Immigrant Assimilation Pre and Post Labour Market Entry: Evidence from the UK

Labour Force Survey[1]

by

Ken Clark, University of Manchester and IZA, Bonn,
PO Box 88, Manchester, M60 1QD, UK.
Fax: +44(0)161 275 4812, Email: ken.clark@manchester.ac.uk

and

Joanne Lindley, University of Sheffield,
9 Mappin Street, Sheffield, S11 7BS, UK.
Fax: +44(0)114 222 3458, Email: J.Lindley@sheffield.ac.uk

Abstract

We estimate models of employment an earnings for a sample of white and non-white male immigrants drawn from the Labour Force Survey between 1993 and 2004. Immigrants who arrived to enter the labour market (labour market entrants) are distinguished from those who arrived to complete their education (education entrants). Diverse patterns of labour market assimilation are found depending on ethnicity and immigrant type. Amongst labour market entrants, whites do better than non-whites whilst among education entrants, highly qualified prime age non-whites perform as well as their white counterparts. Relative to white natives, labour market outcomes for all immigrant groups have a tendency to decline with age.

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1. Introduction

The labour market performance of immigrants is central to political and public discourse on immigration policy in the UK. In 2001 around 8.3 percent of the UK population were born abroad and the Treasury has estimated that net migration contributes 0.5% to the economic growth rate. Recognising the contribution that immigrants make to the economy, the government has endorsed future controlled and selective immigration. Equally, in response to perceived public concerns about the scale of immigration and the motivation of immigrants, it has been emphasised that immigrants should not be dependent on the state. In the Prime Minister's view, "All those who come here to work and study must be able to support themselves"[1] How immigrants fare in the labour market is important both for their ability to support themselves and for their contribution to the wider economy, hence in this paper we analyse the employment and earnings outcomes of immigrants observed in the UK labour market over the period 1993-2004.

We focus on the idea of immigrant assimilation which has received considerable attention in the existing literature.[2] This is the view that is that, after arrival in the host country, immigrant labour market outcomes adjust towards those of non-immigrant (native) workers. Assimilation is thought to take place through human capital enhancement: immigrants acquire skills that are specific to the destination country, including knowledge of the labour market and language proficiency, allowing them to improve their labour market outcomes relative to natives. The longer the process of assimilation takes, the less successful any cohort of immigrants will be at any given time since arrival.

We investigate assimilation and arrival year effects using a sample of native and immigrant workers from the UK's *Labour Force Survey* (*LFS*). The labour market outcomes that we focus on are real weekly earnings and employment and we divide our sample of immigrants along two dimensions. First, to account for well-documented ethnic differences in labour market outcomes, we examine white and non-white immigrants separately. There is considerable evidence that non-whites receive differential treatment in the UK labour market (Blackaby *et al.*, 2002, is a recent example) and separating the distinct contributions of immigrant status and ethnicity is important. For example, if the labour market rewards the human capital of whites and non-whites differentially, then one would expect the employment and earnings trajectories of white and non-white immigrants to differ as years since migration increase. Lower rewards to given levels of human capital for non-white workers have been found in the UK (Blackaby et al., 1994, 1998) and, perhaps as a response to this, the process of human capital acquisition is also affected by ethnicity: Leslie and Drinkwater (1999) show that non-whites are more likely than whites to stay on in school or enter higher education.

Second, and more unusually, we compare immigrants who arrive in the UK to enter the labour market, having completed their education at some time in the past, with those who arrive to complete their education in the UK and subsequently enter the labour market. We call this first group "labour market entrants" and the latter group "education entrants". Analysing education entrants and labour market entrants separately is unusual in the literature. In many studies, the issue is not discussed (e.g. Bell, 2007; Borjas, 1985) while others exclude those who arrive as children (Antecol et al., 2006; McDonald and Worswick, 1998), include children but note the effect that

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their inclusion is likely to have on the estimates (Borjas, 1995) or control for immigrants who arrive as children with a dummy variable (Dustmann et al., 2005). Schaafsma and Sweetman (2001), from a perspective related, but not identical to what we do, specifically investigate the impact of age at migration on immigrant earnings, an issue that is also addressed by Borjas (1995) and Wilkins (2003).   Note that excluding "child immigrants" is not the same as estimating on a sample of labour market entrants alone, as there will be some immigrants who arrived as adults to enter (higher) education.

The importance of treating these two immigrant types separately derives from the different experiences that they have prior to labour market entry. Kossoudji (1989) makes the important distinction between labour market assimilation and pre-labour market assimilation. For the education entrants, assimilation consists of labour market assimilation (time spent after leaving full-time education) and pre-labour market assimilation (in the UK education system).   Most investigators of the assimilation hypothesis are, explicitly or implicitly, only interested in labour market assimilation and ignore the labour market consequences of pre-labour market assimilation. Since around one half of immigrants do actually enter the education system on arrival to the UK, an important part of the picture of immigration is being missed. Given their earlier exposure to the language and culture of the UK, do such education entrants have outcomes which are closer to their native counterparts than to those immigrants who enter the labour market directly?   Or, do differences associated with their foreign origins persist?

Our work builds on previous UK studies which have used cross-section survey data to paint a picture of immigrant labour market performance. In an early paper Chiswick (1980) used a single cross section of the *General Household Survey* (*GHS*) and found that white immigrants earned as much as their native counterparts but that there was, other things equal, a 25% earnings penalty for non-white immigrants. He found no statistically significant role for years since migration, controlling for other things. Shields and Wheatley Price (1998) also examined earnings and used *LFS* data from 1992-94. Like Chiswick they found earnings differences between white and non-white immigrants. They also emphasised the differential returns to human capital acquired in the home country compared to the host country, with UK human capital generally better rewarded in the UK labour market. Using the same data Wheatley Price (2001) examined the unemployment experience of immigrants and found that more recent immigrants had higher unemployment rates than earlier cohorts.

None of these studies attempts to separate the effects on labour market outcomes of changes in the quality of immigrant cohorts from that of years since migration, however this is a requirement of testing the assimilation hypothesis. In this sense our work is closer to Bell (1997) and Dustmann *et al.* (2003) each of which used pooled cross section data to create a 'synthetic panel' of immigrant and native workers. Bell (1997), using *GHS* data from 1973-92, found substantial post-migration earnings growth for non-white immigrants to the UK which he labelled as "strong assimilation". However he also found that white immigrants were predicted to have higher earnings than natives immediately after arrival, an advantage which eroded through time. He labelled this as "dis-assimilation". Dustmann *et al.* (2003) using *LFS* data from 1992-2000 distinguished immigrants by ethnicity and by region of

origin. Wages were broadly predicted to rise with years since migration for non-white immigrants and for whites from the British Commonwealth. Wages fell, however, for white immigrants from Ireland and Europe. Dustmann *et al.* also examined other labour market outcomes including employment rates where they found that non-white immigrants assimilate towards native levels from an initially inferior position.

Compared to previous work the innovative features of our research are the following. First, we use a larger sample of immigrants and more recent data. Second, we make the (it turns out) important distinction between those immigrants who arrive with their education complete and those who enter the education system. Finally we employ a semi-parametric estimator, which places fewer restrictions on the estimated assimilation profiles than previous work. We find that diverse patterns of labour market assimilation exist depending on ethnicity and immigrant type. Amongst labour market entrants, whites do better than non-whites whilst among education entrants, highly qualified prime age non-whites perform as well as their white counterparts. Relative to white natives, labour market outcomes for all immigrant groups have a tendency to decline with age.

The remainder of the paper proceeds as follows. Section 2 gives an overview of the data while section 3 describes the econometric methods. Section 4 discusses the results pertaining to labour market entrants while section 5 considers education entrants. Section 6 concludes.

2. Data

The data are drawn from the *Labour Force Survey* (*LFS*), conducted by the Office for National Statistics (ONS), and represent pooled annual cross-sections over the period 1993-2004. Since 1992 the *Quarterly LFS* (*QLFS*) has a panel design where each sampled address is interviewed for five waves. Interviews take place at three monthly intervals with the fifth interview taking place a year after the first. Each quarter, interviews are achieved at about 59,000 addresses with about 138,000 respondents. The response rate for the first wave of the survey is around 79 percent. Information is collected on earnings, employment and socio-economic characteristics such as age and years of schooling.

From the *LFS* data we draw information on two labour market outcomes. The first is whether the survey respondent was in paid employment at the time of the interview (including the self-employed) and we analyse males between (a minimum of) 16 and 64 (inclusive). Employment rates are expressed relative to a denominator comprising the employed and the unemployed; in other words, those who are inactive are excluded from the analysis. Including the inactive would complicate the analysis given that in the UK many of this group are on long term sickness benefit while others are early retirees (Nickell, 2004). For reference, in our data set, 13% of white natives were classed as inactive compared to 14 % of immigrants.

Our second labour market outcome of interest is real gross weekly pay in main job and we analyse male, full-time workers aged between (a minimum of) 16 and 64 at the time of interview.[3] Between Spring 1992 and Winter 1996, income questions were asked at the respondents final interview. As a consequence, earnings information

is available from Spring 1993 (since these joined the survey in Spring 1992). After Spring 1997 income questions were asked at the first and final interview. We use data from the final quarter here.[4] Around 20 percent of the employed did not respond to the earnings question and were consequently excluded from our sample. This percentage is slightly higher for white labour market entrants (27.7 percent) as well as for all non-whites (around 30%). Overall, 15 percent of the economically active are excluded from our earnings sample because they are self-employed and do not report earnings. This percentage is in fact lower for native born non-whites (10.67 percent) although it is slightly larger across immigrants, and especially large amongst non-white education entrants (20.56 percent). Hence sample selection effects are likely to affect non-white education entrants more than the other groups since this group is less likely to have responded to the earnings question and more likely have been in self-employment, compared to white natives. Around 37 percent of our sample consists of proxy responses whereby another household member completed the survey on their behalf. This was usually the spouse and therefore it is unlikely that earnings were recorded inaccurately. This percentage is slightly lower across non-white and immigrant groups compared to white natives.

An important component of the analysis is the distinction between those who enter the UK having completed full-time education (labour market entrants) and those who have yet to complete (education entrants). This requires dividing the sample based on information about the year in which individuals left full time education and their year of arrival in the UK. We make the assumption that education is obtained in a continuous block before labour market experience is accrued. This is the standard assumption in the human capital literature.[5] It is also worth noting that we adopt

another standard convention of human capital studies: since we do not observe panel data or work histories, labour market 'experience' is in fact potential experience.

When analysing labour market entrants we use a measure of years of schooling to control for educational attainment. This is because, although the *LFS* collects information on qualifications, specifically the highest qualification attained, there is good reason to believe that those who have overseas based qualifications are likely to be classified as having "Other" qualifications rather than being classified to the correct qualification level (Manacorda et al., 2006). For education entrants since their final experience of education is in the UK, we can confidently use information on highest qualification obtained to control for human capital.

Table 1 provides sample means and standard deviations for some key variables by immigration and ethnic status (white or non-white). We also further divide our white and non-white samples into labour market entrants and education entrants. The latter of course will have some UK schooling and may have some foreign schooling, but have no foreign labour market experience. Labour market entrants, by contrast, will have no UK schooling but may have foreign schooling and foreign experience. White native-born men are included for comparative purposes.

(Insert Table 1 here)

Comparing employment rates, what is notable is that the big differences are not between natives and immigrants *per se* but between whites and non-whites. All white workers have roughly the same employment rate, irrespective of their immigrant

status, but those for non-whites are lower by up to nine percentage points. Amongst non-whites, education entrants have higher employment rates than labour market entrants. Comparing mean earnings, immigrants generally fare better than natives: of the four subcategories of immigrant, only non-white labour market entrants earn less than white natives. White labour market entrants earn more on average than white education entrants, although the reverse is true for non-whites. Within the categories of labour market entrants and education entrants, non-whites have lower weekly earnings than whites, an ethnic gap which is also found in the native born population (Blackaby *et al.*, 2005)

Table 1 also reveals some details about the origins of the immigrant samples and their pattern of arrival in the UK. Education entrants are more likely to have come from earlier arrival cohorts reflecting their earlier age at arrival. White education entrants were younger at arrival than non-whites. Country of birth varies predictably between white and non-white immigrants with non-whites concentrated in the New Commonwealth countries (Britain's former colonies in Africa, Asia and the Caribbean). White immigrants are more evenly spread between the Old Commonwealth (Australia, Canada, New Zealand), the EU and the rest of the world. We also provide some detail on the detailed ethnicity of the non-white immigrants as this is used as a control in the subsequent econometric analysis. Previous work has shown that there is considerable diversity in labour market outcomes within the non-white community (e.g. Clark and Drinkwater, 2005).

Turning now to human capital, white labour market entrants have less UK labour market potential experience than their non-white counterparts, although their years of

foreign experience and schooling are more similar. For education entrants whites have more UK potential experience, more years of UK schooling and fewer years of foreign schooling compared to non-whites. Considering total schooling, immigrants of all types have more on average than white natives however the quality of this schooling and how it maps into both qualifications and labour market outcomes is open to question. Bratsberg and Ragan (2002), Chiswick and Miller (1985), Friedberg (2000), Schoeni (1998) and Shields and Wheatley Price (1998), in a variety of host country labour markets, all find differences in the returns to human capital obtained in the host country compared to that obtained in the source country.

For the education entrants we can examine the qualifications obtained in the UK and compare these with white natives. What is immediately obvious is the much higher proportion of education entrants who have university degrees. Furthermore this holds for both whites and non-white education entrants. To some extent this will reflect the fact that many of the education entrants will have arrived in the UK specifically to obtain a British degree; however some of it may also be due to the fact that these immigrants, many of whom arrived as children, are a highly selected sample.

3. Modelling framework

Our investigation of immigrant labour market outcomes is based on the following econometric model:

$$Z_i = f(Y_i) + \gamma C_i + \delta S_i + x_i \beta + \varepsilon_i \qquad i = 1,\dots, n \qquad (1)$$

In equation (1), Z represents a measure of labour market status, Y is years since migration, C is immigrant cohort, S is survey year (year in which the individual was

observed), x is a vector of other explanatory variables including human capital and ε is an error term.

Two measures of labour market status (Z) are used - real weekly earnings in logarithmic form and a discrete dependent variable taking the value 1 if the individual is employed and the value 0 if they are unemployed. We follow the recent literature, particularly Dustmann and Fabbri (2003) and Antecol *et al.* (2006), in two regards. First, in order to make computation of the semi-parametric estimates more tractable, we use a linear probability model, rather than a probit or logit, to analyse employment status. There turns out to be little difference in the estimated marginal effects of the explanatory variables if a probit model is employed instead. Second, given the difficulty of finding identifying exclusion restrictions, we do not attempt to correct for sample selection bias in either employment or earnings models. This is not an indication that we do not believe selection bias to be a problem. In fact, in the current application, the frequently analysed situation whereby those in employment are a selected sample of the entire labour force may be only one source of non-random selection on unobservable attributes. Immigrants themselves are likely to be a highly self-selected group (Borjas, 1987) and the distinction between education and labour market entrants may also introduce further selection bias problems. Finally immigrants may non-randomly re-migrate which affects the interpretation of estimated assimilation profiles. Clearly these considerations should be borne in mind when interpreting our results.

The years since migration variable Y will capture assimilation effects - how immigrant earnings change with length of residence in the host country. The specification of the

function $f(Y)$ is discussed later in this section. C is the immigrant cohort to which an individual belongs (thought of here as year of arrival) and captures otherwise unobserved differences in immigrant cohort quality over time. It has been argued that cohort quality changes have been important in explaining immigrant earnings performance in the US and UK. For example, Borjas (1985) suggests that a secular decline in the quality of immigrant cohorts to the US explains the relatively poor performance of some immigrant groups while Bell (1997), using UK data, emphasises how the different national origin mix of immigrant waves has affected the overall picture of immigrant earnings. To allow our results to be compared with those of Bell (1997), we model C using dummy variables for decade of arrival. We experimented with alternative specifications of the cohort effect, including using five year, as opposed to ten year, intervals. This made some difference to the employment results but the earnings results were virtually the same.

In order to identify cohort and assimilation effects separately it is necessary to have observations at different points in time. Panel data would be ideal however, like most studies of immigrant earnings, we have to make do with pooled cross section data, sometimes called the 'synthetic panel' approach. The variable S reflects when the individual was observed and captures the effect of secular trends on immigrant outcomes.

The vector x contains other worker characteristics including human capital. We distinguish, where appropriate, between human capital (education and potential experience) obtained in the UK and that obtained before arrival in the UK. It also

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contains marital status, region of residence, country of birth and, where appropriate, detailed ethnic group.[6]

For both labour market outcome measures we estimate separate equations for the following four groups: (i) white labour market entrants, (ii) non-white labour market entrants (iii) white education entrants (iv) non-white education entrants. An additional model for white natives is also estimated for comparison purposes.[7] It is worth noting that most previous studies of immigrant assimilation do not estimate separate regression models for immigrants and natives but rather pool the two groups of workers and allow certain coefficients to vary by immigrant status.

Not all of the parameters of equation (1) can be estimated since there is perfect multicollinearity: $S \equiv C + Y$. In line with previous studies of immigrant assimilation we adopt the normalisation of fixing the coefficient on S (δ - the secular wage growth effect) and estimating the effects of C and Y freely. An estimate of δ can be obtained from the sample of native workers thus the constraint is equivalent to assuming that the period effect is equal for natives and immigrants.[8] This is the standard assumption in the literature on immigrant assimilation and is the most innocuous of the alternatives which would be to either fix the effects of years since migration or arrival cohort. In the UK there is some time series evidence to suggest that non-white unemployment rates behave in a hyper-cyclical manner (Leslie *et al.*, 2002) which, *prima facie*, is evidence against the equal period effect assumption made here, at least for non-white immigrants. However, it should be noted that the time series evidence does not control for other factors which are likely to affect relative unemployment rates and which vary between whites and non-whites such as human capital and

region of residence. In our model the equal period effect is conditional on the other explanatory variables and may therefore be easier to maintain. This argument is strengthened by the fact that we obtain separate parameter estimates for white and non-white immigrants hence differences in the impact of human capital and other variables on outcomes is accounted for (see also Barth et al., 2004, for a similar argument).

With respect to the specification of the function $f(Y)$, most studies impose a non-linear functional form – a polynomial – in Y (Bell, 1997; Dustmann *et al.*, 2003; Barth *et al.*, 2004), or divide Y into categories and use dummy variables to represent the categories (Antecol *et al.*, 2003). Since the shape of f is key to the measurement of assimilation we adopt a slightly different approach, which imposes somewhat less structure on the model. Specifically we estimate a semi-parametric version of (1) using a partially linear model (Yatchew, 2003).

Consider rewriting equation (1) as:

$$Z_i = w_i \xi + f(Y_i) + \varepsilon_i \qquad\qquad i = 1,\dots, n \qquad (2)$$

where the vector w includes C, S and x from equation (1). The function f is assumed simply to be some smooth function of years since migration. The data are ordered by Y and quasi-differenced according to the formula: $\{w_i - w_{i-1}\}/\sqrt{2}$. Consider the estimated regression on differenced data

$$\hat{\xi}_D = (\mathbf{W'}_D \mathbf{W}_D)^{-1} \mathbf{W'}_D \mathbf{Z}_D \qquad\qquad (3)$$

where $\mathbf{W}_D$ is a matrix of quasi-differenced individual observations on the explanatory variables (excluding Y) and $\mathbf{Z}_D$ is the equivalent for the dependent variable. Yatchew (2003) shows that

$$Z_i - \mathbf{w}_i \hat{\xi}_D \approx f(Y_i) + \varepsilon_i \qquad (4)$$

and that kernel regression methods applied to the ordered pairs $\{Z_i - \mathbf{w}_i \hat{\xi}_D, Y_i\}$ yield a consistent semi-parametric estimator of the function f. In the empirical application, the non-parametric estimation was done using a Nadaraya-Watson kernel density estimator. We used a Gaussian kernel and began from a bandwidth chosen according to the formulae in StataCorp. (2001, p. 167). The bandwidth was then adjusted (invariably upwards) to give an appropriate degree of smoothing. The results were not particularly sensitive to choice of kernel function and were qualitatively similar to results obtained using other smoothing techniques.[9]

In terms of the amount of structure imposed on the wage and employment profiles, the semi-parametric estimator can be thought of as lying somewhere between a polynomial in Y and modelling each year since migration with a dummy variable. The former imposes a smooth shape on the function but is restrictive in the sense that it requires symmetry around the function's turning points while the latter imposes no smoothness on the function but may, in a finite sample, be susceptible to sampling error.

4. Results: Labour Market Entrants

Table 2 reports selected coefficient estimates based on estimation of equation (1) on the sample of labour market entrants. These are from the "parametric" part of the partially linear model (see Yatchew, 2003, p. 3). Ordinary least squares estimates of the same parameters, assuming a quadratic specification of years since migration, were similar and are available on request[10]. Foreign schooling was significant for both types of immigrant and both ethnicities and had a bigger effect for whites in the earnings equation but a larger effect for non-whites in the employment equation. Regarding the arrival cohort effects it is difficult to pick out any systematic patterns but there is some evidence that non-whites who arrived in the 1960s and 1970s experience and advantage over other immigrants. A large number of the immigrants who arrived in the UK at this time were Asians who were expelled from East Africa; this group of individuals were typically entrepreneurs or in high status occupations in Africa and it is possible that this finding reflects the arrival in the UK of this highly selected group of "twice migrants".

(Insert Table 2 here)

Country of birth does have a significant effect on labour market outcomes even where other factors, including human capital, have been controlled for. Furthermore the effects of this differ between white and non-white groups. Amongst non-white immigrants from the Old Commonwealth countries and New Commonwealth countries, employment rates were higher than those from the excluded "rest of the world" category. Interestingly non-whites born in the EU who migrate to Britain experience substantially and significantly higher employment rates and earnings than

immigrants from other countries. While this is a small proportion of all non-white immigrants, these people are likely to be the children of migrants to Europe in the recent past, and, again, probably represent a highly selected group.

Figures 1 and 2 present the employment and earnings assimilation profiles of immigrants who arrived in the UK labour market having completed their education based on the regression models discussed above. Figure 1 shows the age-employment profiles implied by estimation of equation (1) separately on white and non-white labour market entrants, and also on a comparison sample of white natives. The predicted profiles are based on a "typical" worker who enters the labour market aged 21, but who otherwise has the mean characteristics of his respective group.[11] Employment is then allowed to evolve over the working lifetime in accordance with the estimated semi-parametric function in equation (1).[12]

(Insert Figure 1 here)

White immigrants (Figure 1(a)) have a probability of employment which is high overall, albeit declining slightly over their working lives. The employment probability of non-whites declines by slightly more, around 7 percentage points from age 21 to 60. The most noticeable feature however is not the difference in the slopes of the profiles but the overall difference in employment probabilities between white and non-white immigrants. This is very clear in panel (b) of Figure 1 where we plot the difference between the employment probabilities of each immigrant group and the white native comparison group.[13] The average white immigrant enters the UK labour market with a slightly higher employment probability than the average native and this

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advantage erodes over time. The average non-white immigrant always experiences an employment deficit – by the age of 55 their employment probability is around 13 percentage points lower than white immigrants and around 16 percentage points lower than white natives.

Figure 2 contains the equivalent graphs for earnings. It is worth noting that these profiles are obtained from a potentially non-randomly selected subsample of the sample used to obtain the employment results and this should be borne in mind when interpreting the results. Considering Figure 2(a), first, the slopes of the age-earnings profiles are broadly similar for the two immigrant groups: from labour market entry to the earnings peak is around 0.17 (0.15) log points for whites (non-whites). As in the discussion of employment, the big difference between the immigrant groups is not in the slopes but in the intercept with whites earning substantially more at all points on the profile. The average difference between white and non-white immigrants is 0.18 log points. This compares to a difference in average earnings in the raw data between white natives and non-white natives of 0.10 log points.

(Insert figure 2 here)

It can be seen that on entry to the labour market both white and non-white immigrants earn more than natives however this advantage is soon eroded. Figure 2(b) which plots the difference in log earnings between natives and immigrants shows that native earnings overtake immigrant earnings in around 3 years for non-whites. For whites, native earnings exceed those of immigrants from around 11 years after labour market entry.

As Figure 2(b) shows, the relatively strong growth of white native earnings implies earnings assimilation profiles which are, particularly for the non-whites, the opposite of the textbook model of assimilation. Immigrants are expected to enter the labour market at a lower level of earnings and to overtake their native counterparts. It is possible that the sample selection issues which are likely to affect these data sets help to explain this pattern. For example, Bell (1997) suggests that selective out migration may underlie the pattern of immigrant earnings "dis-assimilation" that he observes in the UK. Specifically, if immigrants of (unobservable) higher quality tend to re-migrate, this is likely to bias downward the estimated wage profiles and the estimate of assimilation. Detailed data on re-migration from the UK are not available however Rendall and Ball (2004) suggest that most re-migration is by immigrants from developed countries whom, it might be surmised, would have unobservable characteristics which would be more productive in the UK labour market than those from less developed countries.

5. Results: Education Entrants

We now turn to examine the labour market assimilation of those immigrants who arrived in the UK to enter the education system, either as adults or as children, and who subsequently entered the UK labour market. The regression results are contained in Table 3. Again there was a mixed pattern of coefficients on the arrival cohort variables although none of the dummy variables reflecting cohort were significant in the employment equations. This might reflect the idea that pre-labour market assimilation within the UK education system irons out differences in outcomes determined by cohort quality and origin which are experienced by those who arrive to

enter the labour market directly. The enhanced English language ability of those non-whites who have exposure to the UK education system is also likely to be important here. English language proficiency has a large, significant impact on earnings and employment in the UK labour market (Leslie and Lindley, 2001; Dustmann and Fabbri, 2003). Similarly there was no effect of country of birth for non-white immigrants; for whites the effects of country of birth were similar to those for labour market entrants.

(Insert Table 3 here)

As already noted, education entrants' terminal experience of the education system will have been in the UK and hence their highest qualification will be a UK one. Thus these regressions also control for highest UK qualification. Focussing on degree level qualifications, the results suggest that, while white immigrants and white natives experience broadly the same returns to a degree, relative to the omitted category of no qualifications, non-white immigrants actually have somewhat higher returns in both earnings and employment terms. These higher returns to educational qualifications obtained by non-white workers in the UK have also been noted by Clark and Drinkwater (2005). For these highly qualified non-white workers, UK education may be a passport to the levels of labour market success enjoyed by whites.

Figures 3 and 4 plot the assimilation profiles for earnings and employment for education entrants. Since the performance of education entrants is likely to depend on the precise qualification obtained, we construct age and assimilation profiles for four individual 'types' differentiated by their UK educational attainment. In all other

respects these types are the same the typical individuals used in the discussion of labour market entrants. Specifically we consider those who leave the education system with a university degree or equivalent, A- levels (the highest qualification available at high school in the UK), O-levels or equivalent (a qualification obtained at the school leaving age) and those with no formal qualifications. The predicted profiles are based on separate estimation of the model for immigrants with each qualification type and the profiles of predicted outcomes start at the age where an immigrant with such a qualification would usually join the labour market.

Consider panel (a) of Figure 3 which examines the employment profiles of education entrants. As before, age is measured along the horizontal axis with predicted employment rates, for each of the four types described above, plotted on the vertical axis. Confidence bands have been suppressed here to avoid cluttering the figures. For white education entrants the value of human capital investment in the UK educational system is evinced by the different intercepts for each of the different types. These reflect higher employment rates on entry to the labour market for those with higher qualifications – the enhancement to the probability of employment on entry to the labour market is up to 40 percentage points for someone with a degree compared to someone with no qualifications. In the early years of potential labour market experience, employment rates continue to grow for education entrants with qualifications levels lower than degrees. The impact of education gradually diminishes over time with immigrants from all qualifications groups having broadly similar employment rates at age 60. The picture for non-white education entrants is quite similar, with the exception perhaps of those with no qualifications whose employment rate at entry is higher than might be expected and which broadly stays

the same over the working life. It also noticeable that for males of peak working age

there is very little difference between the employment rates of white and non-white

education entrants. For example, a 40-year old white immigrant with a UK degree is

predicted to have an employment rate of 95.0% while an equivalent non-white has a

predicted rate of 94.6%. This should be contrasted with the situation for labour

market entrants illustrated in Figure 1 where there is a significant employment penalty

for non-whites. This demonstrates the benefit to non-white immigrants of investment

in UK qualifications. Unqualified, 40-year old, non-white education entrants face a 6

percentage point penalty compared to their white counterparts.

(Insert figure 3 here)

Panel (b) of Figure 3 plots the differences between the predicted employment profiles

of education entrants with similarly qualified whites. The employment levels of white

immigrants are very similar to those of white natives. For non-whites there is much

more variation, particularly for qualification levels below degree at the start of the

working life, and definite evidence of a reduction in employment rates, compared to

white natives, towards the end of their careers. Indeed the differential rises to around

10 percentage points by age 60.

Figure 4 reports predicted earnings profiles for education entrants on the same basis

as the employment results in Figure 3. For both whites and non-whites the earnings

advantage afforded by a degree level qualification is very clear. Furthermore, as in

the discussion of employment, at this level of education, earnings differences between

white and non-white immigrants are negligible. Again this is in marked contrast to

the picture for labour market entrants. However, the lower panels of Figure 4 do suggest that, in a similar fashion to labour market entrants, the earnings of white and non-white education entrants do tend to decline, relative to similarly qualified white native workers. It is interesting again to speculate about whether this reflects selection effects due to selective out-migration; however, in the case of education entrants one might think that re-migration is much less likely than for labour market entrants who are more likely to be temporary residents.

(Insert figure 4 here)

As we have already noted, the education entrants are a heterogeneous group and another way of unpacking some of this heterogeneity by examining the impact of age at arrival on their labour market outcomes (see also Schaafsma and Sweetman, 2001). To investigate this we interacted a variable reflecting the age at which an immigrant arrived (at primary education level or younger, i.e. aged less than eleven, secondary, between eleven and seventeen, and tertiary level) with the qualifications variables in a pooled regression where we controlled for potential UK experience rather than years since migration. The results are shown in Table 4. For non-whites with university degrees there is some evidence that later arrival to join the UK education system is associated with a lower employment and earnings return to that qualification level. In particular, the results suggest that non-whites who arrived after the age of 17 to study for a degree achieve a considerably lower employment premium (6.5 percentage points), relative to those with no qualifications, compared to those who arrived at younger ages (17.7 percentage points for arrivals aged under 11). No similar effect exists for whites which suggests that the differences are likely to be associated with

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the type of schooling undertaken to entry to the UK education system and with language ability as non-white education entrants will be from education systems less similar to the UK's and less fluent in English, on average, than white education entrants. Similar effects exist for the impact of a degree qualification on earnings with lower returns to that qualification for older arrivals.

(Insert Table 4 here)

6. Discussion and Conclusions

Our investigation of the employment and earnings experience of immigrants to the UK was motivated by the need to adequately address the heterogeneity of the immigrant population. As well as disparities in the outcomes experienced by different arrival cohorts, immigrants from different countries and those of different ethnicities, which have formed the focus of previous work in the literature, we have emphasised the distinction between those who arrived in the UK with their education complete and those who continued to enhance their formal human capital in the UK educational system. Whilst we acknowledge that this latter group of education entrants is both unusual and heterogeneous, we believe that consideration of assimilation both pre and post entry to the labour market gives a more complete picture of how the foreign born contribute to the UK economy through their labour market behaviour.

The results bear out making the distinction between labour market and education entrants. Amongst whites, education entrants generally perform better in comparison to white natives in employment and earnings terms than labour market entrants. Non-white education entrants who achieve the highest levels of UK educational attainment

also enjoy levels of employment and earnings which are broadly comparable to those of whites, whether natives or immigrants. This is in marked contrast to the typical non-white labour market entrant whose employment and earnings fall substantially below those of white natives and immigrants. Of course we should note the potential impact of selection bias on these results – education entrants are an unusual group insofar as they comprise those who had little choice in the migration decision (child migrants) and those who not only chose to be educated in the UK, but were also able to remain and work there – and we should take care about drawing causal influences. Nevertheless, the results are suggestive of the importance of exposure to the UK education system as a means of integrating immigrants, particularly non-whites, into the labour market. This has implications for policies which are currently under discussion in the UK regarding the need for immigrants to undertake language and other types of training before being granted the right to remain. Our findings also suggest the importance of the UK education system as a passport to labour market success for second and higher generation immigrants.

Another key finding from our analysis is the persistent differences that exist between white and non-whites in the UK labour market. These are particularly apparent for the samples of labour market entrants in Figures 1 and 2. Whilst much of the policy discussion in the UK concerns immigrants and the differences between immigrants and natives, it is clear that the ethnic "penalty" is a major component of any perceived difference between the outcomes of immigrants and natives. This might suggest that, perhaps as important a policy question as that of how to integrate immigrants into the economy is how best to reduce the detrimental labour market effects of non-white ethnicity, whether those non-whites are native born or born overseas.

There is considerable diversity in the patterns of immigrant earnings and employment assimilation found here. Depending on which of the outcomes, ethnicities or immigrant types is studied, there is evidence of employment rates and weekly earnings rising, falling or staying broadly the same, relative to native workers, as time in the UK labour market increases. The textbook model of assimilation – wherein immigrants initially experience a labour market disadvantage which is eroded over time – is not generally supported by these results. A reading of the recent literature on immigrant assimilation would suggest that this is true more widely. The inability to find clear evidence in favour of the textbook model may reflect selection issues in the process of re-migration as already noted, however it should also be noted that there is considerable variation in the practices of researchers in terms of how they model the process of immigrant assimilation, what samples they use, what variables they control for, what coefficients are held constant between immigrants and natives and so on. Our contribution to this ongoing literature is to suggest that important distinctions between different types of immigrants should be modelled rather than ignored and that the data should be allowed to flexibly determine the shape of assimilation profiles.

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[1] Prime Minister's speech to the Confederation of British Industry, April 27th, 2004. This is also the source of the 0.5% contribution to growth statistic.

[2] Chiswick (1978) and Borjas (1985) are classic references for the US while Bell (1997) examines the UK. Antecol *et al.* (2006) is a recent example which takes a cross-country perspective examining Australia, Canada and the US.

[3] We also re-estimated the models using hourly wages and obtained qualitatively similar results.

[4] Further details on the sampling methodology and questionnaires are available from the Economic and Social Data Service (www.esds.ac.uk).

[5] Of course one could easily imagine an immigrant working either in the origin or destination country for some period before undertaking education in the destination country. Without more detailed panel or life history data it is very difficult to ascertain whether this is the case for any sample member. We can, however, examine the age at which individuals left full time education; if this is implausibly high then the assumption of a single continuous period of education may well be flawed. In the *LFS* data, the proportion of such workers was relatively small thus we proceed to make the standard assumption.

[6] In an earlier version of this work we also included a variable reflecting whether the individual was from an English speaking country. This was intended to proxy language ability. On the advice of an anonymous referee that this is a poor proxy, we have excluded it here.

[7] We compare white and non-white immigrants with *white* natives throughout. Given the relative sizes of the white and non-white native samples it would make little difference if we used all natives as the comparison group.

[8] In practical terms, the separate model for immigrants is estimated as $Z_i - \delta S_i = f(Y_i) + \gamma C_i + \mathbf{x}_i \beta + \varepsilon_i$ where δ is replaced by its estimate from the native equation. Identical parameter estimates would be obtained by estimating a "fully-interacted" pooled model where all explanatory variables were interacted with a dummy variable for being an immigrant.

[9] One further issue with the semi-parametric approach arises from the quasi-discrete nature of the variable Y which is measured as whole years since migration. Since the data are to be sorted by Y, multiple different sort orders are possible. To overcome this problem we took averages over a large number of sorts of the data. Experimentation suggested that estimates converged after 40 replications of the quasi-differenced regression in equation (3)

[10] In spite of the coefficient estimates being similar, the plotted employment and earnings profiles suggest that the semi-parametric model picks up types of non-linearity which would be missed in an approach using a purely parametric or dummy variable model. See in particular the graphs for non-white education entrants (Figures 3 and 4) below.

[11] We experimented with alternative ages of entry to the labour market for these simulations including 16 and 25. This made little difference to the overall shapes of the profiles.

[12] The profiles were stopped at age 60 as the relatively sparse number of observations after this age made semi-parametric estimation less robust.

[13] The native comparator has the average characteristics of natives but the same level of schooling (12 years) as assumed in the immigrant profiles.

Figure 1. Labour Market Entrants: Employment Assimilation

(a) Age profiles
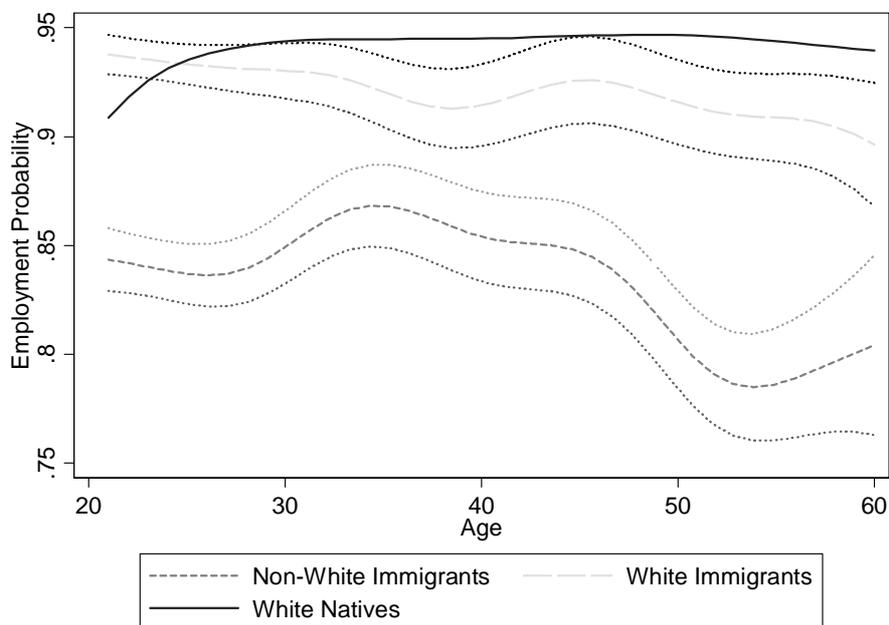
(b) Differences with white natives
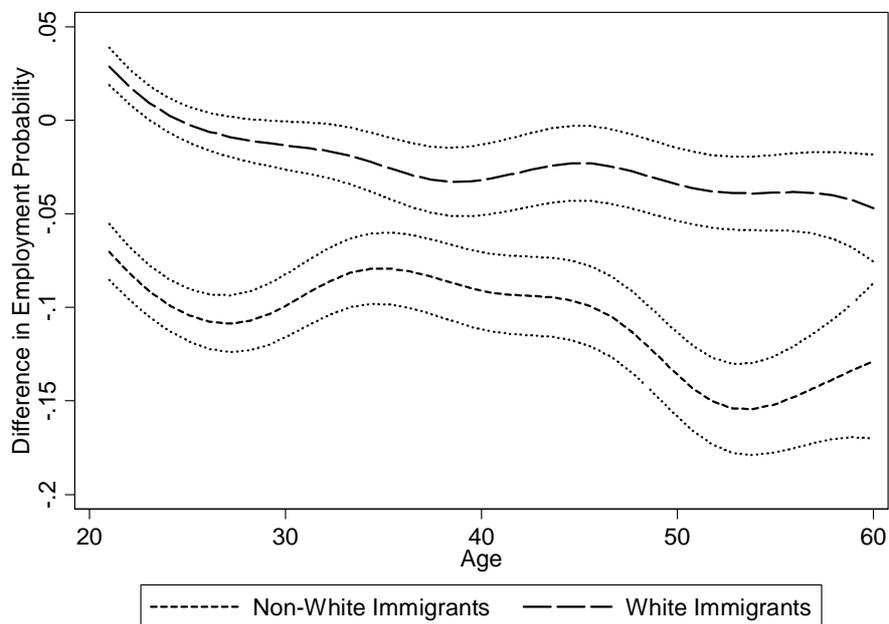
Note to Figure 1: Panel (a) reports predicted outcomes for different groups of workers, together with 95% confidence bands for the immigrant groups. To avoid cluttering the figure, confidence bands were suppressed for the native groups; the large sample size meant these bands were very tight to the predicted values across the entire age range. Panel (b) reports the differential between white native and immigrant workers together with a 95% confidence band.

Figure 2. Labour Market Entrants: Log Earnings Assimilation
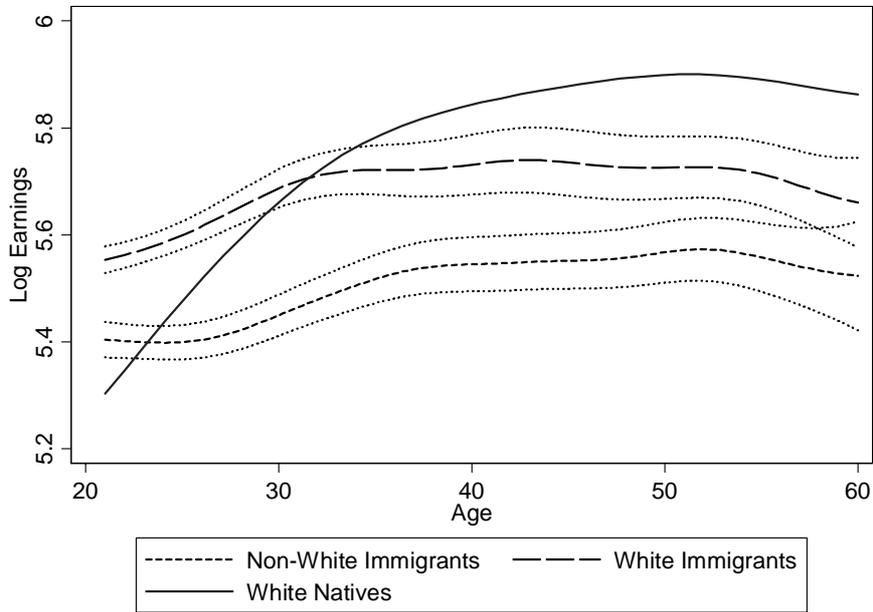
(a) Age profiles

(b) Difference with white natives
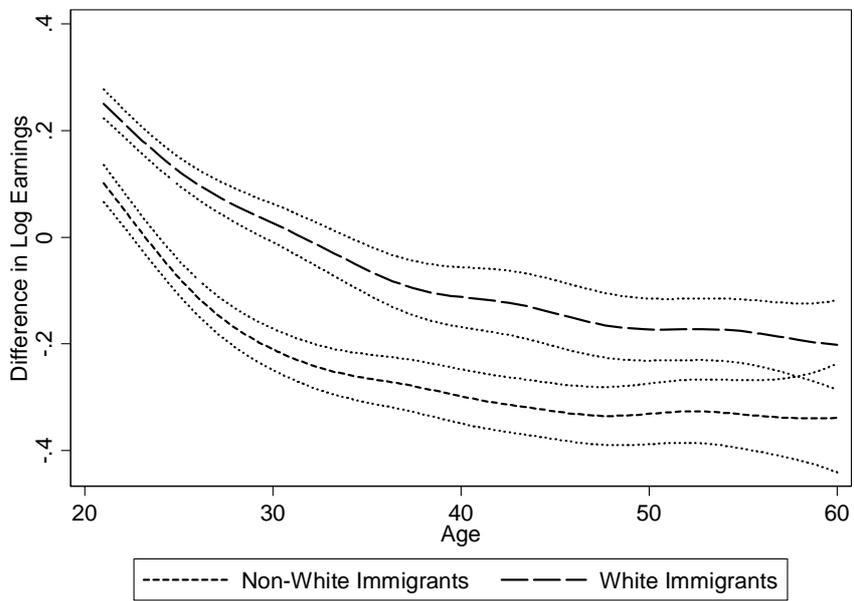
Note to Figure 2: See note to figure 1.

Figure 3. Education Entrants: Employment Assimilation.

(a) Age Profiles

(b) Differences with white natives

Figure 4. Education Entrants: Log Earnings Assimilation.

(a) Age Profiles

(b) Differences with white natives

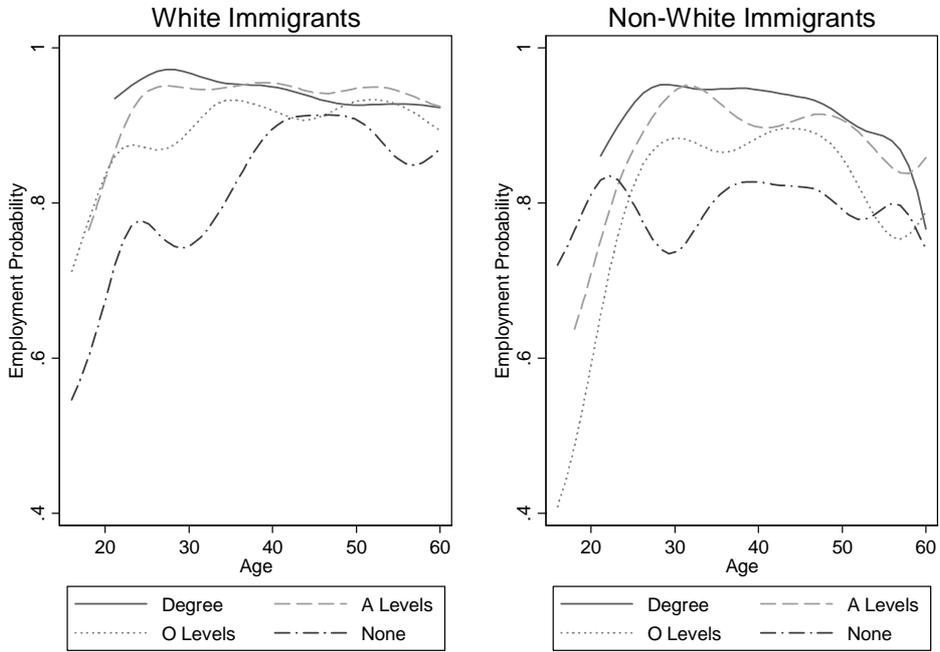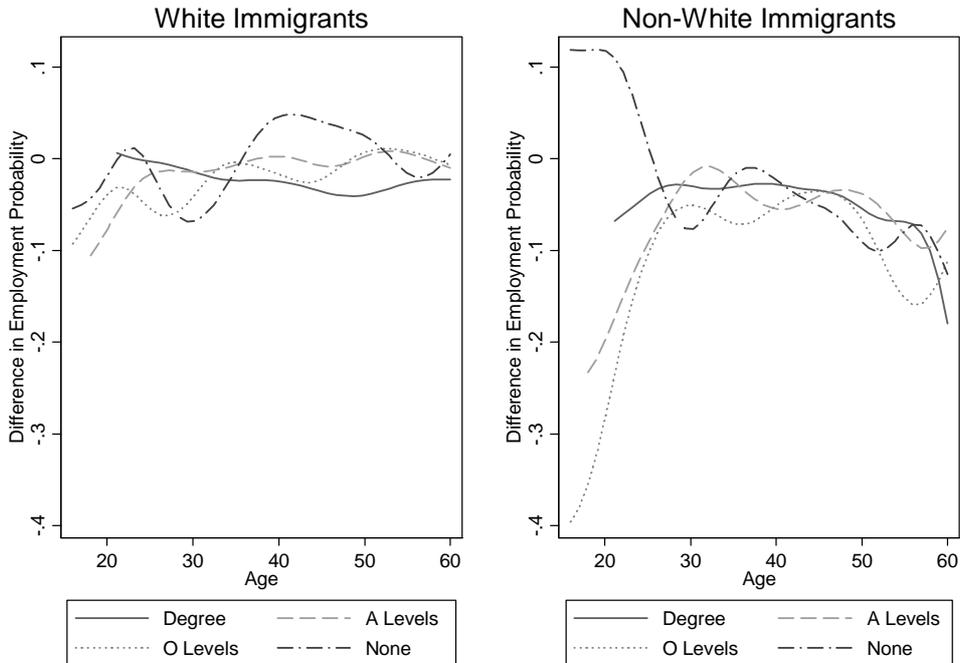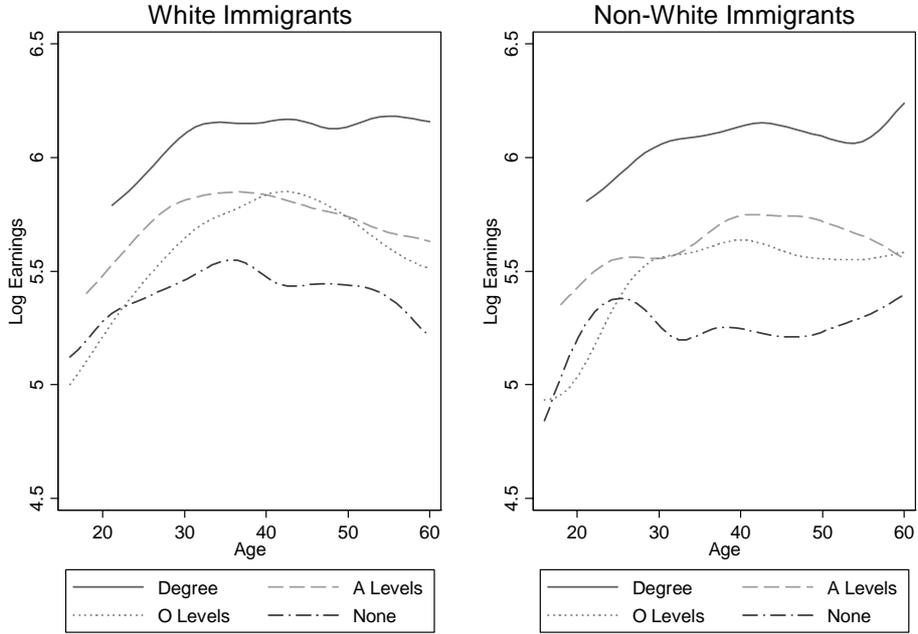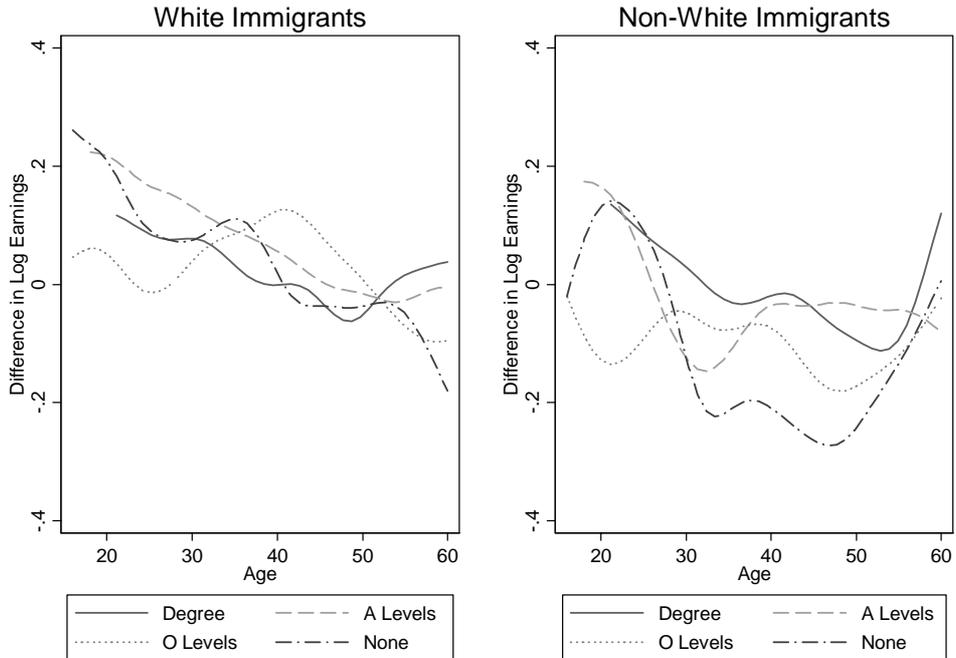## Table 1: Sample Means of Key Variables by Immigration and Ethnic Status. QLFS 1993-2004[a]

	White Natives	Immigrants: Labour Market Entrants		Immigrants: Education Entrants		Total
		Whites	**Non-Whites**	**Whites**	**Non-Whites**	
Employment Rate	93.51	92.84	83.95	91.96	86.59	93.14
Mean Gross Weekly	342.62	407.31	318.15	386.05	349.85	344.30
Pay	(175.52)	(228.34)	(199.19)	(207.24)	(192.43)	(178.18)
Age	39.61	39.85	40.90	37.78	36.94	39.58
	(10.71)	(10.53)	(9.74)	(10.46)	(9.18)	(10.68)
Arrival Age	-	28.81	28.09	6.03	11.43	19.65*
		(9.19)	(8.65)	(6.43)	(6.30)	(12.84)
Arrived <1959	-	6.71	1.87	28.82	4.20	10.42*
Arrived 1960-69	-	14.47	17.57	32.84	36.05	24.09*
Arrived 1970-79	-	14.19	21.67	22.63	36.90	22.65*
Arrived 1980-89	-	19.73	21.52	10.92	15.40	17.21*
Arrived 1990-99	-	35.15	29.90	4.67	6.10	20.05*
Arrived 2000-04	-	9.73	7.65	0.11	0.72	5.05*
Old Commonwealth	-	15.78	0.88	11.36	0.06	7.65*
New Commonwealth	-	6.01	63.96	23.35	78.17	40.14*
EU	-	27.59	1.05	33.15	0.08	16.52*
Other Europe	-	7.72	1.75	2.87	0.05	3.49*
Rest of World	-	42.87	32.34	29.04	19.97	32.17*
Black Caribbean	-	-	7.45	-	10.18	3.99*
Black African	-	-	12.66	-	6.03	4.72*
Black Other	-	-	1.35	-	1.13	0.61*
Indian	-	-	30.02	-	36.01	15.15*
Pakistani	-	-	14.03	-	17.07	7.12*
Bangladeshi	-	-	4.82	-	7.10	2.68*
Chinese	-	-	4.72	-	5.88	2.42*
Other Non-white	-	-	24.91	-	16.23	10.02*
Human Capital:						
UK	22.50	11.04	12.96	18.94	16.85	21.89
Experience	(11.40)	(12.86)	(11.53)	(11.41)	(9.94)	(11.60)
Foreign	-	9.70	8.95	-	-	5.17*
Experience		(9.01)	(8.29)			(7.88)
UK Schooling	13.11	-	-	11.34	8.01	12.43
	(2.51)			(4.93)	(5.36)	(3.76)
Foreign Schooling	-	15.09	15.05	3.41	7.41	10.77*
		(3.91)	(3.84)	(5.38)	(5.74)	(7.11)
Degree	17.38	-	-	32.52	30.46	17.85
Other Higher	9.16	-	-	9.19	9.17	8.97
A-Level	33.11	-	-	26.04	19.80	32.02
O-Level	16.29	-	-	14.95	12.78	15.07
Other quals	12.90	-	-	10.13	12.20	14.06
No qualifications	11.14	-	-	7.15	15.47	11.33
N	277388	6031	5985	53.50	3999	256023
N for employed and positive wage	204668	3090	2693	3160	1828	169434

a The table contains means and standard deviations for continuous variables and percentages in the relevant category for categorical variables. An asterisk indicates that the relevant statistic has been computed for the sample of immigrants only.

Table 2: Labour Market Entrants [a]

	Employment			Log Earnings		
	White Natives	**White Immigrants**	**Non-White Immigrants**	**White Natives**	**White Immigrants**	**Non-White Immigrants**
Schooling	0.007***	0.007***	0.010***	0.079***	0.063***	0.056***
	(0.000)	(0.001)	(0.001)	(0.000)	(0.003)	(0.003)
Foreign Experience	–	-0.003**	-0.001	–	0.023***	0.008**
		(0.001)	(0.002)		(0.003)	(0.004)
Foreign Experience Squared/100	–	0.064*	0.000	–	-0.356***	-0.169
		(0.034)	(0.049)		(0.089)	(0.109)
Arrived pre 1959	–	0.015	0.021	–	0.101*	0.108
		(0.022)	(0.045)		(0.057)	(0.106)
Arrived 1960-69	–	0.033*	0.049*	–	0.062	0.107*
		(0.018)	(0.026)		(0.044)	(0.055)
Arrived 1970-79	–	0.024	0.044**	–	0.017	0.053
		(0.016)	(0.021)		(0.041)	(0.047)
Arrived 1980-89	–	0.017	0.001	–	0.011	-0.056
		(0.012)	(0.016)		(0.031)	(0.035)
Old Commonwealth	–	0.035***	0.124**	–	0.093***	0.124
		(0.010)	(0.050)		(0.026)	(0.101)
New Commonwealth	–	-0.011	0.073***	–	-0.022	-0.042*
		(0.014)	(0.012)		(0.037)	(0.025)
EU	–	0.007	0.165***	–	-0.027	0.409***
		(0.009)	(0.041)		(0.022)	(0.084)
Other Europe	–	-0.063***	-0.041	–	-0.181***	-0.233***
		(0.014)	(0.037)		(0.040)	(0.085)
Sample Size	231770	5868	5912	144934	3010	2642

a Standard errors in parentheses. ***, **, * indicates significance at 1%, 5% and 10% respectively. The regressions also controlled for marital status, region of residence and, for the earnings models, industry. The non-white regressions included controls for detailed ethnic group. The excluded categories for the dummy variables in the table were arrived after 1989 and originated in the Rest of the World.

Table 3: Education Entrants [a]

	Employment			Log Earnings		
	White Natives	**White Immigrants**	**Non-White Immigrants**	**White Natives**	**White Immigrants**	**Non-White Immigrants**
Degree	0.121***	0.105***	0.128***	0.698***	0.671***	0.776***
	(0.002)	(0.015)	(0.017)	(0.004)	(0.037)	(0.040)
A-Levels	0.102***	0.089***	0.085***	0.278***	0.307***	0.314***
	(0.002)	(0.015)	(0.018)	(0.004)	(0.037)	(0.041)
O-Levels	0.085***	0.049***	0.028	0.199***	0.194***	0.236***
	(0.002)	(0.017)	(0.019)	(0.004)	(0.040)	(0.043)
Arrived pre 1959	–	0.027	0.025	–	-0.062	0.113
		(0.023)	(0.038)		(0.050)	(0.080)
1960-69	–	0.020	-0.007	–	-0.115**	0.102*
		(0.021)	(0.028)		(0.045)	(0.060)
1970-79	–	0.019	-0.006	–	-0.147***	0.060
		(0.019)	(0.026)		(0.042)	(0.056)
1980-89	–	0.005	-0.002	–	-0.169***	0.042
		(0.019)	(0.025)		(0.043)	(0.055)
Old Commonwealth	–	0.025**	0.090	–	0.059**	0.167
		(0.012)	(0.066)		(0.027)	(0.153)
New Commonwealth	–	0.021**	0.003	–	0.034*	0.039
		(0.009)	(0.014)		(0.020)	(0.028)
EU	–	0.015*	0.015	–	0.002	0.109
		(0.009)	(0.045)		(0.019)	(0.087)
Other Europe	–	-0.049**	-0.079	–	-0.015	0.084
		(0.022)	(0.070)		(0.049)	(0.191)
Sample Size	265861	5332	3926	162270	3139	1789

a See notes to Table 2. Two other types of educational qualification were also controlled for but the results are not reported here. The excluded educational category is no qualifications.

Table 4: Education Entrants – Effect of Arrival Age [a]

(a) Employment

Arrival Age		Highest Qualification O Level	A Level	Degree
Primary	White	0.072***	0.105***	0.130***
(<11)	*Non-white*	*0.018*	*0.080****	*0.177****
Secondary	White	-0.021	0.103***	0.147***
(11-17)	*Non-white*	*0.024*	*0.096****	*0.146****
Tertiary	White			0.145***
(>17)	*Non-white*			*0.065***

(b) Log Earnings

Arrival Age		Highest Qualification O Level	A Level	Degree
Primary	White	0.207***	0.341***	0.699***
(<11)	*Non-white*	*0.240****	*0.327****	*0.793****
Secondary	White	0.248***	0.258***	0.699***
(11-17)	*Non-white*	*0.144****	*0.275****	*0.751****
Tertiary	White			0.503***
(>17)	*Non-white*			*0.569****

a Tables contain the estimated coefficients in regression model estimated by least squares. The model also contained a quadratic in UK experience, dummies for region, industry, arrival cohort, country of origin and marital status. The default category is an individual with no qualifications who arrived at primary school age as defined here.