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Skill Transferability and Immigrant-Native Wage Gaps

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Abstract

In this paper, I examine wage developments among Eastern European immigrants versus UK natives between 1998 and 2008 by measuring the extent to which inter-group wage differentials are explainable by these groups' changing attributes or by differences in returns to these characteristics. Specifically, by applying unconditional quantile regression to immigrant-native wage gaps before and after the 2004 EU enlargement to Eastern countries, I show that a major part of the decrease in the average wages of Eastern European migrants in the UK results from a large decrease in wage levels at the top of the distribution. At all distribution points, major role is played by occupational downgrading, which increases over time. The results further suggest that the decreased wage levels at the top of the distribution stem mainly from low transferability of skills acquired in the source country.

JEL-code: J31, J61, F22

Keywords: migration, EU enlargement, labour market outcomes

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1 Introduction

Over a very short time, Eastern European immigrants have become one of the largest immigrant groups in the UK labour market. Recent estimates from the Office of National Statistics (2011) show that in Q12002, immigrants from EU8 countries¹ represented 0.2% of all employed workers, a number that increased to 2.2% by Q12011 (versus a relatively stable 2% share of workers from other EU countries). This increase in Eastern European immigrant workers (Figure 1) is linked to the May 2004 accession of these countries to the European Union (EU) and in particular, to a lack of restrictions in the UK labour market. That is, whereas most other European countries have imposed transitional constraints on the free movement of workers from Eastern Europe; the UK, Ireland and Sweden allow them to work in their labour markets without any particular requirements².

As these differences suggest, changes in migration policies can greatly affect both immigrant composition and quality. For example, not only can selective immigration policies affect immigrant labour market outcomes by altering skill composition (see e.g. Antecol, Cobb-Clark and Trejo, 2004), but EU8 migration, and particularly Polish immigration, has changed both the composition and scale of immigration in the UK (Pollard, Latorre and Sriskandarajah, 2008). The 2004 European enlargement can thus serve as an interesting case study on the effect of eliminating administrative barriers to immigrant selection. As pointed out by Borjas (2014), little is known on the effects of a chosen policy on the size and composition of the immigration flows. In this analysis, I use this case to assess how enlargement has impacted the skills of various immigrant groups and how resulting skill changes have transferred to immigrant wage distributions relative to native workers.

The research contribution is twofold: First, the analysis adds to the literature and debate on the effect of EU enlargement on the UK labour market by providing a detailed picture of the wage differences between immigrants and natives. It does so by examining not only average wages but

¹ Poland, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Slovakia and Slovenia.

² As explained in Boeri and Brucker (2005), until May 2011, only Sweden allowed labourers to move freely around the country; the UK required them to register with the Working Registration Scheme (WRS), and Ireland employed a similar registration scheme (see Appendix A.1., for more background details on UK policy before and after 2004). Also see Appendix A1 for more information on the immigration policies in place.

also the entire wage distribution through decomposition of immigrant-native wage gaps at different percentiles. This decomposition reveals whether changes at the bottom or top of the distribution are explainable by similar factors. For example, the distribution can reveal whether the EU8 immigrant glass ceiling is comparable to that of other immigrant groups, especially upon arrival in the country. This decomposition is achieved using the unconditional quantile regression method introduced by Firpo, Fortin and Lemieux (2009), which allows recovery of the unconditional parameter that would be unrecoverable using standard conditional quantile regression. In the immigration literature, Boudarbat and Lemieux (2014) apply this method to identify the different factors that triggered a higher decline in the 1980–2000 immigrant-Canadian born wage gap at the bottom of the wage distribution. My goal is to similarly identify possible causes of the wage gap decrease for EU8 immigrant workers. However, because human capital acquired in the destination country cannot be considered a substitute for human capital acquired in the source country (see e.g. Friedberg, 2000), immigrant experience is divided into foreign experience and experience acquired in the British labour market.

[Figure 1 about here]

The second major contribution of the paper is its focus on a specific immigrant group, those coming from EU8 countries, whose wage gap relative to natives has been worsening differently over the years at each point in the distribution (Table 2). Although Hunt (2012) uses a slightly different econometric technique³ to conduct a similar exercise for the UK, she only distinguishes between White ethnic migrants and migrants from English-speaking countries, with no distinction made by country of origin. She does demonstrate, however, that immigrant performance varies widely at the bottom and top of the distribution and that mean wage differences mask other important differences. For instance, whereas immigrants at the bottom earn less than natives, those at the top may earn even higher wages than their native equivalents. In 2009, however, immigrant wages became lower than those of natives at all deciles with the exception of the 90th. My

³ She uses the Machado and Mata (2005) decomposition.

analysis builds on this finding by showing that this leftward shift of the UK immigrant wage distribution is strongly linked to post-accession migration.⁴

If we consider, the U.S. migration literature, specifically, it has a strong tradition of studying immigrants from a single origin country, particularly Mexico, with a close link identified (and much documented for Mexican immigrants to the U.S.) between national origin and general trends in immigrant skills (e.g. Borjas, 1985, 1995, 1996; Funkhouser and Trejo, 1995; Trejo, 1997). The majority of these studies find that growth of the Mexican flow can account for the decline in immigrant skills, they also show that the poor economic performance of Mexican immigrants may also be responsible for an overall deterioration of wage differentials across ethnic groups. In a similar fashion, I compare EU8 immigrants' performance in the UK labour market before and after enlargement, to investigate the deterioration of immigrant wages in the UK.

My results, based on 10 years (1998–2008) of data from the British Labour Force Survey (hereafter, UK LFS), show that, compared to British natives, EU8 immigrants have spent more years in school but that since 2004, their educational level has decreased, because of the relative increased educational attainment among natives. Most of the decrease can be attributed to occupational downgrading, although the analytic results also provide evidence that source country education is less valued in the British market. In fact, once the wage regression controls for occupation, the returns to education appear very similar over the pre- and post-2004 periods. The return to foreign experience, in contrast, decreases substantially over the two periods (both on average and at different percentiles) and is much lower compared to other immigrant groups. Moreover, before enlargement, EU8 immigrants had similar wages to natives all over the distribution. After 2004, this outcome is changed, with a larger raw wage gap between natives and EU8 immigrants at the top. This higher gap cannot be explained by differences in immigrant and native characteristics, even after I control for occupation and

⁴ As shown by Longhi, Nicoletti and Platt (2013), among others, in the UK, ethnic groups tend to be very heterogeneous, and labour market outcomes are very sensitive to the way groups are disaggregated because of possible within-group variation by religious affiliation and/or generation. Even if the EU8 group is heterogeneous on certain aspects, its labour market performance is very similar, so looking at it as a unique group can still be informative (see n. 21).

industry. Rather, it appears mainly ascribable to differences in wage structure (i.e. returns to characteristics)⁵.

An additional analysis performed to rule out any possibility that the results are determined by the recency of EU8 immigration indicates that these immigrants are actually more likely to compete with other immigrants and not with EU14 immigrants. Also, the occupational downgrading upon arrival is much larger for EU8 immigrants than for all other immigrants. When I estimate the degree of downgrading for recent immigrants I find that EU8 earn around 40% less than a native with the same characteristics and the percentage increase to 50% after 2004. Immigrants from other countries have a much lower degree of downgrading, around 16% before 2004 and 24% after the enlargement. These results and the fact that the return on foreign experience for EU8 immigrants is much lower than that for other groups can be more compellingly explained by lack of skill transferability theory and by the temporariness of migration, both factors that are hard to measure, especially using my data set.

On the other hand, whereas low skill transferability can explain the decreased wages at the top of the distribution, evidence of worsening at the bottom may be explainable by enlargement-induced changes that only allow EU8 immigrants to remain in the UK temporarily. The decline is even more surprising given that jobs at the bottom of the distribution are routine manual tasks that even those with few communication skills and lower educational levels can perform. Thus, in addition to migration temporariness, another explanation may be that immigrants, even compared to low-skilled natives (also found at the bottom), still tend to crowd into less well remunerated positions in low-skilled occupations that require more manual or physical skills, probably because of their imperfect language skills⁶. Although such selection may be happening to all immigrant groups, it seems more notable among EU8 immigrants⁷, a conjecture I evaluate as follows: Section 2 reviews the related literature and explains migration

⁵ Because I cannot control for all factors relevant to wage determination and many characteristics remain unobservable, it is impossible to assess whether (as might be assumed) discrimination plays a role in the high unexplained component (see Altonji and Blank, 1999, for a discussion). Nevertheless, discrimination may be among the factors that are not measured directly (see also Longhi, Nicoletti and Platt, 2013 for a discussion on interpreting unexplained components).

⁶ This immigrant language deficit may cause a shift of natives towards occupations requiring more communication than manual tasks, as documented for the U.S. by Peri and Sparber (2009), Ottaviano, Peri and Wright (2013), and D'Amuri and Peri (2014).

⁷ Table D3 shows the occupational distribution for different groups at the bottom and top of the wage distribution: in the lower part, almost 70% of EU8 immigrants, compared to only 30% of natives, work in occupations involving mainly manual tasks.

theory. Section 3 describes the data and reports relevant descriptive statistics. Sections 4 to 6 then present the results of the regression analyses and robustness checks, after which section 7 concludes the paper.

2 Extant literature and migration theory

2.1 Relevant literature

The recent literature on immigration to the UK focuses extensively on EU8 immigrants in the UK labour market, who are generally deemed better educated than natives but subject to a very high wage penalty. For example, Clark and Drinkwater (2008) show that since enlargement, the great influx of EU8 workers has shifted the wage distribution of recent immigrants in such a way that at the third quartile, immigrants have suffered a real reduction in wages of over £3 per hour, despite higher employment rates. At the same time, as documented by Drinkwater, Eade and Garapich (2009), post-2004 Eastern European immigrants, despite high levels of education and characteristics similar to those of earlier immigrants, tend to be employed in low-paying jobs that translate into lower returns to education than for other immigrant groups. This analysis, however, ends in 2006, only two years after the accession. Nevertheless, the findings are confirmed by Blanchflower and Shadforth (2009), whose analysis of EU8 immigrants' effect on the UK economy identifies *new* EU8 immigrant workers as young; mostly male; subject to lower wages than other immigrants; and highly (un)likely to be (un)employed, more likely to be self-employed and even more likely to be in temporary jobs. The subsequent identification by Longhi and Rokicka (2012) of similar characteristics support the notion that pre- and post-2004 EU8 immigrants have different attributes. Using European LFS data, these authors also show that Polish immigrants in the UK have more years of education than those who remain in Poland.

If EU8 immigrants are considered a White ethnic group, the above findings contrast with the evidence from earlier immigration literature, beginning with Chiswick's (1980) initial finding that the wages of recent White immigrants in the UK tend to be in line with those of native workers. This observation is widely confirmed, most particularly by Bell's (1997) finding that in 1973–1992, recent White immigrants experienced a wage premium with respect to UK natives that was not observable for non-Whites. Dustmann and Fabbri (2005), who also use

pre-enlargement (1979–2004) UK LFS data, similarly document White immigrants earning similar or higher wages than comparable British born natives. Even male immigrants from the future “new accession” countries were performing little differently from natives.

2.2 Migration theory

Combining different migration theories may throw light on the large downgrading and low wages documented for EU8 immigrants. First, given that most EU8 immigrants are recently arrived in the UK and likely to lack the skills that facilitate integration, the lack of certain country-specific characteristics (in most cases, unobservable in the survey) may play an important role. If so, then EU8 recent immigrants would perform similarly to other recent immigrants from other European countries. On the other hand, if two observationally equivalent sets of immigrants (differing only in country of origin) have different earnings ability upon arrival in the destination country, this difference may reflect two factors. First, the transferability of the skills with which immigrants are endowed on entering the country is a function of the country of origin and second, UK employers may have different perceptions of the origin country’s educational system (see e.g. Friedberg, 2000). As shown in later sections, not only education but also foreign experience (as a proxy of home country labour market experience) are valued differently based on immigrant group considered.

This latter argument is supported by European and US evidence of lower returns to skills among Eastern European immigrants, which is mainly a result of occupational downgrading. For example, Adsera and Chiswick (2007), using data from 1999 to 2004, show that Eastern European men and women had the lowest pre-enlargement earnings among all immigrant groups in all European countries studied, even after length of stay in the country was controlled for. According to Mattoo, Neagu and Ozden (2008) for the U.S., Eastern European immigrants’ acceptance of such low-paying jobs should be interpreted as under-placement due to lower quality education in the home country (poor transferability) rather than skill under-utilization. This theory, however, does not explain an almost complete lack of evidence for poor pre-enlargement skill transferability in the UK context. Moreover, even though Clark and Drinkwater (2008) attribute the phenomenon to migration from these countries being much lower before 2004 – meaning UK employer unfamiliarity with the quality of their educational

systems – the magnitude of EU8 immigration, albeit mostly illegal (especially for Polish immigrants) was in fact still quite large (Duvell, 2004; Trevena, 2009). In addition, pre-enlargement immigrants from Eastern countries could enter the UK as self-employed.

An alternative hypothesis, therefore, focuses on migrant selection from sending countries. Migration policies can also act on the cost side: removing barriers can lower the cost of migration which affects both the observable and unobservable quality of migrants (Bertoli, Dequiedt, and Zenou, 2016; McKenzie and Rapoport, 2007; Beine, Docquier, and Özden, 2011). Therefore, the 2004 policy change could have encouraged even those from the poorest regions within the sending countries to migrate. In fact, accession has notably changed the regional distribution of emigrants (see e.g. Dustmann, Frattini and Rosso, 2015, and Rosso, 2013, for Poland). For example, before enlargement, a large share of Polish emigrants lived in richer areas (e.g. Warsaw), but after enlargement, a much large fraction began coming from more agricultural regions. Other explanations for pre- and post-enlargement differences in immigrant labour market performance in the UK include differences in institutional quality within source countries and, partly related to the previous explanation, even greater migration temporariness resulting from more freedom to move around Europe (Blanchflower and Shadforth, 2009; Blanchflower and Lawton, 2008). Not only do temporary immigrants have lower reservation wages than permanent migrants, they invest less in host country-specific human capital (Dustmann, 2000). EU8 immigrants also tend to compensate for lower wages by working longer hours (Clark and Drinkwater, 2008), which could also signal temporariness and/or lack of investment in country-specific human capital.

3 Data

3.1 Data and descriptive statistics

3.1.1 UK LFS: variables and sample selection

The analysis is based on 1998–2008 data from the UK LFS (see Appendix A.2 for additional detail), which just precedes the financial crisis⁸. In line with the immigration literature, which

⁸ Because the economic crisis has had drastically different effects on the outcomes of diverse cohorts (OECD, 2012), I use data up to 2008 to avoid any sample selection from the likelihood of long-term migrants returning to their home countries during an economic crisis.

defines immigrants based on country of birth, I define EU8 immigrants as those born in one of the countries that gained access to the EU in 2004, excluding Malta and Cyprus⁹. As comparison groups, I also report statistics for immigrants from the other countries that were already part of the European Union (EU14) and for all other immigrants. I restrict the analysis to individuals of working age (16–65) at the time of interview who reported being employed or in government schemes. The earnings measure is real hourly wage – gross weekly wage divided by total hours usually worked in a week, including usual hours of paid overtime – which is deflated using the CPI. This hourly measure is less contaminated (than other measures) by the decision of how much to participate in the labour market¹⁰. Finally, excluding the self-employed, for whom no wage information is reported, for each year, I trim all the employee wage observations below the 1st and above the 99th percentile to eliminate outliers.

Because the UK’s Office for National Statistics recodes any foreign qualification not on their list as “other”, in the immigration context, the “highest qualification achieved” variable is unusable. That is, whereas natives classified into this category are likely to have low educational attainment, immigrants so classified may have achieved all levels of education (see Manacorda, Manning, and Wadsworth, 2012; Saleheen and Shadforth, 2006 for a more detailed discussion). I therefore define the education variable based on “age [at which the individual] left full-time education”, which serves as a good proxy for educational level in the absence of precise information on qualifications and allows better comparison of different groups likely to have been educated abroad. More specifically, I define workers with tertiary education as those who left full-time education at age 21 or later, workers with secondary education as those who left between 17 and 20, and less than secondary as those who left before age 16 or had no full-time education. Using an identical variable in the LFS, I also define a variable for each worker’s years of education, whose estimation results are easy to interpret in the wage decomposition context.

⁹ Malta and Cyprus are among the EU countries with the lowest number of immigrants to other EU countries (Vargas-Silva, 2012).

¹⁰ I report results for men and women together because the final results differ little by gender. Moreover, using hourly wages may not completely solve the selection problem in that part-time jobs, for example, are systematically paid less than full-time jobs but tend to be more popular among female workers (Manning and Petrongolo, 2008). Hence, as a robustness check, I report descriptive statistics and estimation results for men only.

3.1.2 Descriptive Statistics

Table 1 reports labour market statistics for natives, EU8 immigrants, all other immigrants (excluding EU8 and EU14) and EU14 immigrants for the pre- (1998–2003) and post-2004 years (2004–2008)¹¹. The natural logarithm of hourly gross wage is reported in the first row in real terms. Overall, EU8 immigrants are the lowest paid group in both periods, with a mean log wage 8 log points below that of natives¹² and 15 points below other immigrant groups in the pre-accession period. Most important, the gap between EU8 immigrants and all other groups widens notably after 2004, with EU8 immigrants earning 35 log points (30%) less than British-born workers and even less than other immigrants.

[Table 1 about here]

Following Green and Worswick (2010) and Boudarbat and Lemieux (2014), I divide work experience into British and foreign experience on the assumption that the latter is probably less valued in the British labour market¹³. In fact, the literature provides ample evidence that immigrants find it hard to transfer both formal education and labour market experience from the origin to the destination country. In particular, a strong inverse relation exists between source country labour market experience and the likelihood of being correctly matched to the skill requirements of the job (Chiswick and Miller, 2009). For natives and immigrants who studied in the UK and left full-time education after their arrival, British experience is defined as age minus age of leaving full-time education, which is also assumed to be the age of entry into the labour market. For all other immigrants who arrived at the end of their studies, British experience is defined simply as the years since migration, which is also assumed to be years since entering

¹¹ Appendix Table D2 reports the employment rates for all groups over the two periods. Because the UK LFS allows for a distinction between inactive, employed and self-employed, these latter are included in the sample to compute employment rates but then excluded to avoid sample selection bias (see e.g. Dawson, Henley and Latreille, 2014) and because the earnings data for this group are minimal.

¹² It should be noted that my definition of natives includes all individuals born in Britain, with no distinction between ethnic groups. A further possible distinction in the reference group would be between British-born Whites and British-born ethnic minorities, the latter of whom are shown to have lower employment rates and lower wages than the former (see e.g. Dustmann et al., 2003; Dustmann, Frattini and Preston, 2013). If the definition of natives were to include only British-born Whites, the wage gap would probably be higher.

¹³ As Green and Worswick (2010) argue, we should be cautious in interpreting the *value* of foreign experience as *returns* to foreign experience because individuals arriving with different numbers of years of source country labour market experience may also face different selection processes along different dimensions.

the British labour market. Foreign experience is calculated as age at arrival minus school leaving age and is assumed to be zero for natives.

In Table 1 shows, before enlargement, natives have on average 22 years of British labour market experience, which increases to 23 following enlargement. British experience for EU8 immigrants decreases by 11 years between the two analytic periods, from 14 to 3 years, an expected reduction given the large cohort of EU8 immigrants who arrived after 2004. This short UK experience, which is not observable for other immigrant groups, seems strongly related to the widening gap between EU8 immigrants and natives. For other EU immigrants, British experience remains stable between the two periods, although it decreases by 1 year for all other immigrants. Overall, the EU8 immigrants' labour market experience decreases 50% after enlargement, mainly because new arrivals are younger than before. Specifically, prior to 2004, their labour market experience is far more comparable to that of other immigrants, even if they still suffer a wage penalty. After 2004, their foreign labour market experience increases by 2 years (from 4 to 6 years) compared to only 1 year for other immigrants.

Educational levels also increase between the two periods; however, whereas natives, other immigrants and EU14 immigrants show an increase in the share of tertiary educated, EU8 immigrants show only an increase in the share of secondary educated, a rise that is barely noticeable in other groups. The share of primary educated also decreases more in the other groups than among EU8 immigrants. Interestingly, a comparison of groups within each period clearly indicates that in general, immigrants are better educated than natives: before 2004, only 16% of natives fall into the top of the educational distribution, whereas for other groups, the fraction is around 40%, which climbs even higher after 2004. EU8 immigrants also have the lowest share of primary educated (12% and 8%, respectively, in the two periods), while natives have a 50% share in both periods and the most tertiary educated (41%) before 2004. After 2004, the share of secondary educated individuals among EU8 immigrants is above 50%, again the highest among all groups. Because of the strong relation between wages and education, these statistics could be expected to imply higher wages, especially for EU8 immigrants. However, whereas this expectation holds true for all other immigrants in both periods, for Eastern European

immigrants, who have always had lower wages on average than natives, the wage penalty has become even higher.

Table D1 in the Appendix also reports the percentage of individuals who are single; married (or in a civil partnership); or separated, divorced or widowed, grouped together as “other”. Before 2004, EU14 immigrants are more likely to be single (42%), while other groups are more likely to be married. After 2004, this distribution only changes for EU8 immigrants, who are now more likely to be single (partly because they are younger). Before 2004, all immigrants are disproportionately concentrated in London (inner and outer), a regional distribution that after 2004 changes only for EU8 immigrants. That is, post-accession, the London-based share of EU8 immigrants falls from 44% to 21%, while the percentage living in the lower-wage regions of the East Midlands and Yorkshire rises to 10% each. To assess whether this relation affects relative wages, for each group, I also report occupation and industrial distributions, even though these may differ simply because of poor job matches resulting from low inter-country skill transferability (represented by education and foreign experience)¹⁴. As shown in the lower part of Table D1, before 2004, native workers’ occupational distribution is fairly similar to that of all immigrants – except EU8 immigrants. Overall, immigrants are over-represented among professionals and slightly under-represented among crafts and related trade workers. Before 2004, over 80% of Eastern European immigrants are working in low-wage jobs (particularly, service, sales and elementary occupations), whereas after 2004, even though the percentage of immigrants in high-wage jobs increases, the percentage of those in low-paying jobs is still very high. On the other hand, the distribution of industries changes little over the two periods: in both periods, EU8 immigrants are more likely than other immigrants to work in the low-paying distribution, hotel and restaurant sectors. After 2004, they are also more likely than other groups to work in the manufacturing sector.

¹⁴ As Altonji and Blank (1999) suggest, in the case of labour market discrimination, occupational and industrial differences can represent either a preferential choice or an outcome of low skill transferability (or other unobservable factors). Not controlling for these variables may thus lead to underestimation of their importance for labour market outcomes. On the other hand, controlling for them may result in the under-estimation of the existence of some type of occupational segregation for this immigrant group and thus the constraints it faces.

3.1.3 Changes in wage distribution

To illustrate wage distribution changes for immigrants versus natives, Figure 2 reports the log wage gaps between natives and EU8, EU14 and all other immigrants at each percentile over the pre- and post-2004 periods. Because the trends for males and females are so similar, I report these results together. Consistent with the descriptive statistics, before 2004, EU8 immigrants earn less than British-born individuals at every percentile except the 80th, at which the gap is positive. After enlargement, the gap is again always negative but larger at the top of the wage distribution. In particular, at the 90th percentile, EU8 immigrants earn (almost) 60% less than natives at the same percentile. For the other two groups, however, there is little difference in the wage gap at each percentile across the two periods. After 2004, the gap for EU14-born individuals increases at the top in favour of EU14 immigrants while becoming more negative at the bottom (i.e. a widened wage distribution) but shrinks for all other immigrants while still remaining positive.

[Figure 2 about here]

Table 2 then reports the log real wages for each percentile for UK natives versus EU8, EU14 and other immigrants before and after enlargement. Whereas natives' wages increase similarly at each percentile, EU8 immigrants' wages decrease at each percentile, with higher (around 40%) reductions at the top of the distribution. Wages for EU14 immigrants, in contrast, increase by 9% at the 20th percentile and more than 10% at the other percentiles. These statistics clearly illustrate that the wage distribution of EU8 immigrants is moving disproportionately to the left at each distribution point (and more at the top), making them the only group to experience a wage decrease over the two periods considered.

[Table 2 about here]

4 Estimation Results

In the standard Oaxaca-Blinder method (Oaxaca, 1973; Blinder, 1973), which decomposes mean wage differences into explained and unexplained components, it is the explained part that is attributable solely to the differences between two groups' characteristics (valued at the reference group coefficients). This part could thus be interpreted as the amount of the gap that is explainable

by differences in group characteristics were the reference group's wage structure held constant. The unexplained component is simply the part of the gap that cannot be explained by group characteristics and is usually attributed to differences in the two groups' returns-to-skill function.

Decomposing the mean is made relatively easy by the statistical properties of the expected values: thanks to the law of iterated expectations, the estimated coefficient of a simple OLS regression can be interpreted as the effect of a change in the covariate's mean value on the *unconditional* mean value of the dependent variable¹⁵. Decomposing quantiles is more difficult because the law of iterated expectation does not hold here. Rather, the coefficient in the conditional quantile regression can only be interpreted as the effect of a change in the covariate's mean value on the τ *th conditional* quantile of the dependent variable. Hence, the alternative regression method proposed by Firpo, Fortin and Lemieux (hereafter, FFL, 2009) estimates a re-centred influence function (RIF) instead of the usual conditional quantile regression and then applies standard Oaxaca-Blinder decomposition to the results¹⁶ (see Appendix B, for the econometric details). It should nevertheless be noted that the coefficients in both mean and quantile decompositions are interpreted under the assumption that immigration has no general equilibrium effects on skill prices, which implies that the native wage structure is given and serves as the reference structure. Nothing can thus be said about what would happen to the natives' wage structure in the absence of immigrants, which would probably serve as a better counterfactual for decomposition.

4.1 Results for the mean wage gap

To compare the wage structures of EU8 immigrants and natives, I run two OLS regressions for each group¹⁷, one each for the pre- (1998–2003) and post-enlargement (2004–2008) periods, using

¹⁵ $E[Y] = E_X [E(Y|X)] = E(X)$

¹⁶ Fortin, Lemieux, and Firpo (2011) provide an extensive description of the method, including its advantages and disadvantages.

¹⁷ The alternative would be to estimate a pooled (immigrant and native) wage regression simply by adding an immigrant dummy control (whose value would be the same as the unexplained component), which would require the assumption that skill prices are the same in both groups. Such similarity is not credible in this context, however, because the coefficients on separate regressions are very different. As shown by Elder, Goddeeris and Haider (2010), unless the coefficients are equal across groups, the unexplained component in a pooled model depends on the relative sample sizes of the two groups and the variance of the observable characteristics. On the other hand, using natives as the reference group and comparing results over two periods risks some of the changes in the unexplained component being the result of changes in the reference group's wage structure, making the results harder to interpret. As I show in the OLS results, the wage function for natives barely changes over the two periods, so most of the decomposition results are imputable to changes in the immigrant group (composition and prices).

the natural logarithm of hourly wages, measured in real terms, as the dependent variable. Tables D4 and D5 report the results of running these two regressions for two different models. Model 1 controls for British labour market experience and its square, completed years of schooling¹⁸, civil status, gender, and dummies for region of residence to control for time-constant differences in labour market conditions across regions. The immigrant regression also controls for foreign experience and its square, as well as the interaction between foreign and British labour experience (cf. Boudarbat and Lemieux, 2014). For immigrants, I allow the intercept to vary across three arrival cohorts, those arriving before 1998, between 1998 and 2003, and between 2004 and 2008. Model 2 then adds in dummies for occupation and industry. For this model, the wage equation is run separately for each group in both periods because the differences in the estimated coefficients are large and thus, given the higher proportion of natives to immigrants, more likely to reflect native returns to skills (see n.17 for more details). Following Trejo (1997), for each group of immigrants, the table reports the intercept as a weighted average of each separate intercept estimated for each arrival cohort, with the weights representing the share of each cohort in that immigrant group in each period as reported in Table 1¹⁹.

After 2004, the return to British experience increases for EU8 immigrants while remaining constant for natives with each additional year of British labour market experience increasing wages by 5%. Adding controls for industry and occupations, on the other hand, decreases the returns to pre-2004 levels²⁰. The coefficient on foreign experience also declines substantially: in contrast to the pre-2004 period, in which foreign experience is valued similarly to British experience, after enlargement, each year of work in the source country is valued three times less in

¹⁸ I use years of education instead of “age left education” to avoid any difficulties arising from interpretation of the effect when an omitted category must be chosen. As Oaxaca and Ransom (1999) point out, the choice of omitted category is arbitrary, and the conventional practice is to omit one category as a reference point. Moreover, although the overall effect of the categorical variable in the explained part may not be influenced, in the unexplained part, it would be hard to distinguish which portion of the effect is due to different wage structures (different returns) and which to the differences in the coefficient resulting from the arbitrary choice of omitted variable (see Fortin, Lemieux and Firpo, 2011, for a discussion of this issue and possible solutions).

¹⁹ For example, the intercept for EU8 immigrants in the pre-2004 period is $\overline{intercept}_{EU8,before2004} = share_{before1998,before2004} * intercept_{before1998,before2004} + share_{1998-2003,before2004} * intercept_{1998-2003,before2004}$. The standard errors are computed using the variance-covariance matrix of the estimated coefficients given $se(\overline{intercept}_{EU8,before2004}) = \sqrt{Var(intercept_{EU8,before2004})}$ and the following formula for variance: $var(\sum_i \alpha_i x_i) = \sum_i \alpha_i^2 var(x_i) + \sum_i \sum_{i \neq j} \alpha_i \alpha_j cov(x_i x_j)$

²⁰ The increase in the return to labour market experience is also related to the fact that Eastern European immigrants are younger in the post-enlargement period, so this return is calculated on a steeper part of the wage-experience profile.

the British labour market. It should also be noted that return to foreign experience for EU8 immigrants is lower than that for any other immigrant group. A similar substantial decline is also observable for EU8 immigrants in the education premium, even after occupation and industry are controlled for, however, there is little statistical difference between the coefficients on education in model 2 before and after 2004. Before enlargement, not only are the skills of EU8 immigrants valued similarly to those of EU14 immigrants (Table D5)²¹, but for every extra year of education, immigrants from Eastern European countries earn 7.1% higher wages. After enlargement, however, this figure drops to 4%. Admittedly, these returns decrease for all groups studied, but on average only by 1 percentage point. As regards gender differences, before 2004, Eastern European female workers earn 42% (33% in model 2) less than males, but this gender gap reduces to 15% in the post-enlargement period.

To provide additional evidence of wage structure differences between natives and EU8 immigrants, I jointly test for differences in the coefficients for these two groups on education, experience, gender and marital status. The very high F-statistics period (37 versus 4 in the pre-enlargement period) confirm that their wage structures are remarkably different, particularly in the post-enlargement. In Table 3, I use the mean decomposition technique illustrated in Appendix B.1 to assess which portion of the wage differences can be attributed to characteristics and which to the change in skill prices. I do so by reporting the decomposition results using model 1 and model 2 for each of three groups: EU8 versus natives, EU14 versus natives and all other immigrants versus natives. In vertical order, the table shows the raw differences in real term log hourly wages before and after 2004, the gaps attributable to characteristics, and the gaps resulting from differences in the coefficients.

Between the two periods, the explained component decreases substantially. In model 1, the driving factor is British experience, which accounts for two thirds of the 29 log point decrease in the gap. Education also plays an important role, however, despite immigrants being more educated than

²¹ Country composition and the lower transferability of skills from certain countries matter because the relative distribution of countries within this group changes somewhat. For example, the percentage of individuals from Hungary decreases (from 20% to 3% of all immigrants from East European countries), immigrants from Poland account for 42% before but about 70% after, and those from the Czech Republic make up 12% before but 6% after. The shares of immigrants from other countries only show minor adjustments. As a further test, I also run regressions that include a country control dummy, but the results do not change. Table A1 reports the country distribution and mean wages for each group in the two periods.

natives its role decreases after 2004. The contribution of marital status is zero before 2004 because its distribution is identical for immigrants and natives; it does, however, make a slight contribution to the post-enlargement wage decline because of the increased share of unmarried EU8 immigrants, who earn relatively lower wages than married workers. The only improvement we had after 2004 is the increase in share of EU8 males, which positively contributes to decrease the wage gap. After 2004, location's contribution to the wage gap remains positive albeit lower than in the pre-enlargement period. That is, immigrants are still located in places with higher wages (i.e. London), but a higher fraction of EU8 immigrants have located to regions with lower wages (e.g. the East Midlands, Yorkshire). In general, the total explained component is positive before 2004 but becomes negative after 2004, whereas the total unexplained component is very high and negative in both periods. Before 2004, the characteristics of EU8 immigrants are already valued less than those of natives, but the differences are offset by immigrant attributes that are, on average, better than those of natives. After 2004, however, the total explained component becomes negative and further contributes to widening the gap. The total negative unexplained component results mainly from the lower returns to education, which are even more evident after enlargement.

[Table 3 about here]

The results for model 2 clearly show that adding occupation and industry controls greatly increases the total explained component, particularly after 2004. In fact, in the latter period, 80% of the total wage gap is explainable by the differences in observable characteristics while the rest is simply attributable to differences in the wage structure. After the enlargement, differences in the group's occupations distribution also play an important role in explaining the decline in the wage gap and confirm that EU8 immigrants have a higher probability of ending up in low-paying jobs. Controlling for occupation and industry, however, shrinks inter-group difference in returns to education. Nevertheless, taken together, these findings provide clear evidence of occupational downgrading.

The results for other immigrant groups, in contrast, show little change over time, with the contribution of both explained and unexplained components to the wage gap remaining stable over the two periods, particularly for EU14 immigrants. The wage gap for this group improves

slightly, but no significant changes occur in either immigrant composition or wage structure. For the group of other immigrants, the decline in the gap from 0.073 to 0.042 is entirely explainable by a change in their characteristics, mainly a decline in British experience. Unlike EU8 immigrants, both EU14 and other immigrants work in occupations that are on average more similar to those of natives.

4.2 Results for the quantile gaps

I identify the changes between the two periods by first running an RIF regression for each quantile and each group and then performing an Oaxaca-Blinder decomposition of the quantile wage gaps (as shown in Appendix B.2)²². Table 4 shows the FLL decomposition results for the EU8 immigrant-native wage gap using only for the 20th, 50th and 90th quantiles for models 1 and 2. The first row shows the unadjusted gaps for real wages (as reported in Figure 2), after which the subsequent rows report the explained and unexplained gaps. Before 2004, the total explained gap is positive at every quantile and, as before, higher towards the top of the distribution, implying that if the native price function were applied to EU8 immigrants, they would be earning more, particularly at the top. After 2004, however, the explained component becomes negative.

Although British experience plays an important role in the gaps at each quantile, before 2004, lower experience levels are compensated by higher educational levels, whereas after 2004, especially at the top, educational levels decrease relative to natives so the effect of British experience becomes even more negative. It therefore has a negative impact on the total explained component. Other factors change similarly over the two periods at all quantiles. Whereas location's contribution is positive as the EU8 immigrant presence grows in high-paying regions, this contribution decreases after 2004 and even more at the top of the distribution. The total unexplained part is negative in both periods, primarily because EU8 immigrants have lower returns to education at each distribution point. Once I control for occupations and industries (model 2), however, the unexplained gap is positive at the bottom of the distribution but very negative at the top where most is unexplainable by background characteristics. All else being equal, British experience is also more valued at the top, probably because individuals work in occupations that value the knowledge of local culture and norms that are gained with time

²² Regression results are available from the author upon request.

spent in the country. Foreign experience also plays a much larger and more positive role at the top of the distribution.

As regards returns to education, EU8 workers in the middle of the distribution experience the most notable decline, probably in relation to a mismatch between worker education and job tasks, which, all else being equal, translates into lower wages and lower returns to education²³. This conclusion is confirmed by the fact that when occupation is added into the regression, characteristics can explain more than 90% of the negative wage gap, 50% of which is native-immigrant differences in occupational distribution. In fact, whereas before 2004, a greater set of immigrant endowments implies higher wages than natives (assuming the same wage structure), after 2004, characteristics worsen in all parts of the distribution, mainly because of occupational downgrading (see appendix Table D3). Moreover, whereas the pre-enlargement gap is more negative at the bottom of the distribution, the post-enlargement gap is much higher for workers at its top, a large part of which remains unexplained even after model 2 controls for industry and occupation.

[Table 4 about here]

Table 5 then shows the quantile decomposition for other immigrant groups using only model 2. Here, EU14 immigrants appear to be performing better than natives at all quantiles of the distribution, especially above the median. That is, although I observe no changes in the gaps at the bottom of the distribution over time, the gaps above the 50th percentile improve in favour of EU14 immigrant. More specifically, EU14 workers at the median see an improvement in both explained and unexplained components, primarily because of an increase in educational level, which is likely to explain the movement towards better jobs in the immigrant occupational distribution (see Table D3 for more details). The improvement in wage structure also applies primarily to immigrants at the top of the distribution. In contrast to EU8 immigrants, EU14 immigrants' British experience is more valued than that of natives at the bottom of the distribution but less valued at the top. Overall, these results indicate that for low-skilled jobs, the

²³ The post-2004 data show more workers with tertiary education and wages below the median.

experience gained in the destination country plays a major role, while foreign experience is more valued at the top of the distribution.

The right side of Table 5 lists the results for other immigrant groups, for whom the most notable difference is that after 2004, other immigrants at the bottom of the distribution begin to suffer a wage penalty that did not exist before enlargement. These results confirm a worsening of the overall gap and wage declines at each quantile. The main change results from the total explained component and worsening of occupations and British experience. Whereas for EU14 immigrants, the unexplained component is negative only at the top, all other immigrants have a worse wage structure than that of natives at all points of the distribution.

[Table 5 about here]

5 Recent immigration

To assess whether the large downgrading and wage deterioration reported for EU8 immigrants result from a lack of economic assimilation or other factors like selective return migration²⁴, I examine the wage structure across different recent immigrant groups, which should be very similar if the former is true and vice versa. Defining recent immigrants as those arriving between 2004 and 2008 (meaning those who have been in the country for a maximum of four years), I decompose the quantile wage gaps of recent EU8 and EU14 immigrants, respectively, versus natives using models 1 and 2 (see Tables 6 & D6). Although recent EU14 immigrants have almost 40% higher wages, they have less British labour market experience but more home country labour market experience than recent immigrants from Eastern Europe. On average, they are better educated (having stayed in school two years longer) with a higher percentage of tertiary educated than EU8 immigrants, who are over-represented among secondary educated. EU14 immigrants are also slightly older and more likely to be single. Over 60% of recent EU14-born individuals live in

²⁴ Selective return migration may play a role in the changes of the distribution of observable characteristics of immigrants. As shown in Dustmann and Weiss (2007) for the period 1992-2004, after 5 years around 45% of White European, American and Australasian would have left the country. However, they find a minor education selection from the highest qualified having left the country and no occupational selection. After 10 years in the country, their data suggest that some workers in high skilled occupation become self-employed. In our data we find that EU8 recent immigrants that arrived between 2004 and 2008 are slightly more negative selected in terms of education (Table D6) with respect to the whole EU8 sample in Table 1, which may suggest that the brightest are staying. Yet, it is beyond the scope of this paper to assess the direction of selection of short vs. long-term immigrants.

London or in the rest of the South East, which are among the wealthiest regions in the UK. Only 13% of recent Eastern European immigrants live in London, with a large portion residing in the South East and East Midlands. The group of other immigrants, although more similar to EU14 immigrants in educational level, age and location (London and the South East), have more foreign experience and are more likely to be male and married.

In order to assess the degree of downgrading among recent immigrants, I perform a simple exercise where I compare immigrant wages to those earned by natives with comparable levels of education, age, civil status and gender. I estimate a wage regression on the native population and use results to predict wages for immigrants. Because I am also looking at the evolution of the degree of downgrading over time (before and after 2004), I fix the wage structure to that of natives in the period before the enlargement and predict wages for immigrants in both periods using the before-2004 estimated prices of skills²⁵. I find the following results. Before 2004, EU8 immigrants, if paid according to native wages, should have earned on average 44% more than their actual wage. This share increases to 51% after 2004. In the case of other immigrants, they earned 16% less than a native worker with the same characteristics before 2004, and the percentage increased to 20% after 2004.

[Table 6 about here]

6 Summary and conclusions

Despite higher educational levels, the wage gap between immigrants from Eastern European countries and British natives has increased since enlargement, mainly because of a decrease in average immigrant wages. This gap has changed not only at the mean but also along the wage distribution, with the distance between immigrant and native wages increasing more at the top percentiles. By examining the entire wage distribution, my analysis produces a complete picture of the different factors influencing the wage gap increase, particularly whether these factors differ at different distribution points. To better understand how skills acquired in EU8 countries pre-migration are transferable to the UK labour market, I divide labour market experience into foreign (a proxy for home country labour experience) and British. The results indicate that the foreign labour market

²⁵ I also perform a nonparametric estimation of the wage distribution of natives before 2004. Following DiNardo, Fortin, and Lemieux (1996), I fix the prices of attributes to the levels in the years 1994-2004 and evaluate immigrants characteristics before and after 2004 at those prices. Results do not change, qualitatively. This exercise is also performed using all EU8 immigrants, without restricting to only recent ones: the degree of downgrading changed from 24% before 2004 to 40% after 2004.

experience of other immigrant groups is much more valued in the UK labour market than that of EU8 immigrants, which could be explained theoretically by skills acquired in different home countries being differently transferred to the destination country.

In a further step, to rule out the possibility that the results are simply a product of EU8 migration being a recent phenomenon, I compare EU8 migrant wage gaps along the distribution with those of other recent immigrant groups. A much larger proportion of the EU8 gap is explainable by occupational downgrading in all parts of the distribution, while the occupational distribution of other recently arrived immigrant groups is more similar to that of natives. These results are in line with previous findings for Eastern European immigrants in the UK and elsewhere. For example, Mattoo, Neagu and Ozden (2008) argue that the low wage levels observed for Eastern European immigrants in the U.S. should not be considered a waste of brain power but rather a simple consequence of the quality education in the countries of origin. As Friedberg (2000) demonstrates, human capital is not portable across countries, and degree of transferability also depends on how employers in the destination country perceive the quality of institutions in the source country. When perceptions are negative, workers suffer major skill downgrading.

The results for different distribution points also shed light on the wage level decrease at the bottom of the distribution, particularly when compared to the pre-2004 period. However, although poor skill transferability can explain the presence of secondary and tertiary educated in low-paying jobs – and thus the decreased wage levels at the top of the distribution – it does not explain the increased wage penalty at its bottom where immigrants should be competing with natives for more similar (mainly routine and manual) jobs. Such competition should be more likely because communication and cognitive skills (in the form of appropriate language use and knowledge of the local culture) are much more valued at the top of the distribution.

Another possible determinant of the wage decrease at the bottom of the distribution is the temporary nature of EU8 migration: compared to their permanent equivalents, temporary immigrants are more likely to accept lower wages (i.e. have lower reservation wages) and invest much less in the human capital of the destination country (Dustmann, 2000). However, whether this condition is decided by immigrants with a strong desire to return home or results simply from discrimination (or perhaps entry barriers in some occupation) is hard to determine. Admittedly, the changes in emigrant regional distribution in the source country, as documented for Poland (Dustmann,

Frattini and Rosso, 2015; Rosso, 2013), could also explain EU8 immigrants' poorer labour market performance over time, but such an effect is difficult to demonstrate using only destination country data because of the lack of information on region (and country) of previous residence.

Even with these unanswered questions, the analytic findings have important implications for policies in both source and destination countries. First, given that most occupational downgrading is a consequence of poor skill transferability, the two countries could collaborate to improve the quality of education, in particular, by making qualifications more transferable across countries so that education can be more easily exported to other destinations. However, from the source country's perspective, increasing educational quality (and investment) could induce increased emigration, a brain drain that would not benefit the domestic labour market, at least in the short run (Mattoo, Neagu and Ozden, 2008). Nevertheless, an increased probability of immigrants entering high-skill occupations could have positive indirect effects for source countries through higher remittances and/or skill and technology acquisition. For these reasons, destination country governments, for their part, could directly enhance labour market integration and the job opportunities of Eastern European immigrants by providing language classes to improve their communication abilities (Clark and Drinkwater, 2008).

For all the above reasons, this research contributes to the understanding of the labour market integration of immigrants in the UK. By putting together different migration theories and looking at the entire wage distribution, I try to explain the large downgrading suffered by EU8 immigrants in the UK after 2004, and how skill transferability but also the temporariness of migration can have an important role in explaining this change.

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Appendix

A Background and data

A.1 EU8 Immigrants in the UK

In May 2004, nationals from eight European countries were allowed free access to the UK labour market with the one requirement that they register with the Worker Registration Scheme (WRS) if they wished to work for even one month in the UK. Before 2004 accession, the immigration of EU8 workers to the UK was regulated by the Immigration Act of 1971, which required non-European Community nationals to obtain work permits issued only for a particular job with a particular employer for a limited period²⁶. Yet even before 2004, the 1990's Europe Agreement²⁷ allowed EU8 citizens to come to the UK to establish a business and remain as self-employed or owner of a company or partnership. Nevertheless, pre-2004 labour mobility within the EU was limited,²⁸ and Eastern European immigrants particularly moved mainly to Western countries situated close to their own borders (Longhi and Rokicka, 2012). In 2004, in contrast, the number of WRS applications approved was more than 120,000, and this number increased until 2008, when it began to decline (Home Office, 2009).

Table A1 shows the changes in the country of origin composition (and the log of mean real hourly wages) in the periods before and after 2004 among EU8 immigrants, the largest group of whom are from Poland in both periods (see n.21). All groups experience a decline in wages except for immigrants from the Czech and Slovak Republics, whose wages increase by more than 10%

²⁶ These restrictions could only be lifted after four years in the country, when individuals could obtain resident status and choose their occupation freely. Work permits were not required for seasonal agricultural workers, teachers on exchange programmes, migrants with British grandparents, business men and Commonwealth working holiday-makers.

²⁷ Ratified in different years for each country.

²⁸ Only 4% of EU citizens have ever lived in another EU country, and in 2002, only 1.5% of EU workers lived in a different member state (see Dobson, 2009, for a discussion and sources).

over the two periods but are still below the average wages of British natives (see Table 1 in text).

[Table A1 about here]

A.2 UK LFS

The UK LFS, from which the 1998–2008 data are taken, has been administered since the mid-1970s to a sample of private households in the UK to gather information on their demographic and labour market characteristics. In the spring of 1992 (1994 in Northern Ireland), it became a rotating panel that samples the same individuals for five consecutive waves. The LFS sample is large, with an average 80,000 observations in each quarter. After 1993, age data are available in the last wave for each person interviewed, although since 1997, questions on wages have also been asked in the first interview. In particular, this data set contains information on country of birth, year of arrival in the UK, educational attainment, monthly gross wage, hours worked per week, occupation²⁹ and industry sector. Because the LFS is a nationally representative sample that does not focus on immigrants, these latter are less likely to respond to the survey and so more likely to be underrepresented in the LFS data (Saleheen and Shadforth, 2006). The survey is also likely to underestimate the number of EU8 immigrants in the country, particularly those who have been in the UK for less than 6 months and those living in communal establishments, who are more difficult to include in the sample (Gilpin et al. 2006).

My analysis, however, addresses a very specific group of the immigrant population. Therefore, although the small selected sample size can be problematic, especially before 2004, as the number of EU8 nationals in the country increases³⁰, so does the probability of being included in the survey.

²⁹ In 2001, the Standard Occupational Classification (SOC) used by the ONS to classify occupations changed the SOC1990 occupational classification to SOC2000. I therefore recode the occupation variable into the International Standard Classification of Occupations (ISCO-88) codes in both periods using tables provided by the ONS's Classification and Harmonisation Unit to enable comparison of the occupational distribution over the years.

³⁰ WRS statistics show over 800 thousand applications being registered and approved between May 2004 and September 2008 (Home Office, 2009), and from May 2004 until April 2011, all EU8 immigrants who wanted to work in the UK had to register with the scheme. However, as the collection of these data only began after 2004, they would be useless in the context of this paper. Moreover, as pointed out by Blanchflower and Lawton (2008), the major caveat for these data is that individuals do not need to de-register if they leave the country, meaning that the WRS may be over estimating the number of immigrants from those countries in the UK. Such over-estimation could be even more severe in the case of EU8 migrants who should more appropriately be considered temporary workers. Nevertheless, according to 2001–2012 census statistics, the share of EU8 immigrants has increased: in 2001, they only represented 0.13% of the working age

In addition, the population weights provided in the survey can correct for non-response rate differences between immigrants and natives (Longhi and Rokicka, 2012). In any case, this dataset is already widely used to study EU8 immigration in the UK (e.g. Blanchflower and Shadforth, 2009; Drinkwater, Eade, and Garapich, 2009; Longhi and Rokicka, 2012) and to analyse UK immigrant labour market outcomes (e.g. Dustmann and Fabbri, 2005; Dustmann, Frattini and Preston, 2013; Manacorda, Manning and Wadsworth, 2012). Given its nature, the LFS is extremely likely to give a valid picture of long-term EU8 immigrants who are still living in the UK. Finally, the LFS allows comparison between natives and other immigrant groups for both periods under study (before and after 2004).

B Decomposition Methods

B.1 Mean decomposition

For the mean decomposition, I consider a simple log wage equation for immigrants (I) and for natives (N).

$$W_{Iit} = X_{Iit}\beta_{Iit} + \epsilon_{Iit} \quad (1)$$

and

$$W_{Nit} = X_{Nit}\beta_{Nit} + \epsilon_{Nit} \quad (2)$$

where t is either before or after 2004. I then estimate a log wage regression separately for immigrants and natives. The main assumptions are the linearity and separability of wages as a function of observable and unobservable characteristics. I also assume the conditional mean independence of the error term ($E[\epsilon_{it}|X_{it}] = 0$), which enables me to estimate unbiased and consistent estimators using OLS. These assumptions are then used to re-write the difference in the mean wages $\Delta_t = \bar{W}_{It} - \bar{W}_{Nt}$ into two components:

$$\Delta_t = \bar{W}_{It} - \bar{W}_{Nt} = \underbrace{(\bar{X}_{It} - \bar{X}_{Nt})\beta_{Nt}}_{\text{explained}} + \underbrace{(\beta_{It} - \beta_{Nt})\bar{X}_{It}}_{\text{unexplained}} \quad (3)$$

population (and 0.21% of the total population), but in the latest 2012 census, they represent almost 2% of the population in England and Wales.

where W_{gt} and X_{gt} represent the mean wages and characteristics for all individuals in group g in period t . Because some variables are immigrant specific (i.e. foreign experience), I set the values for these variables and the corresponding parameters for natives to zero (cf. Boudarbat and Lemieux, 2014). The first part of the decomposition is the explained component, which is given by inter-group differences in average composition; the second part is the unexplained component, the immigrant-native differences in estimated returns to similar characteristics.

B.2 Unconditional quantile decomposition

The quantile wage gap is the difference between immigrant and native quantiles:

$$\Delta_t(\tau) = q_{It}(\tau) - q_{Nt}(\tau) \quad (4)$$

The unconditional quantile regression introduced to counter the inequality between the unconditional quantile and the mean of the conditional quantile provides estimates of the coefficient of each single characteristics at different points of the distribution, where the dependent variable is substituted by a re-centred influence function (RIF). The first step is to construct the RIF of the wage W_{it} for the quantile $q(\tau)$, expressed as

$$RIF_{it}(W_{it}, q) = q(\tau) + \frac{I\{W_{it} \geq q\} - (1-\tau)}{f_W(q(\tau))} \quad (5)$$

where $f_W(\cdot)$ is the wage density function and $I(\cdot)$ is the indicator function, which is 1 when the wage observation is above the quantile $q(\tau)$. The second part of the function is the influence function. The main advantage of using this transformation is that the expected value of the influence function is zero, meaning that the expected value of RIF is $q(\tau)$. The first method suggested for the estimation is a simple OLS, which provides consistent estimates of the parameters as long as $Pr(W_{it} \geq q|X)$ is linear in the covariates (Firpo, Fortin and Lemieux, 2009):

$$E[RIF_{it}(W_{it}, q)|X] = \beta_t X_{it} \quad (6)$$

The underlying intuition is that running an RIF regression is similar to running a linear model on the probability of the wage observation being above the quantile. The only difference with a simple linear probability model is that in the RIF case, the coefficients are normalized by

the density function evaluated at the quantile. Hence, as Firpo, Fortin and Lemieux (2009) demonstrate, instead of decomposing the quantile gap ($\Delta_t(\tau)$), it is easier to decompose the corresponding gap in the probability, which is given by the difference between the fraction of natives and the fraction of immigrants earning below the value of the quantile for natives $q_{Nt}(\tau)$, which is $I\{W_{it} \geq q_{Nt}(\tau)\}$. The probability decomposition and quantile decomposition are then reconciled by dividing the probability gap by the probability density function³¹. The Oaxaca-Blinder decomposition is then performed on this probability gap:

$$\text{RIF}_{Iit} = X_{Iit}\delta_{Iit} + \epsilon_{Iit} \quad (7)$$

and

$$\text{RIF}_{Nit} = X_{Nit}\delta_{Nit} + \epsilon_{Nit} \quad (8)$$

In my case, I first run an RIF regression for each group and interpret the coefficients as partial effects on the probability estimation (similar to any linear probability model)³². I can then re-write the quantile wage gap as a difference in conditional expected value of RIF³³ between the two groups:

$$\Delta_t(\tau) = \underbrace{(\bar{X}_{It} - \bar{X}_{Nt})\delta_{Nt}}_{\text{explained}} + \underbrace{(\delta_{It} - \delta_{Nt})\bar{X}_{It}}_{\text{unexplained}} \quad (9)$$

C Robustness checks

Sample selection

To reduce any selection bias from individuals dropping out of the survey after the first wave, I leverage the fact that wage information is collected in waves 1 and 5 by running robustness checks that include only workers who report their wages in the first interview (Longhi and Rokicka, 2012; Drinkwater, Eade and Garapich, 2009). These checks (see right panel of Table C1) confirm

³¹ In a cumulative function, if P_I is the cumulative probability for immigrants at quantile $q_{Nt}(\tau)$ and P_N is the cumulative probability for natives at the same quantile $q_{Nt}(\tau)$, then the slope of the cumulative distribution function is given by the probability function $\frac{P_N - P_I}{q_{It}(\tau) - q_{Nt}(\tau)} = f_W$, where f_W is the wage pdf. Hence, $q_{It}(\tau) - q_{Nt}(\tau) = \frac{P_N - P_I}{f_W}$.

³² In conditional quantile regression, the parameter is an estimate of the shift in location of the quantile in the conditional wage distribution.

³³ The RIF-Regression STATA ado file from Firpo, Fortin and Lemieux (2009) is available at <http://faculty.arts.ubc.ca/nfortin/datahead.html> (accessed 28 August 2013).

all the results for EU8 immigrants, with only one major difference in the pre-2004 wage gap for the 50th and 90th percentile. This difference, however, only affects the unexplained component, confirming the possible presence of a selection bias in the coefficients that can be ascribed to non-random attrition.

Estimating the gap for men and women separately.

To ensure that no results are being driven by female worker decisions to participate differently in the labour market, the second robustness check examines male workers only. The results reveal a positive pre-enlargement gap in all parts of the distribution for White males, one confirmed by previous studies (Dustmann and Fabbri, 2005). Interestingly, deterioration of the wage gap is even worse than in the pooled case, with EU8 immigrants earning over 30% less than British males on average and almost 50% less than British males at the top of the distribution. The decomposition also confirms that immigrants at the top of the distribution have a larger unexplained component.

[Table C1 about here]

D Tables and OLS results

[Tables D1–D6 about here]

Table 1: Descriptive statistics

	Before 2004				After 2004			
	UK Natives	EU8	Other Immigrants	EU14	UK Natives	EU8	Other Immigrants	EU14
log hourly gross real wage	2.25	2.17	2.32	2.32	2.34	1.99	2.38	2.42
British labour market experience	22	14	15	13	23	3	14	13
Foreign labour market experience		4	4	3		6	5	4
males (%)	50%	37%	51%	46%	50%	55%	52%	49%
Education								
	Primary	12%	26%	30%	51%	8%	21%	25%
	Secondary	27%	36%	33%	29%	51%	36%	33%
	Tertiary	16%	37%	37%	20%	41%	43%	42%
Years of education	11	14	13	13	12	14	14	14
Arrival cohort								
	Before 1998	73%	84%	81%		7%	59%	64%
	Arrival 1998-2003	27%	16%	16%		15%	28%	23%
	Arrival 2004-2008					78%	13%	12%
Age	39	38	38	36	40	30	39	37
Observations	346,509	348	22,092	4,723	240,038	2,245	20,315	3,903

Source: UK LFS, years 1998 to 2008

Note: Employees aged 16-65. Self employed are excluded as there is no wage information. Real wages at constant 2008 prices. EU8 immigrants include Poland, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Slovakia and Slovenia. EU14 immigrants include Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden. Other immigrants include all foreign born in the UK with the exclusion of EU8 and EU14 born. Tertiary education: left full-time education at age 21 or later; secondary education: left full-time education between the ages of 17 and 20; less than secondary: left full-time education before 16 years old (included) or never had full-time education. Before 2004 include years 1998 to 2003 after 2004 include years 2004 to 2008.

Table 2: Log hourly gross real wage by quantile, before and after 2004

	UK Natives		EU8		Other Immigrants		EU14	
	Before 2004	After 2004	Before 2004	After 2004	Before 2004	After 2004	Before 2004	After 2004
20th	1.79	1.89	1.75	1.69	1.82	1.88	1.83	1.92
40th	2.08	2.16	2.03	1.83	2.15	2.20	2.14	2.26
50th	2.21	2.30	2.16	1.91	2.30	2.35	2.29	2.41
60th	2.36	2.44	2.32	1.99	2.46	2.50	2.45	2.56
80th	2.71	2.79	2.72	2.22	2.81	2.86	2.81	2.90
90th	2.95	3.04	2.94	2.45	3.07	3.13	3.06	3.16

Source: UK LFS, years 1998 to 2008

Note: Real wages at constant 2008 prices. Before 2004 include years 1998 to 2003 After2004 include years 2004 to 2008.

Table 3: Decomposition of natives and immigrants mean wage gaps

	EU8 Immigrants vs. Natives				Other Immigrants vs. Natives				EU14 Immigrants vs. Natives			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
	Before 2004	After 2004	Before 2004	After 2004	Before 2004	After 2004	Before 2004	After 2004	Before 2004	After 2004	Before 2004	After 2004
Raw (unadjusted) gap	-0.079	-0.369	-0.079	-0.369	0.073	0.042	0.073	0.042	0.072	0.087	0.072	0.087
British Experience	-0.146	-0.339	-0.107	-0.248	-0.094	-0.12	-0.068	-0.088	-0.126	-0.123	-0.092	-0.090
Education	0.267	0.223	0.131	0.107	0.189	0.187	0.093	0.09	0.190	0.185	0.093	0.089
Marital Status	0	-0.016	0	-0.01	0.002	0.004	0.001	0.003	-0.007	-0.008	-0.006	-0.005
Female	-0.033	0.012	-0.026	0.009	0.002	0.006	0.001	0.005	-0.010	-0.001	-0.007	-0.001
Location	0.089	0.028	0.076	0.024	0.085	0.078	0.072	0.064	0.062	0.061	0.053	0.051
Occupation	-	-	-0.017	-0.168	-	-	0.026	0.016	-	-	0.033	0.040
Industry	-	-	-0.018	-0.019	-	-	0.001	-0.002	-	-	-0.004	-0.003
Total Explained	0.18	-0.093	0.039	-0.306	0.187	0.155	0.126	0.088	0.111	0.114	0.070	0.080
British Experience	0.007	0.023	-0.041	-0.001	-0.04	-0.034	-0.057	-0.05	-0.019	-0.003	-0.028	-0.017
Foreign Experience	0.089	0.071	0.042	0.042	0.069	0.07	0.052	0.056	0.082	0.094	0.065	0.077
Brit-foreign exp interaction	-0.064	-0.019	-0.05	-0.005	-0.046	-0.051	-0.028	-0.031	-0.048	-0.053	-0.032	-0.038
Education	-0.498	-0.713	-0.401	-0.332	-0.39	-0.432	-0.3	-0.318	-0.268	-0.245	-0.163	-0.161
Marital Status	0.006	-0.029	-0.046	-0.019	-0.086	-0.085	-0.051	-0.041	-0.011	-0.026	-0.014	-0.007
Female	-0.052	0.035	-0.023	0.018	0.055	0.056	0.04	0.033	0.031	0.024	0.031	0.020
Location	-0.143	0.028	-0.093	0.031	-0.015	0.009	0.018	0.009	0.083	-0.004	0.054	0.078
Occupation	-	-	-0.058	0.177	-	-	-0.061	-0.029	-	-	-0.032	-0.004
Industry	-	-	-0.221	-0.047	-	-	-0.135	-0.12	-	-	-0.071	-0.047
Intercept and other variables	0.395	0.327	0.773	0.073	0.34	0.353	0.47	0.445	0.108	0.185	0.192	0.012
Total unexplained	-0.259	-0.276	-0.118	-0.063	-0.114	-0.113	-0.053	-0.046	-0.040	-0.027	0.001	0.007

Source: Author's OLS regressions using the UK LFS, 1998-2008

Note: Other variables are dummies for cohorts of arrival. Before 2004 pool years 1998 to 2003. After 2004 pool years 2004 to 2008. Model 2 also include occupation and industry dummies. Mean wage differences are decomposed into explained and unexplained components, where the explained part is attributable solely to the differences between two groups' characteristics (valued at reference group coefficients estimated in the OLS regressions). The unexplained component is simply the part of the gap that cannot be explained by group characteristics and is usually attributed to differences in the two groups' returns-to-skill function.

Table 4: Decomposition of natives and immigrants quantile wage gaps

	EU8 Immigrants vs. Natives										EU8 Immigrants vs. Natives									
	Model 1					Model 2					Model 1					Model 2				
	20th		50th		90th		20th		50th		20th		50th		90th		20th		50th	
Raw (unadjusted) gap	Before 2004	After 2004	Before 2004	After 2004	Before 2004	After 2004	Before 2004	After 2004	Before 2004	After 2004	Before 2004	After 2004	Before 2004	After 2004	Before 2004	After 2004	Before 2004	After 2004	Before 2004	After 2004
	-0.047	-0.192	-0.050	-0.393	-0.017	-0.590	-0.047	-0.192	-0.050	-0.393	-0.017	-0.589								
British Experience	-0.120	-0.282	-0.150	-0.357	-0.160	-0.358	-0.083	-0.193	-0.101	-0.240	-0.132	-0.295								
Education	0.165	0.142	0.284	0.250	0.371	0.285	0.060	0.052	0.111	0.099	0.248	0.187								
Marital Status	0.000	-0.010	0.001	-0.021	0.000	-0.023	0.000	-0.006	0.001	-0.013	0.000	-0.016								
Female	-0.032	0.011	-0.039	0.013	-0.034	0.013	-0.026	0.009	-0.028	0.009	-0.026	0.009								
Location	0.071	0.019	0.100	0.032	0.101	0.038	0.060	0.015	0.087	0.028	0.083	0.032								
Occupation							-0.043	-0.150	-0.021	-0.223	-0.010	-0.141								
Industry							-0.027	-0.034	-0.026	-0.028	0.002	0.003								
Total Explained	0.087	-0.122	0.198	-0.081	0.279	-0.045	-0.055	-0.307	0.025	-0.368	0.173	-0.222								
British Experience	-0.154	-0.029	0.024	-0.007	0.192	0.098	-0.174	-0.015	-0.070	-0.007	0.166	-0.001								
Foreign Experience	0.005	0.022	0.076	0.022	0.069	0.180	-0.033	0.012	0.021	0.003	0.051	0.115								
Brit-foreign exp interaction	-0.030	-0.002	-0.035	-0.003	-0.067	-0.057	-0.006	0.000	-0.022	0.005	-0.070	-0.023								
Education	-0.572	-0.570	-0.549	-1.079	-0.493	-0.448	-0.286	-0.117	-0.585	-0.393	-0.559	-0.587								
Marital Status	0.155	-0.014	-0.062	-0.026	-0.196	-0.062	0.062	-0.005	-0.062	-0.009	-0.141	-0.059								
Female	-0.043	0.056	-0.039	0.057	-0.029	0.017	-0.024	0.048	-0.058	0.027	-0.067	-0.001								
Location	-0.187	-0.038	-0.130	0.105	0.065	-0.053	-0.074	-0.035	-0.113	0.102	0.152	-0.059								
Occupation							-0.058	-0.032	0.040	0.010	0.373	0.056								
Industry							-0.035	0.171	-1.573	0.523	0.233	0.477								
Intercept and other variables	0.692	0.505	0.467	0.618	0.163	-0.218	0.636	0.088	2.348	-0.286	-0.329	-0.286								
Total unexplained	-0.134	-0.070	-0.247	-0.312	-0.297	-0.545	0.008	0.115	-0.074	-0.025	-0.191	-0.367								

Source: Author's RIF regressions using the UK LFS, 1998-2008

Note: Other variables are dummies for cohorts of arrival. Before 2004 pool years 1998 to 2003. After 2004 pool years 2004 to 2008. Wage differences are decomposed into explained and unexplained components, where the explained part is attributable solely to the differences between two groups' characteristics (valued at reference group coefficients estimated in the RIF regressions). The unexplained component is simply the part of the gap that cannot be explained by group characteristics and is usually attributed to differences in the two groups' returns-to-skill function.

Table 5: Decomposition of natives and immigrants quantile wage gaps

	EU14 Immigrants vs. Natives						Other Immigrants vs. Natives					
	20th			50th			20th			50th		
	Before 2004	After 2004	Before 2004	After 2004	Before 2004	After 2004	Before 2004	After 2004	Before 2004	After 2004	Before 2004	After 2004
Raw (unadjusted) gap	0.038	0.031	0.082	0.116	0.103	0.130	0.032	-0.003	0.086	0.048	0.117	0.091
British Experience	-0.068	-0.068	-0.083	-0.085	-0.118	-0.113	-0.050	-0.066	-0.061	-0.083	-0.091	-0.110
Education	0.042	0.043	0.078	0.082	0.175	0.155	0.042	0.043	0.078	0.083	0.174	0.156
Marital Status	-0.004	-0.003	-0.007	-0.006	-0.008	-0.007	0.001	0.001	0.001	0.003	0.002	0.004
Female	-0.007	-0.001	-0.008	-0.001	-0.007	-0.001	0.001	0.005	0.001	0.005	0.001	0.005
Location	0.040	0.030	0.059	0.056	0.061	0.071	0.056	0.038	0.081	0.074	0.079	0.087
Occupation	0.006	0.014	0.042	0.053	0.049	0.049	0.008	-0.003	0.034	0.023	0.034	0.022
Industry	-0.009	-0.009	-0.008	-0.008	0.007	0.009	-0.001	-0.004	-0.002	-0.005	0.006	0.004
Total Explained	0.001	0.007	0.073	0.091	0.158	0.162	0.057	0.015	0.133	0.100	0.207	0.169
British Experience	-0.031	0.051	-0.010	0.034	-0.077	-0.121	-0.050	-0.066	-0.047	-0.027	-0.058	-0.016
Foreign Experience	0.031	0.043	0.039	0.037	0.139	0.171	0.022	0.028	0.040	0.040	0.115	0.127
Brit-foreign exp interaction	-0.011	-0.017	-0.029	-0.016	-0.056	-0.082	-0.016	-0.013	-0.031	-0.028	-0.046	-0.057
Education	-0.001	0.016	-0.043	-0.122	-0.538	-0.390	-0.064	-0.136	-0.210	-0.284	-0.659	-0.521
Marital Status	-0.033	-0.028	-0.024	-0.033	-0.007	0.017	-0.072	-0.048	-0.059	-0.058	-0.032	-0.021
Female	0.040	0.024	0.040	0.039	0.014	0.003	0.051	0.041	0.047	0.043	0.021	0.026
Location	0.037	0.124	0.088	0.162	-0.055	-0.040	0.112	0.057	0.019	0.013	-0.246	-0.032
Occupation	-0.133	-0.244	-0.055	-0.044	0.084	0.553	-0.208	-0.100	-0.127	0.095	-0.118	0.169
Industry	-0.253	0.012	0.145	0.060	0.643	0.150	-0.195	0.250	0.088	0.253	0.471	0.155
Intercept and other variables	0.391	0.043	-0.143	-0.091	-0.202	-0.293	0.394	-0.033	0.234	-0.098	0.461	0.093
Total unexplained	0.037	0.023	0.009	0.025	-0.055	-0.032	-0.026	-0.018	-0.046	-0.052	-0.090	-0.078

Source: Author's RIF regressions using the UK LFS, 1998-2008

Note: Other variables are dummies for cohorts of arrival. Before 2004 pool years 1998 to 2003. After 2004 pool years 2004 to 2008. Wage differences are decomposed into explained and unexplained components, where the explained part is attributable solely to the differences between two groups' characteristics (valued at reference group coefficients estimated in the RIF regressions). The unexplained component is simply the part of the gap that cannot be explained by group characteristics and is usually attributed to differences in the two groups' returns-to-skill function.

Table 6: Mean and quantile decomposition for recent immigrants

	EU8 vs. Natives			EU14 vs. Natives			Other Immigrants vs. Natives		
	20th	50th	90th	20th	50th	90th	20th	50th	90th
Raw (unadjusted) gap	-0.216	-0.437	-0.750	-0.059	0.089	0.183	-0.100	-0.068	0.087
British Experience	-0.218	-0.270	-0.329	-0.221	-0.275	-0.334	-0.217	-0.269	-0.328
Education	0.049	0.093	0.176	0.082	0.157	0.295	0.065	0.123	0.233
Marital Status	-0.007	-0.016	-0.019	-0.008	-0.019	-0.022	-0.002	-0.004	-0.003
Female	0.017	0.018	0.018	0.006	0.006	0.006	0.015	0.015	0.015
Location	0.005	0.008	0.009	0.045	0.084	0.106	0.038	0.073	0.088
Occupation	-0.172	-0.255	-0.164	0.001	0.002	0.003	-0.024	0.008	0.016
Industry	-0.033	-0.027	0.002	-0.008	0.063	0.088	-0.021	-0.016	0.018
Total Explained	-0.358	-0.448	-0.307	-0.104	0.017	0.141	-0.146	-0.069	0.039
British Experience	0.023	0.037	0.001	0.012	-0.058	-0.005	0.008	0.023	-0.002
Foreign Experience	0.015	-0.012	0.059	0.126	0.160	0.567	0.047	0.129	0.408
Brit-foreign exp interaction	-0.001	0.014	-0.003	-0.065	-0.082	-0.194	-0.005	-0.044	-0.144
Education	-0.118	-0.409	-0.837	-0.199	-0.009	-0.163	-0.245	-0.393	-0.577
Marital Status	-0.006	-0.010	-0.039	-0.017	-0.021	0.064	-0.015	-0.066	-0.003
Female	0.046	0.039	0.027	0.064	0.053	0.016	0.052	0.073	0.050
Location	-0.036	0.059	-0.009	0.078	0.371	0.156	0.082	0.134	0.080
Occupation	0.201	0.439	0.738	-0.150	0.220	-0.015	-0.186	-0.142	-0.161
Industry	-0.024	-0.034	-0.529	-0.119	-0.120	1.165	-0.130	-0.339	-1.227
Intercept and other variables	0.041	-0.111	0.149	0.316	-0.443	-1.550	0.440	0.625	1.625
Total unexplained	0.141	0.011	-0.443	0.045	0.071	0.042	0.046	0.001	0.048

Source: Author's RIF regressions using the UK LFS, 2004-2008

Note: Other variables are dummies for cohorts of arrival. Recent immigrants are immigrants that arrived between 2004 and 2008. Recent immigrant wages are compared to native wages as reported in Table 1. Wage differences are decomposed into explained and unexplained components, where the explained part is attributable solely to the differences between two groups' characteristics (valued at reference group coefficients estimated in the RIF regressions). The unexplained component is simply the part of the gap that cannot be explained by group characteristics and is usually attributed to differences in the two groups' returns-to-skill function.

Table A1: Share of EU8 immigrants by country of birth and average wages, before and after 2004

	Before 2004		After 2004	
	%	mean wages	%	mean wages
Hungary	20%	2.07	3%	2.05
Poland	43%	2.31	67%	1.98
Czech Republic	12%	1.96	6%	2.10
Estonia	2%	2.30	1%	2.08
Lithuania	9%	2.19	9%	1.88
Latvia	3%	2.22	3%	1.90
Slovak Republic	10%	1.73	10%	1.89
Slovenia	1%	2.60	0%	2.30

Source: UK LFS, years 1998 to 2008

Note: mean of log hourly wages in real terms. Only employed are included to compute the shares

Table C1: Robustness checks on mean and quantile decomposition for EU8 immigrants

	EU8, only wave 1										EU8, only males									
	Mean					20th					Mean					20th				
	Before 2004	After 2004	Before 2004	After 2004	Before 2004	Before 2004	After 2004	Before 2004	After 2004	Before 2004	Before 2004	After 2004	Before 2004	Before 2004	After 2004	Before 2004	After 2004			
Raw (unadjusted) gap	-0.091	-0.371	-0.039	-0.186	-0.103	-0.395	-0.048	-0.604	-0.604	0.043	-0.435	0.022	-0.288	0.028	-0.467	0.096	-0.643			
British Experience	-0.148	-0.334	-0.118	-0.275	-0.153	-0.350	-0.164	-0.357	-0.135	-0.388	-0.144	-0.401	-0.135	-0.400	-0.113	-0.320				
	Education	0.279	0.220	0.172	0.140	0.246	0.384	0.282	0.258	0.184	0.172	0.122	0.279	0.207	0.345	0.229				
	Marital Status	0.001	-0.017	0.001	-0.011	0.002	-0.022	0.001	0.002	-0.034	0.002	-0.031	0.003	-0.045	0.002	-0.037				
	Female	-0.030	0.011	-0.029	0.010	-0.036	0.013	-0.031	0.012	0.002										
	Industry	0.084	0.032	0.068	0.021	0.094	0.036	0.097	0.044	0.066	0.016	0.058	0.013	0.068	0.015	0.079				
Total Explained	0.186	-0.087	0.094	-0.116	0.205	-0.076	0.288	-0.040	0.194	-0.223	0.090	-0.296	0.217	-0.224	0.315	-0.109				
British Experience	-0.029	0.030	-0.164	-0.013	-0.152	0.004	0.540	0.040	0.066	0.003	0.063	-0.038	-0.034	0.005	0.497	0.138				
	Foreign Experience	0.059	0.068	-0.002	0.013	0.008	0.018	-0.003	0.085	0.096	0.067	0.035	0.106	0.029	0.121	0.248				
	Brit-foreign exp interaction	-0.026	-0.024	-0.010	-0.005	-0.043	-0.002	-0.052	-0.067	-0.078	-0.009	-0.049	-0.001	-0.102	-0.007	-0.173				
	Education	-0.469	-0.718	-0.497	-0.566	-0.512	-1.069	-0.174	-0.378	-0.293	-0.533	-0.406	-0.515	-0.902	-0.369	-0.020				
	Marital Status	0.003	-0.033	0.063	-0.015	-0.132	-0.027	-0.489	-0.085	-0.182	-0.069	-0.248	-0.067	-0.138	-0.073	-0.216				
Female	-0.030	0.039	0.012	0.062	0.097	0.063	-0.048	-0.011												
	Location	-0.241	-0.064	-0.192	-0.064	-0.324	0.070	-0.344	0.019	-0.039	-0.146	-0.143	-0.236	0.044	1.058	0.198				
	Intercept and other variables	0.455	0.417	0.658	0.517	0.663	0.625	0.234	-0.078	0.232	0.339	0.651	0.734	0.582	0.648	-1.137				
Total unexplained	-0.278	-0.284	-0.132	-0.070	-0.308	-0.319	-0.336	-0.565	-0.151	-0.212	-0.068	0.008	-0.189	-0.243	-0.219	-0.535				

Source: Author's OLS and RIF regressions using the UK LFS, 1998-2008

Note: Other variables are dummies for cohorts of arrival. Before 2004 pool years 1998 to 2003. After 2004 pool years 2004 to 2008. Wage differences are decomposed into explained and unexplained components, where the explained part is attributable solely to the differences between two groups' characteristics (valued at reference group coefficients estimated in the RIF regressions). The unexplained component is simply the part of the gap that cannot be explained by group characteristics and is usually attributed to differences in the two groups' returns-to-skill function. Only wave 1 includes only individuals in their first wave.

Table D1: Descriptive statistics (continued)

		Before 2004				After 2004			
		UK Natives	EU8	Other Immigrants	EU14	UK Natives	EU8	Other Immigrants	EU14
Marital status									
	Single	30%	29%	28%	42%	32%	55%	28%	43%
	Married	58%	58%	61%	47%	55%	36%	61%	46%
	Other	12%	13%	11%	10%	13%	9%	11%	10%
Region									
	Tyne & Wear	2%	1%	1%	1%	2%	1%	1%	1%
	Rest of northern region	3%	2%	1%	2%	3%	1%	1%	2%
	South Yorkshire	2%	0%	1%	1%	2%	2%	1%	1%
	West Yorkshire	4%	2%	3%	2%	4%	6%	3%	2%
	Rest of Yorkshire & Humberside	3%	1%	1%	2%	3%	3%	1%	2%
	East Midlands	8%	4%	5%	5%	8%	10%	5%	5%
	East Anglia	4%	5%	3%	4%	4%	5%	3%	5%
	Inner London	3%	14%	19%	18%	3%	8%	16%	17%
	Outer London	6%	30%	23%	14%	5%	13%	21%	13%
	Rest of South East	20%	22%	20%	24%	20%	18%	21%	23%
	South West	9%	6%	6%	8%	9%	5%	6%	8%
	West Midlands (met. county)	4%	1%	5%	2%	4%	4%	4%	2%
	Rest of West Midlands	5%	1%	2%	3%	5%	3%	2%	3%
	Greater Manchester	5%	3%	2%	2%	4%	4%	3%	2%
	Merseyside	2%	0%	0%	0%	2%	1%	1%	1%
	Rest of North West	4%	1%	2%	2%	4%	3%	2%	2%
	Wales	5%	2%	2%	2%	5%	3%	2%	3%
	Strathclyde	4%	1%	1%	1%	4%	2%	1%	2%
	Rest of Scotland	6%	3%	3%	4%	6%	4%	3%	5%
	Northern Ireland	2%	1%	1%	3%	2%	3%	1%	3%
Occupation									
	Legislators and managers	14%	0%	14%	15%	15%	3%	13%	17%
	Professionals	15%	6%	21%	21%	14%	5%	20%	21%
	Technicians	11%	3%	11%	10%	13%	4%	15%	15%
	Clerks	18%	9%	16%	16%	16%	8%	12%	12%
	Service and sales workers	15%	38%	16%	18%	16%	17%	17%	16%
	Agricultural and fishery workers	1%	0%	0%	0%	1%	1%	0%	0%
	Crafts and related trades workers	9%	0%	5%	5%	7%	9%	4%	4%
	Plant and machine operators	8%	13%	7%	5%	7%	20%	6%	4%
	Elementary occupations	9%	31%	9%	9%	10%	34%	12%	11%
Industry									
	Agriculture & Fishing	1%	1%	0%	0%	1%	2%	0%	1%
	Energy & Water	1%	0%	1%	1%	1%	0%	1%	1%
	Manufacturing	19%	14%	15%	15%	14%	27%	12%	12%
	Construction	5%	6%	2%	3%	6%	6%	3%	3%
	Distribution, Hotels & Restaurants	18%	23%	20%	21%	17%	25%	19%	20%
	Transport & Communication	7%	3%	7%	7%	7%	11%	7%	7%
	Banking, Finance & Insurance etc	15%	15%	19%	20%	15%	11%	20%	21%
	Public admin, Educ & Health	30%	24%	30%	27%	34%	11%	34%	30%
	Other Services	5%	13%	5%	6%	5%	5%	4%	5%
	Workplace Outside UK	0%	0%	0%	0%	0%	0%	0%	0%
Observations		346,509	348	22,092	4,723	240,038	2,245	20,315	3,903

Source: UK LFS, years 1998 to 2008

Note: Employees aged 16-65. Self employed are excluded as there is no wage information. Real wages at constant 2008 prices. EU8 immigrants include Poland, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Slovakia and Slovenia. EU14 immigrants include Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden. Other immigrants include all foreign born in the UK with the exclusion of EU8 and EU14 born. Other in the marital status include separated, divorced or widowed. Before 2004 include years 1998 to 2003 After 2004 include years 2004 to 2008.

Table D2: Participation, employment and unemployment rates, before and after 2004

	Before 2004				After 2004			
	UK natives	EU8	Other Immigrants	EU14	UK natives	EU8	Other Immigrants	EU14
Participation rate	78%	67%	71%	79%	79%	87%	73%	81%
Employment rate	74%	62%	65%	75%	75%	81%	68%	77%
Unemployment rate	5%	7%	8%	6%	5%	6%	7%	5%

Source: UK LFS 1998 to 2008

Note: Participation rate is defined as the ratio between the labour force and the working age population; employment rate is defined as the ratio between the number of employed (including self-employed) and the working age population; the unemployment rate is defined as the ratio between the number of unemployed and the labour force. The labour force is given by the number of employed plus the number of unemployed. The working age population includes those who are inactive.

Table D3: Occupational distribution at the 20th and 90th percentile after 2004

	20th						90th					
	EU8			EU14			Other Immigrants			EU8		
	Natives	Recent	All	Recent	All	Recent	All	Natives	Recent	All	Recent	All
Legislators and managers	5.57	0.51	0.85	5.19	6.29	3.01	4.59	33.33	3.56	9.82	32.52	34.7
Professionals	2.89	0.26	0.66	3.46	5.06	3.02	3.4	37.52	11.88	21.19	47.97	44.8
Technicians	6.19	1.4	1.69	8.23	7.33	3.92	5.47	14.8	6.41	9.17	13.82	12.3
Clerks	22.13	3.06	4.41	12.12	18.85	9.05	15.03	4.63	5.94	11.76	4.07	4.16
Service and sales workers	27.34	17.73	21.69	30.74	30.81	37.19	31.12	3.18	9.5	8.27	0.81	1.59
Agricultural and fishery workers	0.88	0.13	0.28		0.36	0.1	0.31	0.03		0.26		1.33
Crafts and related trades workers	7.66	8.04	7.51	5.19	5.27	2.61	5.29	3.99	12.35	10.47	0.81	1.65
Plant and machine operators	10.27	20.92	19.53	9.09	7.43	9.75	11.63	1.63	25.18	13.57		0.43
Elementary occupations	17.06	47.96	43.38	25.97	18.6	31.36	23.16	0.9	25.18	15.5		0.37
												0.95
												0.65

Source: UK LFS, years 1998 to 2008
Note: Employees aged 16-65. Self employed are excluded as there is no wage information. Real wages at constant 2008 prices. EU8 immigrants include Poland, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Slovakia and Slovenia. EU14 immigrants include Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden. Other immigrants include all foreign born in the UK with the exclusion of EU8 born. Recent immigrants are defined as those whose year of arrival is between 2004 and 2008.

Table D4: OLS estimates for natives and EU8 immigrants before and after 2004

	Before 2004				After 2004			
	Natives		EU8 Immigrants		Natives		EU8 Immigrants	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
British Experience	0.046*** (0.000)	0.035*** (0.000)	0.043*** (0.011)	0.030*** (0.009)	0.044*** (0.000)	0.032*** (0.000)	0.054*** (0.011)	0.034*** (0.010)
British Experience squared	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Foreign experience			0.045*** (0.017)	0.021 (0.016)			0.015*** (0.004)	0.009*** (0.004)
Foreign experience squared			-0.001*** (0.001)	0 (0.001)			-0.000*** (0.000)	-0.000*** (0.000)
Brit-foreign exp interaction			-0.002*** (0.001)	-0.001*** (0.001)			-0.001*** (0.000)	0 (0.000)
Education	0.101*** (0.000)	0.051*** (0.000)	0.071*** (0.011)	0.030*** (0.012)	0.091*** (0.001)	0.046*** (0.001)	0.038*** (0.004)	0.022*** (0.003)
Married	0.076*** (0.002)	0.061*** (0.002)	0.216*** (0.086)	0.096 (0.088)	0.089*** (0.003)	0.057*** (0.002)	0.031 (0.021)	0.014 (0.019)
Other marital status	0.030*** (0.003)	0.028*** (0.003)	0.118 (0.135)	0.049 (0.123)	0.035*** (0.004)	0.022*** (0.003)	-0.03 (0.035)	0.005 (0.031)
Female	-0.257*** (0.002)	-0.198*** (0.002)	-0.429*** (0.066)	-0.336*** (0.066)	-0.220*** (0.002)	-0.165*** (0.002)	-0.157*** (0.018)	-0.133*** (0.017)
Intercept	0.269*** (0.008)	1.105*** (0.013)	0.280 (0.286)	1.548*** (0.336)	0.715*** (0.010)	1.480*** (0.016)	1.246*** (0.080)	1.960*** (0.104)
<i>Other controls</i>								
Region dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation and Industry dummies	No	Yes	No	Yes	No	Yes	No	Yes
R-squared	0.328	0.474	0.941	0.959	0.303	0.463	0.956	0.964
obs	346509	346380	348	348	240038	239834	2245	2245

*Robust Standard errors reported in brackets. * indicates significance at 10%, ** indicates significance at 5%, *** indicates significance at 1% level.*

Dependent variable is log gross hourly wages. Regressions are run separately for natives and immigrants. When controlling for occupation and industry in Model 2 some observations for natives are lost. Before 2004 include years 1998 to 2003 After 2004 include years 2004 to 2008.

Table D5: OLS estimates for natives and EU14 and other immigrants, before and after 2004

	Before 2004				After 2004			
	Other Immigrants		EU14 Immigrants		Other Immigrants		EU14 Immigrants	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
British Experience	0.039*** (0.001)	0.026*** (0.001)	0.042*** (0.003)	0.031*** (0.003)	0.041*** (0.002)	0.026*** (0.002)	0.047*** (0.004)	0.032*** (0.003)
British Experience squared	-0.001*** (0.000)	-0.000*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Foreign experience	0.026*** (0.002)	0.022*** (0.002)	0.040*** (0.005)	0.033*** (0.004)	0.021*** (0.002)	0.018*** (0.002)	0.045*** (0.005)	0.037*** (0.004)
Foreign experience squared	-0.000*** (0.000)	-0.000*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Brit-foreign exp interaction	-0.001*** (0.000)	-0.001*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)
Education	0.071*** (0.001)	0.027*** (0.001)	0.083*** (0.002)	0.045*** (0.002)	0.059*** (0.001)	0.021*** (0.001)	0.074*** (0.003)	0.034*** (0.003)
Married	-0.048*** (0.010)	-0.013 (0.008)	0.072*** (0.021)	0.049*** (0.019)	-0.034*** (0.010)	-0.002 (0.009)	0.043* (0.023)	0.044** (0.020)
Other civil status	-0.060*** (0.015)	-0.012 (0.012)	0.027 (0.030)	0.006 (0.026)	-0.081*** (0.015)	-0.029** (0.012)	-0.019 (0.031)	0.015 (0.025)
Female	-0.163*** (0.008)	-0.126*** (0.007)	-0.213*** (0.016)	-0.150*** (0.015)	-0.110*** (0.008)	-0.102*** (0.007)	-0.186*** (0.017)	-0.135*** (0.017)
Intercept	0.622*** (0.046)	1.682*** (0.072)	0.029*** (0.042)	0.136*** (0.049)	1.106*** (0.040)	2.052*** (0.056)	1.605*** (0.071)	1.601*** (0.119)
<i>Other controls</i>								
Region dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation and Industry dummies	No	Yes	No	Yes	No	Yes	No	Yes
R-squared	0.936	0.956	0.946	0.958	0.946	0.964	0.956	0.968
obs	22,092	22,083	4,723	4,723	20,315	20,288	3,903	3,900

Note: Robust Standard errors reported in brackets. * indicates significance at 10%, ** indicates significance at 5%, *** indicates significance at 1% level. When controlling for occupation and industry some observations for both groups are lost. Dependent variable is log gross hourly wages. Regressions are run separately for natives and immigrants. When controlling for occupation and industry, in Model 2 some observations for natives are lost. Before 2004 include years 1998 to 2003. After 2004 include years 2004 to 2008.

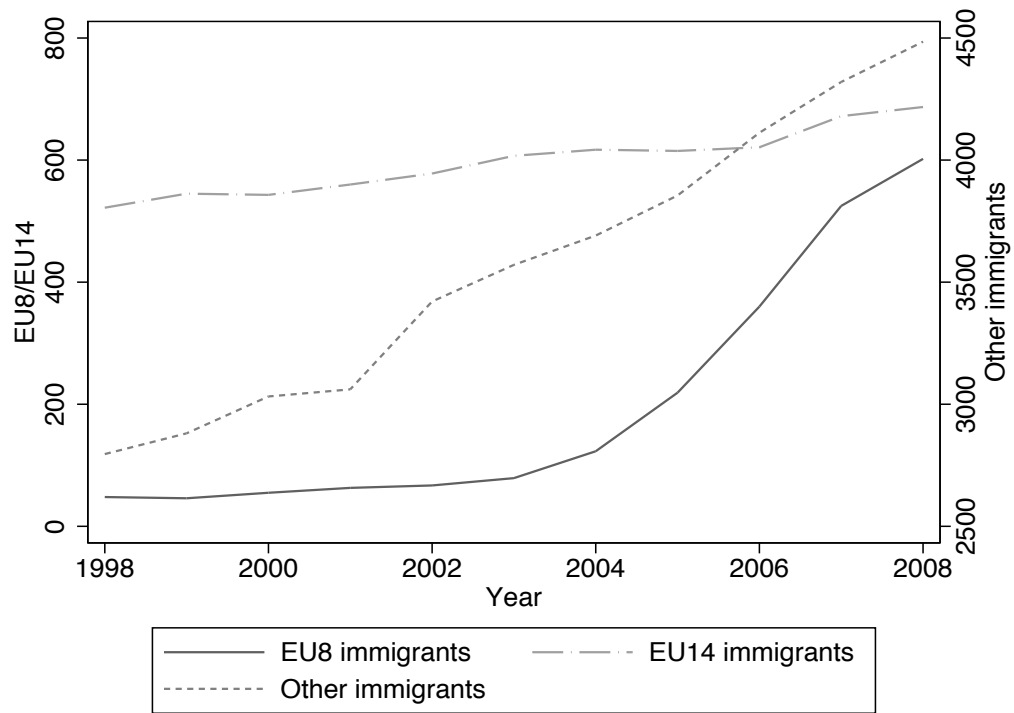
Table D6: Recent immigrants form EU8 and EU14, after 2004

	EU8	EU14	Other Immigrants
log hourly gross real wage	1.87	2.34	2.28
British Experience (year since migration)	1.65	1.47	1.68
Foreign experience	6.62	7.41	8.96
males (%)	0.60	0.52	0.57
Education			
Primary	9%	10%	10%
Secondary	53%	29%	33%
Tertiary	38%	60%	57%
Years of education	14	16	15
Age	28	31	32
Marital status			
Single	61%	68%	43%
Married	32%	28%	53%
Other	7%	4%	5%
Region			
Tyne & wear	1%	1%	1%
rest of northern region	1%	1%	2%
south Yorkshire	3%	2%	1%
west Yorkshire	8%	2%	3%
rest of yorks & Humberside	4%	1%	1%
east midlands	12%	3%	4%
east Anglia	5%	10%	6%
inner london	4%	28%	20%
outer london	9%	13%	17%
rest of south east	17%	20%	19%
south west	5%	3%	5%
west midlands (met county)	4%	2%	3%
rest of west midlands	4%	3%	2%
greater manchester	4%	3%	3%
merseyside	1%	0%	1%
rest of north west	3%	1%	2%
wales	4%	1%	2%
strathclyde	2%	2%	2%
rest of scotland	5%	4%	4%
northern ireland	4%	3%	2%
Observations	1,732	420	2,346

Source: UK LFS, years 2004 to 2008

Note: Employees aged 16-65. Self employed are excluded as there is no wage information. Real wages at constant 2008 prices. Recent immigrants are defined as those whose year of arrival is between 2004 and 2008. EU8 immigrants include Poland, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Slovakia and Slovenia. EU14 immigrants include Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden. Other immigrants include all foreign born in the UK with the exclusion of EU8 and EU14 born. Tertiary education: left full-time education at age 21 or later; secondary education: left full-time education between the ages of 17 and 20; less than secondary: left full-time education before 16 years old (included) or never had full-time education. Other in the marital status include separated, divorced or widowed. Before 2004 include years 1998 to 2003 After2004 include years 2004 to 2008.

Figure 1: Total number of immigrants in the UK (in thousands)

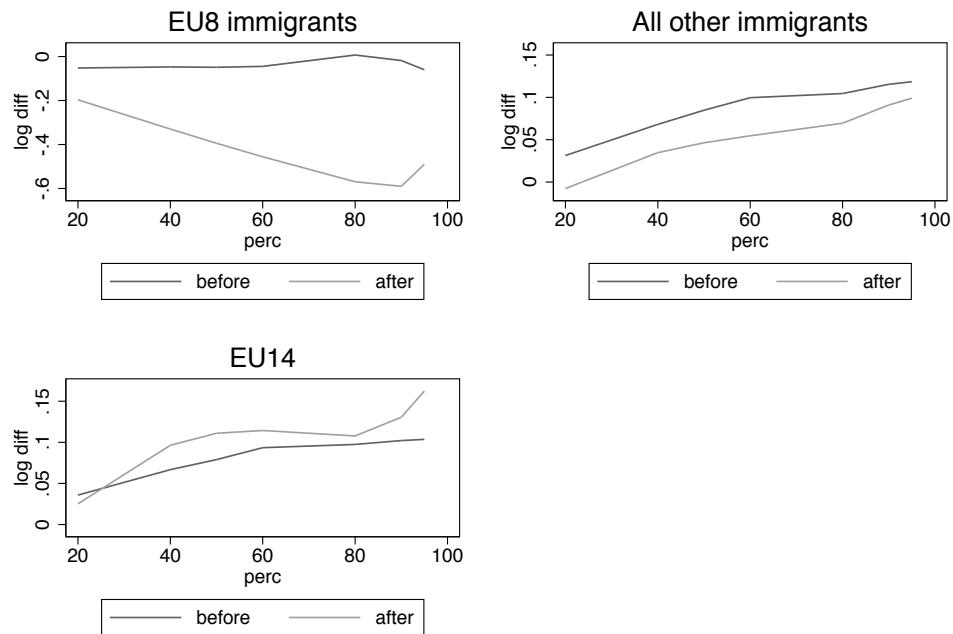


Source: UK LFS, years 1998-2008

Note: Totals include employed, unemployed and inactive, aged 16-65

Figure 2: Immigrant-Native wage gap by percentile

by percentile in the two periods



Source: UK LFS, years 1998-2008

Note: Real wages in 2008 prices. Gaps are defined as differences in log wages between immigrants minus natives at each percentile. Before 2004 include years 1998 to 2003 After 2004 include years 2004 to 2008.