inflows from Poland for the period 2004-2011 (Poland is the only A8 country for which the census data at the local authority level are publicly available; however, it is also the largest contributor to the A8 inflows, representing 62% of all A8 migrant inflows in 2004-2011). We obtained a very strong relationship between the WRS and Census data. Specifically, one additional WRS registration from Poland was associated with a 0.66 increase in the number of Polish-born between the two Censuses (or, using log transformations of the variables, a 1% increase in the WRS registrations from Poland was associated with a 0.95% increase in the number of Polish-born between the two Censuses). This provides us with further confidence that the WRS data are a good proxy for the actual inflows of A8 immigrants.

Third, migrants did not have to de-register when they stopped working – the data thus reflect migrant inflows rather than net migration. This, however, is not necessarily an issue for our study, as it can be argued that it is the inflow rate of new migrants that matters for the life satisfaction of receiving populations – regardless of whether migrants become permanent or not. Finally, to avoid double counting, the data refer only to first migrant registrations (Bauere et al., 2007); they, therefore, cannot capture migrants' spatial mobility. However, Bell et al. (2013) find that there is a very close correlation between the WRS registrations and the changes in corresponding migrant stocks across the (more aggregated) Police Force Areas, implying a limited spatial mobility of migrants.

3.3 Estimation strategy

The baseline linear regression model explaining life satisfaction (LS) for individual i in local authority district (LAD) j at year t can be expressed as follows:

$$LS_{ijt} = \alpha_1 MIR_{jt} + \alpha_2 Z_{jt} + \alpha_3 X_{ijt} + \alpha_4 LAD_j + \alpha_5 T_t + u_i + \varepsilon_{ijt}, \quad (1)$$

where MIR is the migrant inflow rate at the LAD level, Z is a vector of LAD-level control variables, X a vector of individual-level socio-demographic characteristics, LAD a vector of LAD dummies, T a vector of year dummies, u_i the individual fixed effect, and ε the unobserved error term. The α 's are the coefficients to be estimated. We assume cardinality of the life satisfaction measure – a common practice in the literature on happiness/life satisfaction (see, e.g., Ferrer-i-Carbonell and Frijters 2004). This assumption enables us to run individual fixed effects OLS regressions, which account for time-invariant individual unobserved heterogeneity in a simple way by using a standard within estimator and permit a straightforward interpretation of the coefficients of interest. Standard errors in all tables of results presented below are estimated assuming clustering at the individual level.¹⁰

We control for time-invariant spatial heterogeneity with the insertion of a full set of 320 LAD dummies. To account for time-varying LAD characteristics, which might be related to both life satisfaction and migrant inflows, we include the LAD-level job claimant rate, the crime rate, the rate of migrant registrations with general health practitioners (GPs) (total job claimants, total crime count, and migrant registrations with GPs, all as a proportion of LAD

¹⁰ Note that in our case it is not possible to cluster standard errors at the LAD level. This is because our panel dimension is the individual, and individuals can change LADs over time. We have experimented with a sample of non-movers, which allows for clustering at the LAD level, and found very similar results from either clustering option.

population), the log of median house price, and the log of median gross annual salary by LAD.¹¹ Crime, house prices, and salary data are only available for England and Wales, so our final sample excludes respondents interviewed in Scotland and Northern Ireland.¹² All specifications also include a set of standard socio-demographic controls: log of household monthly income, labor market status, subjective general health status, marital status, number of children, household size, housing tenure and highest education level attained. Finally, all year-specific influences on life satisfaction are captured by year dummies.¹³

We proceed by presenting our baseline estimates for three time periods: the whole period (2003-2008), the initial period of the ‘migration shock’ (2003-2005), and the later, ‘matured flows’ period (2006-2008). To check whether immigration is related to the life satisfaction of residents through other local-level variables, we estimate the models with and without the LAD-level controls. Also, as discussed above, we are interested in whether the impact of migration differs across different groups of people. For this reason, we report results from

¹¹ The job claimant rate for each LAD and year is directly available from the ONS (see <https://www.nomisweb.co.uk/>). Total crime, migrant registrations with GPs, median house price and median gross annual salary are also available from the ONS (the first two are divided by the LAD population).

¹² According to the WRS data for 2004-2011, 85.7% of A8 immigrants went to England, 8.37% to Scotland, 3.62% to Northern Ireland, and 2.29% to Wales. Our analysis, thus, captures the bulk of the A8 migrant inflows in the UK. We did additional regressions by including both Scotland and Northern Ireland (the latter available as a boost sample in the BHPS after 2001) and by excluding the LAD-level controls. Results were very similar to the ones reported in this paper.

¹³ Descriptive statistics for all variables used in the following analysis are presented in Appendix Table A1.

(separate) specifications where the migrant inflow rate is interacted with age, employment status, household income, and education level.¹⁴

Our final sample, after dropping observations with missing information for any of the variables used in the analysis and keeping only UK natives (i.e. people reporting that were born in the UK), consists of 30,448 observations, across 8,252 persons and 320 local authorities in England and Wales, for the whole 2003-2008 period (excluding 2004, as was mentioned above).

4. Results

4.1 Baseline estimates

We start our analysis by estimating the baseline model for the three time periods: 2003-2008, 2003-2005 and 2006-2008. Estimates from two specifications for each period, the first without the LAD-level controls and the second including them, are presented in Table 1. On average, there is no significant relationship between local migrant inflows and the life

¹⁴ Age can only be inserted in the model through its interaction term. Its direct effect on life satisfaction cannot be identified in a fixed effects model that includes year dummies, since its change is constant across time for all persons (Wooldridge, 2006: 489). Note also that we experimented with specifications where all the relevant interaction terms were simultaneously inserted in the model. This did not prove to be a very helpful exercise since no variables of interest reached statistical significance, pointing to a largely demanding model with very high collinearities among the interaction terms. This should be kept in mind when interpreting the results presented in the following sections.

satisfaction of UK nationals. All LAD-level controls, in the model specifications that include them (2, 4 and 6), are also statistically insignificant. Importantly, their inclusion does not seem to substantially affect the estimate for the coefficient of our variable of interest, the migrant inflow rate. We also note that the results for the coefficients of the control variables are broadly consistent with the findings reported in the related literature (e.g. Akay et al. 2014): married or cohabiting individuals are more satisfied with their lives than similar never married or widowed/divorced/separated ones, the unemployed report significantly lower satisfaction than the employed or the inactive, while worse levels of health are also associated with much lower life satisfaction.

[Table 1 about here]

4.2 Interactions

A different picture emerges when the interaction terms between the migrant inflow rate and various individual-level characteristics are entered into the model (Table 2). Starting with age (Panel A), for the whole period of 2003-2008, the coefficient of the migrant inflow rate is positive and that of the interaction term negative, while both are significant at the 99% level. A positive coefficient of the migrant inflow rate and a negative for the interaction term imply that young people become more satisfied with life as immigration increases in their local authority, while old people become less satisfied.

Estimating the model for the two time periods reveals that this finding is driven by the initial 2004-2005 ‘migration shock’ (column 2 of panel A in Table 2), while the coefficients of interest are insignificant for 2006-2008 (column 3 of panel A in Table 2). This makes

intuitive sense, since a large change in migration, like the one that took place between 2003 and 2005, is generally needed for an effect to be more accurately identified.¹⁵

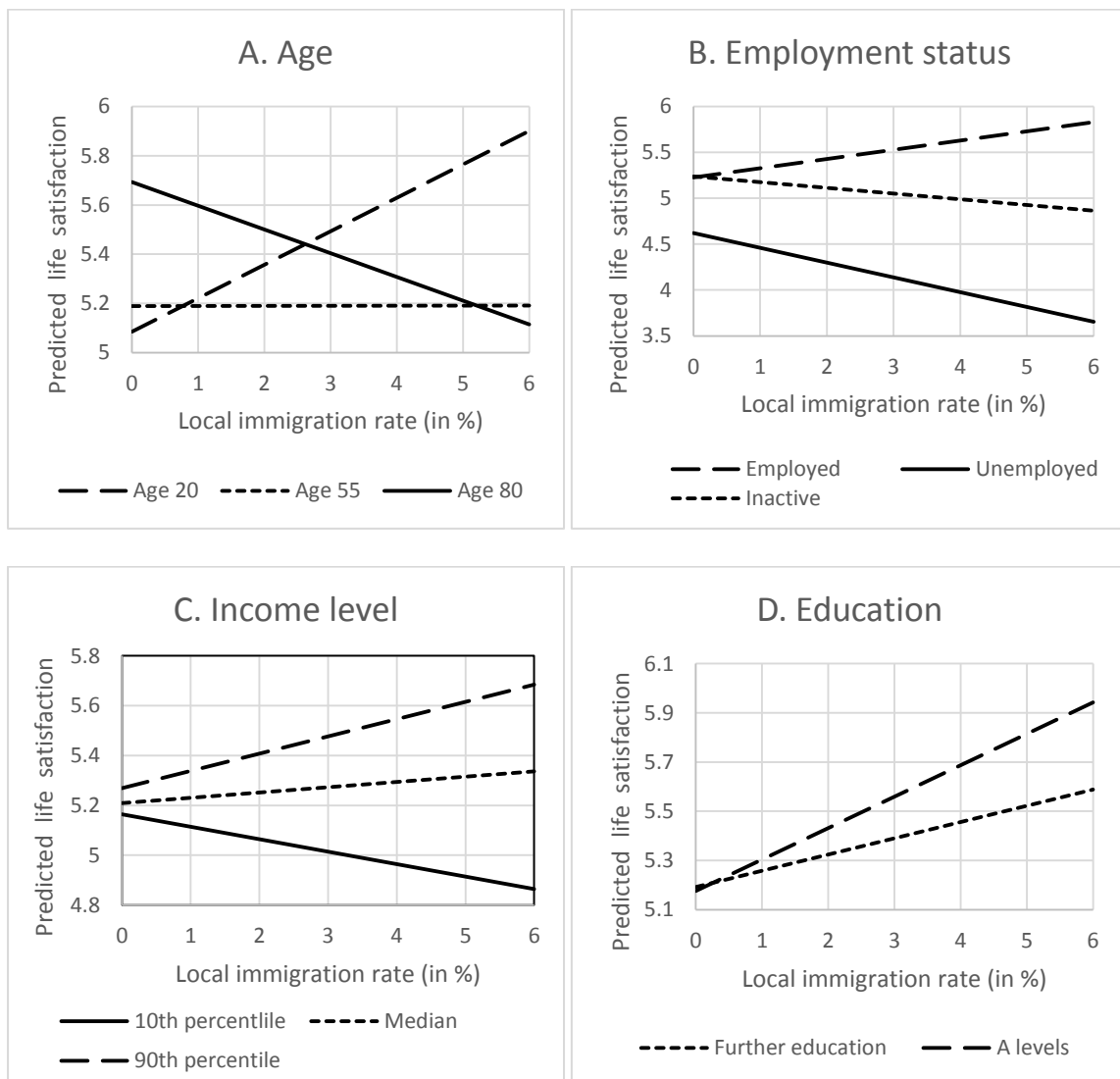
[Table 2 about here]

To get a clearer idea of the direction and size of the estimated relationships, Panel 1 of Figure 2 plots the predicted life satisfaction as a function of the local immigration rate (ranging from 0% to the maximum value observed in the data, 5.65%) for respondents aged 20, 55 (the age-turning point at which the relationship between the migrant inflow rate and life satisfaction turns from positive to negative for the 2003-2005 specification) and 80, based on the 2003-2005 results (column 2 of panel A in Table 2). Predicted life satisfaction increases with the local immigration rate for a 20-years old and decreases with the local immigration rate for an 80-years old, while for someone aged 55 it is essentially a straight line. Additional calculations suggest that, for a 20-year old UK native living in England or Wales in 2005, an increase in the migrant inflow rate in her local authority from zero to the maximum value observed in the data (5.65%) is associated with an *increase* in life satisfaction equal to 0.62 of its standard deviation, *ceteris paribus*. The same increase in the migrant inflow rate is associated with a *decrease* in life satisfaction equal to 0.44 of its standard deviation for an 80-year old, *ceteris paribus*. These are substantial associations in size. For comparison purposes, consider the result we obtain for one of the strongest (statistically and substantially) predictors of life satisfaction in our estimated equation – the subjective general health status of individuals. Based on our results, a person experiencing a deterioration of health from

¹⁵ The overall sample mean of the migrant inflow rate is 0.24% (see Appendix Table A1). The sample mean of the migrant inflow rate for each year is as follows: 0 (2003, as stated above); 0.40% (2005); 0.32% (2006); 0.31% (2007); and 0.22% (2008).

“excellent” (the highest health category) to “very poor” (the lowest health category) is estimated to expect a reduction of around half its standard deviation in her well-being, *ceteris paribus*.

Figure 2. Predicted life satisfaction as a function of the local immigration rate for respondents of different age, employment status, income and education



Source: Authors’ calculations based on the results for the 2003-05 specifications presented in Table 2.

Differential effects of immigration are also evident if we look at other socio-demographic variables. Focusing on employment status, and on the ‘migration shock’ 2003-2005 period

(Column 5 of Panel B in Table 2), we can see that the migrant inflow rate is positively and significantly related to life satisfaction for employed individuals. Instead, the negative and significant interaction terms for the unemployed and inactive people, imply that their life satisfaction of these two groups decreased with the local immigration rate (see also Panel B of Figure 2). The results are insignificant for the 2006-2008 period, as in the case of the specification with the age-interaction term.

Turning to household income, the results indicate that, in the 2003-2005 period, life satisfaction increased with the local immigration rate in higher-income households and decreased with it in lower-income households (Panel C of Figure 2). However, the coefficient of the interaction variable is significant at only the 10% level. The relevant calculations using the results from Column 2 in panel C of Table 2 show that the association between immigration and life satisfaction turns from negative to positive for income levels around the median of the log of income distribution. When the effect of immigration is allowed to vary across different education levels (Panel D of Table 2), the coefficient of the inflow rate is negative and insignificant, indicating no relationship between immigration and life satisfaction for people with no qualifications (the reference group). The interaction terms are positive and statistically significant (at the 10 and 5% level) in 2003-05 for respondents with further education and A levels, meaning that, for these groups, life satisfaction increased with the local immigration rate (see also Panel D of Figure 2). Having said that, we remain quite cautious about putting too much weight on the estimates of the income and education interaction terms because of their relatively low levels of significance (10%).

4.3 Further checks¹⁶

¹⁶ All results reported in this section are available from the authors on request.

To examine the robustness of our results, we first estimate a variant of the fixed effects regressions presented in Table 2 (for the 2003-2008 and 2003-2005 periods), where each person's level of life satisfaction in 2003 is replaced with the average life satisfaction for 2000-2003.¹⁷ We do this to ensure that our results are not driven by the way life satisfaction data were reported and recorded in a particular year (2003). The findings are very similar to the ones presented in Table 2, although the estimated coefficients for the migrant inflow rate and its interaction terms are generally smaller in (absolute) size.

Second, we have used an alternative measure to capture subjective well-being – an index of psychological health, derived from the General Health Questionnaire (GHQ).¹⁸ Both the migrant inflow rate and its interactions are statistically insignificant in all specifications of Table 2 when life satisfaction is replaced with this GHQ index as the dependent variable in the models. A plausible explanation is that life satisfaction and the GHQ index are not comparable measures. The GHQ index is closely related to mental health issues, while life satisfaction is a broader measure of individual well-being.

5. Discussion and conclusion

¹⁷ 2001 is omitted since the life satisfaction question was not asked in that year.

¹⁸ The GHQ in BHPS has 12 question items with possible answers ranging from 1 to 4, each corresponding to (increasing) frequencies of feelings related to psychological health. Hence, the final measure ranges from 12 to 48, with higher values corresponding to worse health. We reverse the measure so that it increases in good health. See Table 4A of the Supplementary Information document for the specific questions included in the GHQ and Dawson et al. (2015) for a more in depth discussion of the various health and well-being measures in the BHPS.

The 2004 European Union enlargement triggered an unprecedented wave of 1.5 million Eastern European workers relocating to the UK. While the evidence shows that this massive migrant inflow had a very modest impact on the UK labor market, its wider effects on the UK population are still underexplored. In this paper, we went beyond the standard labor market effects of migration and explored how A8 migration affected life satisfaction of the UK residents.

Combining data from the British Household Panel Survey with the administrative, local authority level information on A8 migrant inflows in England and Wales, we relate the changes in individual life satisfaction with the intensity of local-level immigration. The results of the estimations, which account for unobserved individual heterogeneity, time-invariant, and time-varying local-level characteristics, show that immigration from the A8 countries in the UK is not *on average* related to the life satisfaction of UK nationals. However, more intense local-level immigration was associated with lower life satisfaction among older people, as well as the unemployed and the economically inactive, while the life satisfaction of younger people and those in employment went up with local-level immigration. We have also obtained somewhat weaker evidence that the life satisfaction of better educated UK nationals and those with higher incomes increased with immigration, while the life satisfaction of people with low incomes decreased with it. All these above-mentioned associations were pronounced in the ‘migration shock’ period – the first two years after the UK opened its labor market to the new Europeans – and became statistically insignificant in the longer term.

How can one explain these results? A positive association between immigration and life satisfaction for the young could be because young people are in favor of diversity brought

about by immigration. In contrast, older people might be particularly opposed to diversity and change, as well as be concerned with the (perceived) pressure immigrants put on local health services; this could explain why the elderly become less life-satisfied when larger immigrant inflows take place. Overall, the age group differences corroborate a finding from the literature on attitudes towards immigration that old people are more opposed to immigration than young people (Mayda, 2006; Facchini and Mayda, 2008; Malcow-Møller et al., 2008).¹⁹ It is thus likely that people's attitudes towards immigration, possibly strengthened by actual encounters with immigrants, feed into life satisfaction.

The negative association between the local immigration rate and life satisfaction among the unemployed could mean that people in this group feel that their chances of getting back to work and their labour market bargaining power get weaker with higher levels of immigration – a form of labour market competition. At the same time, those in employment do not seem to be threatened by labour market competition, as their life satisfaction increases with the levels of local immigration. This is consistent with the evidence that the post-enlargement immigration did not have adverse effects on UK wages and unemployment (Gilpin et al., 2006; Lemos and Portes, 2013; Lemos, 2014), as well as the evidence that natives move to other, potentially more desirable, types of jobs (such as communication-intensive jobs) as immigrants come in (Peri, 2014). The negative association between the local immigration rate and life satisfaction among the economically inactive echoes the negative association between the two variables among the elderly: the latter are retired and less likely to

¹⁹ Unfortunately, the BHPS does not contain information on individual attitudes towards immigration and we are unable to test whether the negative relationship between age and pro-immigration attitudes holds in our case.

participate in the labour force, while the largest part (around 60%) of inactive people in our sample consists of retired people.

The finding that life satisfaction increases with local-level immigration among those with high incomes and relatively high levels of education, even if of weaker significance than the age and employment status interactions, could indicate that these groups do not perceive Eastern European migrants as labour market competitors (which is consistent with the fact that the A8 migrants are concentrated in low-skilled sectors/occupations). Instead, the wealthier and better educated could be gaining in life satisfaction through, for example, enhanced social life (many A8 migrants are employed in the hospitality industry, keeping its product prices low) or satisfaction with house or family life (A8 migrants increased the supply of cheap household services). These conjectures echo the results by Akay et al. (2014), who show that immigration increases satisfaction with dwelling among respondents in Germany.

Overall, the results of our paper suggest that immigration does not affect the well-being of different groups of people in the same way and that labour market considerations are unlikely to be a dominant factor in explaining the links between immigration and natives' well-being. In addition, the fact that the life satisfaction of particular groups, such as the elderly, decreases with immigration has implications for the formation of immigration policy in most developed immigration-receiving countries, where populations are aging and older people are generally more likely to vote (Melo and Stockemer, 2014). From this perspective, the recent decision of the UK to leave the EU could well be explained by the negative association between A8 immigration and the life satisfaction of older people in the UK. This contention, however, hinges on the assumptions that 1) the Brexit referendum vote was indeed largely

about restricting immigration, and 2) life satisfaction affects people's immigration policy preferences. The second assumption, in particular, has received little attention in the literature and, as such, represents a fruitful avenue for future research.

REFERENCES

- Akay A, Constant A and Giulietti C (2014) The impact of immigration on the well-being of natives. *Journal of Economic Behavior and Organization* 103: 72-92.
- Akay A, Constant A, Giulietti C, Guzi M (2017) Ethnic diversity and well-being. *Journal of Population Economics* 30(1): 265-306.
- Alfano M, Dustmann C and Frattini T (2016) *Immigration and the UK: Reflections After Brexit*. CREAM Discussion Paper 23/16.
- Aslam A and Corrado L (2012) The geography of wellbeing. *Journal of Economic Geography* 12: 627-649.
- Ballas D and Tranmer M (2012) Happy People or Happy Places? A Multilevel Modeling Approach to the Analysis of Happiness and Well-Being. *International Regional Science Review* 35(1): 70-102.
- Bauere V, Densham P, Millar J and Salt J (2007) Migrants from Central and Eastern Europe: Local geographies. *Population Trends* 129: 7–19.
- BBC (2013) Fens migrant workers 'exploited', BBC finds. Available at: <http://www.bbc.co.uk/news/uk-england-24108665>
- Becker S, Fetzer T and Novy D (2016) *Who Voted for Brexit? A Comprehensive District-Level Analysis*. CAGE Working Paper 305/2016.
- Bell B, Fasani F and Machin S (2013) Crime and Immigration: Evidence From Large Immigrant Waves. *Review of Economics and Statistics* 95(4): 1278-1290.
- Betz W and Simpson NB (2013) The effects of international migration on the well-being of native populations in Europe. *IZA Journal of Migration* 2:12.
- Brücker H and Damelang A (2009) Labour Mobility within the EU in the Context of Enlargement and the Functioning of the Transitional Arrangements: Analysis of the

Scale, Direction and structure of Labour Mobility. Background Report, IAB, Nürnberg.

Bulman M (2017) Young people consider immigration 'least important issue' in Brexit negotiations, survey finds. Available at:

<http://www.independent.co.uk/news/uk/home-news/brexit-young-people-immigration-reducing-least-important-a7539506.html>

Constant A (2012) Sizing It Up: Labor Migration Lessons of the EU Enlargement to 27. In: Gortázar C, Parra C, Segaert B and Timmerman C (eds) *European Migration and Asylum Policies: Coherence or Contradiction*. Bruylant: Belgium, pp.49-77.

Constant A (2014) Do migrants take the jobs of native workers? *IZA World of Labor* 2014: 10.

Dawson C, Veliziotis M, Pacheco G and Webber DJ (2015) Is temporary employment a cause or consequence of poor mental health? A panel data analysis. *Social Science and Medicine* 134: 50-58.

De Neve J-E, Diener E, Tay L and Xuereb C (2013) The Objective Benefits of Subjective Well-Being. In: Helliwell J, Layard R and Sachs J (eds) *World Happiness Report 2013*. New York: UN Sustainable Development Solutions Network.

Dustmann C, Frattini T and Halls C (2010) Assessing the Fiscal Costs and Benefits of A8 Migration to the UK. *Fiscal Studies* 31(1): 1-41.

Elsner B (2013) Emigration and Wages: The EU Enlargement Experiment. *Journal of International Economics* 91(1): 154-163.

Facchini G and Mayda AM (2008) From individual attitudes to immigration policy: theory and evidence. *Economic Policy* 56: 651–713.

Ferrer-i-Carbonell A and Frijters P (2004) How important is methodology for the estimates of the determinants of happiness? *The Economic Journal* 114(497): 641-659.

- Geddes A (2014) The EU, UKIP and the Politics of Immigration in Britain. *The Political Quarterly* 85(3): 289–295.
- Gietel-Basten S (2016) Why Brexit? The Toxic Mix of Immigration and Austerity. *Population and Development Review* 42(4): 673-680.
- Gilpin N, Henty M, Lemos S, Portes J and Bullen C (2006) *The Impact of Free Movement of Workers from Central and Eastern Europe on the UK Labour Market*. Department for Work and Pensions Working Paper No. 29.
- Goodwin MJ and Heath O (2016). The 2016 referendum, Brexit and the Left Behind: An aggregate-level analysis of the result. *The Political Quarterly* 87(3): 323–332.
- Howley P, Neill S and Atkinson R (2015) Who needs good neighbors? *Environment and Planning A* 47(4): 939-956.
- Iammarino S and Marinelli E (2011) Is the grass greener on the other side of the fence? Graduate mobility and job satisfaction in Italy. *Environment and Planning A* 43(11): 2761-2777.
- Ivlevs A (2015) Happy moves? Assessing the link between life satisfaction and emigration intentions. *Kyklos* 68(3): 335-356.
- Jayaweera H and Anderson B (2008) *Migrant workers and vulnerable employment: a review of existing data*. Report for TUC Commission on Vulnerable Employment.
- Kahanec M, Pytlikova M and Zimmermann K (2016) The Free Movement of Workers in an Enlarged European Union: Institutional Underpinnings of Economic Adjustment. In: Kahanec M and Zimmermann KF (eds) *Labor Migration, EU Enlargement, and the Great Recession*. Springer: Berlin.
- Lawless J (2015) In an English market town, a political battle over immigration. Available at: <http://www.macleans.ca/politics/worldpolitics/in-an-english-market-town-a-political-battle-over-immigration/>

- Lemos S and Portes J (2013) New Labour? The Effects of Migration from Central and Eastern Europe on Unemployment and Wages in the UK. *The B.E. Journal of Economic Analysis and Policy* 14(1): 299-338.
- Lemos S (2014) Labour Market Effects of Eastern European Migration in Wales. *The Manchester School* 82(5): 524-548.
- Liberini F, Redoano M and Proto E (2017) Happy voters. *Journal of Public Economics* 146: 41-57.
- Longhi S (2014) Cultural diversity and subjective well-being. *IZA Journal of Migration* 3:13.
- Malchow-Møller N, Munch JR, Schroll S and Rose Skaksen J (2008) Attitudes towards immigration: perceived consequences and economic self-interest. *Economics Letters* 100: 254–257.
- Mayda AM (2006) Who is against immigration? A cross-country investigation of individual attitudes toward immigrants. *Review of Economics and Statistics* 88(3): 510-530.
- McCollum D (2012) Investigating A8 migration using data from the Worker Registration Scheme: Temporal, spatial and sectoral trends. *Land Economy* 28(1): 35–50.
- Melo D and Stockemer D (2014) Age and political participation in Germany, France and the UK: A comparative analysis. *Comparative European Politics* 12: 33-53.
- MigrationWatch (2012) Youth Unemployment and Immigration from the A8 Countries. Migration Watch Briefing Paper 3.16.
- Nikolova M and Graham C (2015) In transit: the well-being of migrants from transition and post-transition countries. *Journal of Economic Behavior and Organization* 112: 164-186.
- Nowok B, van Ham M, Findlay A and Gayle V (2013) Does migration make you happy? A longitudinal study of internal migration and subjective well-being. *Environment and Planning A* 45(4): 986-1002.

- OECD (2013) *Guidelines on measuring subjective well-being*. Paris: OECD.
- Office for National Statistics (2013) *Personal Well-being in the UK, 2012/13*. United Kingdom: Office for National Statistics.
- Oswald AJ, Proto E and SgROI D (2015) Happiness and Productivity. *Journal of Labor Economics* 33(4): 789-822.
- Peri G (2014) Do immigrant workers depress the wages of native workers? *IZA World of Labor* 2014: 42.
- Pierewan AC and Tampubolon G (2014) Spatial dependence multilevel model of well-being across regions in Europe. *Applied Geography* 47: 168-176.
- Pittau MG, Zelli R and Gelman A (2010) Economic Disparities and Life Satisfaction in European Regions. *Social Indicators Research* 96: 339–361.
- Rhys A, Boyne GA, Meier KJ, O'Toole LJ and Walker RM (2009) European Union Accession and Public Service Performance. *Policy & Politics* 37(1): 19-37.
- Rosenbaun M (2017) Local voting figures shed new light on EU referendum. Available at: <http://www.bbc.co.uk/news/uk-politics-38762034>.
- SgROI D, Hills T, Donnell G, Oswald A and Proto E (2017) Understanding Happiness: A CAGE Policy Report. London: Social Market Foundation.
- Shields M, Wheatley Price S and Wooden M (2009) Life satisfaction and the economic and social characteristics of neighborhoods. *Journal of Population Economics* 22(2): 421-443.
- Simpson N (2013) Happiness and Migration. In: Zimmerman K and Constant AF (eds) *International Handbook on the Economics of Migration*. Cheltenham: Edward Elgar.
- Sumption M and Somerville W (2010) The UK's New Europeans: Progress and Challenges Five Years After Accession. Manchester: Equality and Human Rights Commission.

The Economist (2015) The recent numbers on immigration pushed the issue to the top of voters' concerns. How they vote is a different matter. *The Economist*, 19 March.

The Guardian (2010) Young, self-reliant, educated: portrait of UK's eastern European migrants. Available at: <http://www.theguardian.com/uk/2010/jan/17/eastern-european-uk-migrants>

Tselios V, Noback I, McCann P and van Dijk J (2015) Local social engagement, satisfaction, and embeddedness in the Netherlands: which effects matter and for whom? *Environment and Planning A* 47(5): 1132-1154.

Ward G (2015) *Is Happiness a Predictor of Election Results?* CEP Discussion Paper No. 1343.

Wooldridge A (2006) *Introductory Econometrics: A Modern Approach*. (Third Edition). Mason, OH: Thomson Higher Education.

Table 1. Migrant inflows and life satisfaction, OLS fixed effects estimates

	Full sample (2003-08)		2003-05		2006-08	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Local authority level variables</i>						
Migrant inflow rate	0.363	1.215	1.206	2.337	4.623	4.682
Job claimants rate	-	-0.036	-	-0.083	-	0.020
Crime rate	-	0.759	-	0.740	-	-0.580
Log of average house price	-	0.037	-	0.113	-	0.282
Log of average salary	-	-0.254	-	-0.136	-	-0.253
GP rate	-	-0.550	-	-0.088	-	-1.558
<i>Individual-level control variables</i>						
Marital status (Base: Never married)						
<i>Married or Cohabiting</i>	0.202***	0.203***	0.193*	0.196**	0.198**	0.197**
<i>Widowed, Divorced or Separated</i>	-0.056	-0.054	0.091	0.095	-0.021	-0.024
Number of children in the household	0.003	0.004	-0.000	0.001	0.049	0.050
Household size	-0.001	-0.002	0.016	0.013	-0.006	-0.007
Labor market status (Base: Employed)						
<i>Unemployed</i>	-0.221***	-0.218***	-0.268**	-0.265**	-0.233***	-0.233***
<i>Inactive</i>	-0.034	-0.034	-0.045	-0.045	-0.054	-0.054
Log of Monthly Household Income	0.007	0.007	0.008	0.009	-0.004	-0.003
Education (Base: No qualifications)						
<i>Degree</i>	-0.119	-0.117	0.217	0.213	-0.342*	-0.352*
<i>Further Education</i>	0.083	0.085	0.204	0.209	-0.008	-0.014
<i>A Levels</i>	0.001	0.003	0.107	0.111	-0.151	-0.157
<i>O Levels</i>	0.011	0.013	-0.158	-0.153	0.018	0.014
<i>Other Qualifications</i>	-0.014	-0.015	-0.181	-0.177	-0.358	-0.363
Health status (Base: Excellent)						
<i>Good</i>	-0.133***	-0.133***	-0.097***	-0.097***	-0.095***	-0.096***
<i>Fair</i>	-0.318***	-0.318***	-0.295***	-0.296***	-0.254***	-0.255***
<i>Poor</i>	-0.585***	-0.585***	-0.452***	-0.454***	-0.492***	-0.492***
<i>Very Poor</i>	-0.857***	-0.858***	-0.604***	-0.602***	-0.765***	-0.764***
Home ownership (Base: Social Housing)						
<i>Outright House Owner</i>	0.014	0.016	0.124	0.127	-0.011	-0.010
<i>House Owner with Mortgage</i>	-0.046	-0.046	0.117	0.116	-0.051	-0.050
<i>Rented House</i>	0.010	0.013	0.172	0.171	-0.038	-0.037
Local authority fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	30,448	30,448	12,441	12,441	18,007	18,007
Number of persons	8,252	8,252	7,280	7,280	7,026	7,026
R-squared	0.044	0.044	0.072	0.073	0.040	0.040

Source: BHPS 2003-2008 and authors' calculations.

Notes: *** Significant at 0.01, ** at 0.05, * at 0.1. Standard errors (not reported) clustered at the individual level. Full econometric output is available in the supplementary information document.

Table 2. Migrant inflows and life satisfaction, with interaction terms, OLS fixed effects estimates

	A. Age			B. Employment status		
	2003-08	2003-05	2006-08	2003-08	2003-05	2006-08
	(1)	(2)	(3)	(4)	(5)	(6)
Migrant inflow rate	21.283***	21.004**	-2.033	5.692	9.887**	-0.237
Migrant inflow rate * Age	-0.424***	-0.381**	0.152	-	-	-
Migrant inflow rate * Employed	-	-	-	Ref.	Ref.	Ref.
Migrant inflow rate * Unemployed	-	-	-	-9.343	-25.753**	25.210
Migrant inflow rate * Inactive	-	-	-	-11.566**	-16.010**	12.338
Local authority level controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual level controls	Yes	Yes	Yes	Yes	Yes	Yes
Local authority fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	30,448	12,441	18,007	30,448	12,441	18,007
Number of persons	8,252	7,280	7,026	8,252	7,280	7,026
R-squared	0.044	0.074	0.040	0.044	0.075	0.040
	C. Income			D. Education		
	2003-08	2003-05	2006-08	2003-08	2003-05	2006-08
	(1)	(2)	(3)	(4)	(5)	(6)
Migrant inflow rate	-31.311	-47.492	7.277	-9.695	-9.464	13.592
Migrant inflow rate * Income	4.132	6.309*	-0.332	-	-	-
Migrant inflow rate * Degree	-	-	-	14.059*	13.563	-10.655
Migrant inflow rate * Further Education	-	-	-	14.947**	15.956*	-11.258
Migrant inflow rate * A Levels	-	-	-	14.658	22.030**	-32.066
Migrant inflow rate * O Levels	-	-	-	12.826	7.993	-1.599
Migrant inflow rate * Other Qualifications	-	-	-	9.334	23.626	5.298
Migrant inflow rate * No Qualifications	-	-	-	Ref.	Ref.	Ref.
Local authority level controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual level controls	Yes	Yes	Yes	Yes	Yes	Yes
Local authority fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	30,448	12,441	18,007	30,448	12,441	18,007
Number of persons	8,252	7,280	7,026	8,252	7,280	7,026
R-squared	0.044	0.073	0.040	0.044	0.075	0.040

Source: BHPS 2003-2008 and authors' calculations.

Notes: *** Significant at 0.01, ** at 0.05, * at 0.1. The same control variables as in Table 1 are included in all regressions. Standard errors (not reported) clustered at the individual level. Full econometric output is available in the supplementary information document.

APPENDIX TABLE A1: Descriptive Statistics

Variable	Mean	St. dev.	Min	Max
Life satisfaction	5.2145	1.2084	1	7
LAD level variables				
Migrant inflow rate	0.0024	0.0029	0	0.0565
Job claimant rate	2.2560	1.0847	0.4	6.5
Crime rate	0.0964	0.0371	0.0205	0.3758
Log of median house price	11.9018	0.3476	10.4617	13.1062
Log of median gross annual salary	9.8631	0.1579	9.4147	10.4895
New migrant GP registrations rate	0.0092	0.0081	0.0002	0.0530
Individual level variables				
Age	46.1724	18.4830	16	99
Log monthly household income (in 2005 prices)	7.7620	1.0384	-6.9893	11.2887
<i>Labor market status</i>				
Employed	0.6072	-	-	-
Unemployed	0.0290	-	-	-
Inactive	0.3638	-	-	-
<i>Subjective general health status</i>				
Excellent	0.2262	-	-	-
Good	0.4836	-	-	-
Fair	0.2093	-	-	-
Poor	0.0649	-	-	-
Very poor	0.0160	-	-	-
<i>Marital status & household characteristics</i>				
Married or Cohabiting	0.6739	-	-	-
Widowed, Divorced or Separated	0.1299	-	-	-
Never Married	0.1962	-	-	-
Number of children in household	0.4846	0.8922	0	7
Household Size	2.8361	1.3211	1	10
<i>Housing tenure</i>				
Outright House Owner	0.3039	-	-	-
House Owner with Mortgage	0.4737	-	-	-
Rented House	0.0911	-	-	-
Social Housing	0.1313	-	-	-
<i>Education</i>				
Degree	0.1480	-	-	-
Further Education	0.3260	-	-	-
A Levels	0.1252	-	-	-
O Levels	0.1671	-	-	-
Other Qualifications	0.0741	-	-	-
No Qualifications	0.1594	-	-	-

<i>Year</i>					
	2003	0.2150	-	-	-
	2005	0.1936	-	-	-
	2006	0.2085	-	-	-
	2007	0.1974	-	-	-
	2008	0.1855	-	-	-
Additional variable					
	GHQ – Psychological health	24.8021	5.4784	0	36
<hr/>					
	Number of person-year observations	30,448			
	Number of persons	8,252			
<hr/>					

Source: BHPS 2003-2008 and authors' calculations.

Notes: Full descriptive statistics for continuous and satisfaction variables, only sample means reported for dummy variables.