Immigrant Labour Market Assimilation and Arrival Effects: Evidence from the Labour Force Survey

by

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Abstract

We estimate models of employment and earnings outcomes for a sample of white and non-white male immigrants drawn from the Labour Force Survey between 1993 and 2002. Two hypotheses are investigated: (i) whether immigrant outcomes assimilate towards those of natives and (ii) whether labour market conditions at time of entry to the UK labour market have a permanent impact on outcomes. We find positive earnings assimilation for all immigrant groups and strong employment assimilation for those immigrants who complete their education in the UK. We find negative assimilation for non-white immigrants who completed their education overseas. There is some evidence of unemployment rates at time of entry to the labour market causing lower earnings for non-white immigrants.

Immigration policy in the UK is rarely out of the headlines, reflecting its importance to the general public and the government. The economic analysis of immigration contributes directly to discussions of immigration policy by providing estimates of the likely impact of alternative policies both on the welfare of the immigrant population and on the wider economy. The labour market success or otherwise of immigrants is clearly central to an evaluation of the relative costs and benefits of different immigration and social policies. In this paper we contribute to the assessment of the labour market impact of immigration by analysing the earnings and employment performance of immigrants to the UK.

We focus on two key hypotheses from the literature. The first is that, after arrival in the destination country, immigrant labour market outcomes will gradually begin to resemble those of equivalent non-immigrant, or native, workers. This view is often known as the assimilation hypothesis and has received much attention from economists[1]. The mechanism by which assimilation takes place is through human capital enhancement: immigrants are viewed as acquiring skills, including such things as knowledge of the labour market and language proficiency, which are specific to the destination country, and which allow them to improve their labour market outcomes relative to natives. Clearly the extent of assimilation affects the welfare of immigrants but the labour market status achieved by immigrants also has implications for the impact of immigrant flows on the wider economy.

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[1] Chiswick (1978) and Borjas (1995) are classic references for the US while Bell (1997) looks at the UK. Antecol et al. (2003) is a recent example which takes a cross-country perspective examining Australia, Canada and the US.

The second hypothesis that we examine is the view that current labour market outcomes for immigrant workers may be influenced by labour market conditions when they arrived. Labour economists often argue that early experiences of unemployment can permanently increase an individual worker's risk of unemployment and reduce their future earnings[2]. This is sometimes called the 'scarring hypothesis' and may be relevant for immigrants arriving to a foreign labour market. Scarring occurs because, on the supply side, unemployment events lead to a loss of firm-specific and general human capital. Equally, however, on the demand side, where information is incomplete, employers may use past unemployment events as a signal of low productivity. This latter mechanism may be particularly important for immigrants if employers are relatively ignorant of the qualifications and skills of workers arriving from overseas.

We investigate these hypotheses using a sample of native and immigrant workers from the UK's *Labour Force Survey*. The labour market outcomes that we focus on are real weekly earnings and employment. We divide our sample of immigrants along two dimensions. First, to account for well-documented racial differences in labour market outcomes, we examine white and non-white immigrants separately and control for ethnic group in our non-white models. There is considerable evidence that non-whites receive differential treatment in the UK labour market (Blackaby et al. is a recent example) and it is important to account for this.

Second, and more unusually, we examine in detail both immigrants who arrive in the UK, having completed their education at some time in the past, and enter the labour

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[2] Arulamapalam et al. (2001) introduce a symposium on the topic of unemployment scarring.

market directly, but also those who arrive to complete their education in the UK. We

call this first group "labour market entrants" and the latter group "education entrants".

Of course the group of education entrants includes immigrant children who arrive

with their parents as well as adults who arrive to undertake education in the UK. We

will observe both types of member of this group if they enter the labour market on

completion of their UK studies.

Clearly, compared the labour market entrants, those who enter education are affected

differently by the two labour market hypotheses outlined above. For the education

entrants, assimilation consists of labour market assimilation (after leaving full-time

education) and pre-labour market assimilation (in the UK education system)[3]. We

explore whether, given their earlier exposure to the language and culture of the UK,

such immigrants have outcomes which are closer to their native counterparts than to

those immigrants who enter the labour market directly. This is an important issue

which is not typically discussed in studies of immigrant labour market status yet.

education entrants represent a significant proportion of immigrants to the UK. For

example, in our data set, the proportion of immigrants in the labour force who arrived

at age less than 16 is around 40%.

Our work builds on previous studies which have used multiple years of cross-section

survey data to paint a picture of immigrant labour market performance. Bell (1997)

used pooled cross-sections from the General Household Survey from 1973 to 1992 to

analyse the earnings assimilation of male immigrants to the UK. He found positive

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[3] Kossoudji (1989) makes this important distinction between labour market and pre-labour market
assimilation. Most investigators of the assimilation hypothesis exclude those who arrive as children or
with incomplete education from the estimation sample; they therefore focus on labour market
assimilation.

assimilation for non-white immigrants and negative assimilation (dis-assimilation) for white immigrants. That is to say, non-whites were predicted to arrive with higher earnings than natives but this advantage eroded through time. Compared to Bell we use a larger sample, more recent data and a broader set of labour market outcomes; we also make what turns out to be an important distinction between labour market entrants and education entrants. Shields and Wheatley-Price (1998) also examine earnings and use *Labour Force Survey* data from 1992-94. Using the same data Wheatley Price (2001) examines the unemployment experience of immigrants. Neither of these latter papers directly examines assimilation in the UK context, however. Closest in approach to our work is the report to the UK Home Office by Dustmann et al. (2003) who also use *Labour Force Survey* data over a similar period. Compared to these authors we focus on just two labour market outcomes and provide a more detailed account of differences between education entrants and labour market entrants. In addition, and, as far as we are aware, for the first time using UK data, we provide semi-parametric estimates of earnings and employment assimilation effects and we estimate the impact of entry year economic conditions on immigrant earnings and employment.

The principal findings from our empirical work are that:
- there is positive earnings assimilation for all immigrant groups;
- there is strong employment assimilation for those immigrants who complete their education in the UK;
- there is negative assimilation for non-white immigrants who completed their education overseas and

- there is some evidence of unemployment rates at time of entry to the labour market causing lower earnings for non-white immigrants.

The remainder of the paper proceeds as follows. Section 1 gives and overview of the data while section 2 describes the econometric methods. Section 4 discusses the results and section 5 concludes.

1. The Data

Our data are drawn from the *Labour Force Survey (LFS)*, conducted by the Office for National Statistics (ONS) and represent pooled cross-sections over the period 1992-2002. The *LFS* collects information on earnings, employment and socio-economic characteristics such as age and years of schooling. Further details on the sampling methodology and questionnaires are available from the ONS.[4]

Our first labour market outcome of interest is gross real weekly pay in main job and we analyse male, full-time workers aged between 16 and 65 at the time of interview[5]. Our second labour market outcome is whether the survey respondent was employed for pay at the time of the interview. In all the results employment rates are expressed relative to a denominator comprising the employed and the unemployed; in other words, the self-employed and inactive are excluded from the analysis. Overall after excluding observations with missing data and trimming outliers we have a sample of 148,528 native and 9,454 immigrant men.

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[4] http://www.ons.gov.uk
[5] All earnings data were deflated to a common year.

An important component of the analysis is the distinction between those who enter the UK having completed their education (labour market entrants) and those who have yet to complete (education entrants). This requires dividing the sample and this is based on information about the year in which individuals' left full time education and their year of arrival in the UK. We make the important assumption that education is obtained in a continuous block before (potential) labour market experience is accrued. This is the standard assumption in the human capital literature however 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 hence we proceed to make the standard assumption in what follows[6].

Table 1 provides sample means and standard deviations for some key variables by immigrant 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. Native born men, white and non-white, are included for comparative purposes.

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[6] It is also worth noting that since we do not observe panel data or work histories, 'experience' is in fact potential experience.

Comparing mean earnings, immigrants generally do better than natives and whites better than non-whites. Comparing between immigrant groups, white labour market entrants earn more on average than white education entrants, although the reverse is true for non-whites. Comparing employment rates, compared to white natives, all immigrants exhibit lower employment rates. Non-whites tend to do worse than whites in all cases and education entrants tend to do better than their labour market entrant counterparts.

For natives, mean potential labour market experience is larger for whites than non-whites (mainly because non-whites tend to be younger), whilst mean years of schooling are less for whites compared to non-whites. For immigrants, white labour market entrants have less UK labour market experience than their non-white counterparts, although their years of foreign experience and schooling are the same, on average. For education entrants , whites have more UK potential experience, more years of UK schooling and less years of foreign schooling compared to non-whites. Not surprisingly, immigrants who arrived with their education complete were older on arrival than those with education incomplete. Although for the latter whites were younger on arrival than non-whites.

Table 2 examines average gross weekly earnings in more detail by focusing on immigrants and breaking down by UK arrival cohort, immigrant type and ethnic status (white or non-white). Table 3 does the same for employment rates. Table 2 demonstrates that white men almost always earn more than non-white men and that labour market entrants exhibit higher mean earnings for the most recent arrivals. In contrast, education entrants exhibit lower earnings for the most recent arrivals. Table

3 shows that, again, white men always enjoy higher employment rates compared to non-whites. Moreover, like earnings, the employment assimilation profiles differ depending on whether the immigrant arrived in the UK with education complete or incomplete. For labour market entrants, employment rates are highest for the most recent arrivals while for education entrants employment rates are highest for those who arrived earliest. This suggests that earnings and employment assimilation patterns work in opposite directions depending on whether education was complete or incomplete. However we need to exercise caution in drawing conclusions about assimilation from Tables 2 and 3 since cohort differences could reflect differences in average cohort quality through time rather than the impact of time in the UK. To tease out the impact of years since migration we need to specify an multivariate regression model.

2. Modelling framework

Our investigation of immigrant labour market outcomes is based on equation (1):

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

In this expression, Z represents a measure of labour market status for immigrant i. As outlined in the previous section two measures of labour market status are used - log real weekly wages and a discrete dependent variable taking the value 1 if the individual is unemployed and the value 0 if they are employed. We follow the recent literature (particularly Dustmann and Fabbri (2003) and Antecol et al. (2003)) in two regards. First, given the difficulty of finding identifying exclusion restrictions, we do not attempt to correct for sample selection bias. Clearly this will affect the interpretation of our results if it is thought that selection bias is a problem. Second, 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. The linear probability model affords a degree of computational convenience for some of the more complex models estimated later in the paper.

Y is years since migration and this variable will capture assimilation - how immigrant earnings change with length of residence in the host country. The specification of the function $f(Y)$ is discussed in the next sub-section. Note however that the assimilation hypothesis suggests that $f'(Y) > 0$ for at least some values of Y. 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.

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 most studies of immigrant earnings have had to make do with pooled cross section data. The variable S (for survey year) reflects when the individual was observed and captures the effect of secular wage growth on immigrant wages.

The vector **x** contains other worker characteristics including human capital. We distinguish between human capital (education and potential experience) obtained in the UK from that obtained before arrival in the UK. It also contains such things as marital status, region of residence and where appropriate, industry of employment.

For both labour market outcome measures we estimate separate versions of equation (1) for the following four groups: (i) labour market entrant white immigrants, (ii) labour market entrant non-white immigrants, (iii) education entrant white immigrants, (iv) education entrant non-white immigrants. Two additional models for white natives and non-white natives are also estimated for comparison purposes.

2.1 Modelling Assimilation

As is stands all of the parameters of equation (1) cannot be estimated since there is perfect multicollinearity: $S \equiv C + Y$. In common with most studies of immigrant assimilation we adopt the normalisation of fixing the coefficient on S (δ - the secular wage growth effect) and estimate 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.

With respect to the specification of the function $f(Y)$, most studies impose a non-linear functional form - either quadratic or cubic - in Y (Bell, 1997, Dustmann *et al*., 2003), 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 while still enabling one to draw conclusions which can be generalised outwith

the sample. Specifically we estimate a semi-parametric version of (1) using a partially linear model.

Consider rewriting equation (1) as:

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

where the vector w includes C, S and x from equation (1). The non-parametric function f is assumed simply to be some smooth function of years since migration. Ordering the data by Y and computing the OLS estimator on differenced data yields

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

where $\mathbf{W}_D$ is a matrix of quasi-differenced individual observations $\{w_i - w_{i-1}\}/\sqrt{2}$ and equivalently for $\mathbf{Z}_D$. Yatchew (2003) shows that

$$Z_i - w_i \hat{\xi}_D \approx f(Y_i) + \varepsilon_i$$

and that kernel regression methods applied to the ordered pairs $\{Z_i - w_i \hat{\xi}_D,\ Y_i\}$ yield a consistent semi-parametric estimator of the function f.

2.2 Modelling Arrival Effects

To investigate the impact of economic conditions at time of arrival to the UK we replace the cohort effects in (1) with two variables. The first is the male unemployment rate for the UK in the year of entry to the labour market while the

second is the rate of GDP growth. The unemployment rate has been used in a number of studies (Chiswick et al., 1997, Chiswick and Miller, 2002, Aslund and Rooth, 2003). We have also included the growth rate to investigate whether more general economic conditions at arrival have any impact on future earnings and employment opportunities. The 'macro' variables pertaining to the year in which the immigrant entered the labour market are entered into the regression model; clearly this is year of arrival for labour market entrants and year left full-time education for education entrants. We also, following Chiswick et al., 1997, experimented with entering an average unemployment or growth rate based on a 3 year moving average centred on the year of entry to the labour market plus one.

3. Results

3.1 Assimilation

To discuss the results of our regressions pertaining to the assimilation hypothesis, we note first that the variable Y in equation (1), representing years since migration, has a quite different interpretation depending on whether an immigrant is a labour market entrant or an education entrant. For those who enter the labour market, Y is identical to years of potential UK labour market experience and whether or not such an immigrant "assimilates" towards the labour market status of a similar native is a function of how labour market outcomes depend on UK experience. For those who complete their education in the UK, years since migration is some combination of years in the UK education system plus years of UK potential labour market experience. Hence assimilation for this group will depend on their labour market returns to UK education and the returns to UK experience.

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Thus a good place to start understanding how immigrant outcomes adjust with length of time in the UK is to examine returns to human capital for immigrant and native groups. Table 4 provides estimates, based on separate estimation of equation (1) on each sub-sample of interest, of the returns to immigrant and native human capital in the UK labour market over the period 1992-2002.

Panel (a) of Table 4 contains the results for the log of weekly pay while panel (b) is the equivalent for employment status. In each table we have reported the estimated coefficients and standard errors for UK schooling and foreign schooling. For both labour market outcomes both types of schooling have a significant and positive impact. There are, however, differences in the estimated returns to an additional year's education depending on where that education was obtained and to which sub-group the individual belongs. In the earnings models an additional year of schooling benefits natives more than immigrants and for both outcomes non-white natives do better than whites. For those immigrants for whom we observe both UK and foreign schooling (education entrants), it is, unsurprisingly, the UK variety which offers the higher earnings and employment return.

We also report, in Table 4, estimates of the returns to UK and foreign potential experience. These are based on a quadratic, parametric specification of the function $f(Y)$ and represent an estimate of the marginal return to an additional year's experience calculated at the mean level of (UK or foreign) experience for the sub-sample in question. Considering earnings first, the return to an additional year of UK experience is estimated at around 1-2% for virtually every group and is highly significant. The exception is non-white natives where the return is estimated to be

around 4%. Foreign experience is a significant determinant of earnings only for the whites in our sample which mirrors a finding of Wheatley-Price (1994). This can be interpreted in at least two ways: white immigrants to the UK are more likely to come from a developed country labour market similar to the UK where generic human capital will also have value in other developed countries. On the other hand, differential returns to human capital between racial groups are often seen as evidence of labour market discrimination and the differences seen here between white and non-white immigrants may reflect such employer attitudes.

The results for the employment probability regressions in panel (b) have many broad similarities with those for earnings. The main difference is for those immigrants who arrived in the UK to enter the labour market for whom UK experience is statistically insignificant and foreign experience has a significant negative coefficient. This may reflect that immigrants with large amounts of foreign experience will tend to be relatively old; many studies have found higher unemployment incidence among old workers.

However we should be careful about interpreting the marginal returns to UK experience as indicative of how time in the UK affects the labour market status of immigrants relative to natives. In particular, the results in table 4 might suggest that the experience-earnings profiles for white and non-white natives are very different. As Figure 1 demonstrates this would be a misleading conclusion to draw.

Figure 1(a) plots the earnings-experience profiles for white and non-white native workers while Figure 1(b) plots the employment-experience profiles for the same

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groups. Two estimates of this profile are produced for each group giving a total of 4 lines on each graph. The first estimate is based on the OLS regression results reported in Table 4 and shows the fitted quadratic in experience. The second is a semi-parametric estimate based on the partially linear model introduced in section 3[7]. Two important points are worth making on the basis of Figure 1. First, consider again the apparent difference between white and non-white natives in the marginal returns to labour market experience shown in Table 4. Figure 1 reveals that, for earnings at least, the profiles for these two groups are very similar. The large difference in marginal returns is because non-whites have much less UK experience on average (see Table 1) and hence are observed on a steeper part of the profile. The second important point is that the quadratic specification of experience can impose too much structure on the predicted profiles. This is most apparent for the non-whites in Figure 1(b) where the semi-parametric estimate is much flatter than the quadratic curve. This would suggest that use of the semi-parametric estimator is worthwhile and in the remainder of this section we only report results computed on this basis.[8]

3.1.1 Labour Market Entrants

We now move on to explicitly consider the assimilation of immigrant groups. We look first at the labour market progress of those immigrants who arrived in the UK and entered the labour market (i.e. those whose education was complete).

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[7] The non-parametric estimation was done using a Nadaraya-Watson kernel density estimator implemented using a version of the Stata module kernreg1 (Ramos et al., 1999) modified by the current authors. We used a Gaussian kernel and began from a bandwidth chosen according to the formulae in StataCorp. (2001). 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.

[8] In fact for some of the immigrant groups the differences between quadratic and semi-parametric results were even more pronounced. A full set of results can be obtained from the authors.

Assimilation requires a baseline: to what are immigrants supposed to assimilate? Researchers must make a choice about what comparison is appropriate. For example, we could imagine an eighteen year old immigrant entering the UK labour market at the same time as an eighteen year old native and trace how their labour market status is predicted to develop over their working lives. The key to assimilation here would be differential returns to UK labour market experience between the immigrant and the comparator native. We would argue however that, from a policymaker's perspective it is more useful to consider how a "typical" immigrant's labour market performance would evolve with time spent in the UK relative to an average native worker. That is we would fix the earnings of the comparator native endowed with the average native level of UK experience and observe how immigrant outcomes evolve toward or away from that level. This isolates the importance of returns to immigrant human capital and tells us how an immigrant newly entering the UK labour market can expect his status to change relative to the average native worker.

We follow this latter approach in what follows by examining the predicted weekly earnings and employment probabilities for an immigrant who arrived in the UK before 1960 having completed the sub-group sample average amount of education in their own country and acquiring the sample average amount of foreign experience. For both natives and immigrants, we consider a married male, living in the South East, working in non-manufacturing. Our native male is assumed to have the sample average amount of experience for his group. To abstract from secular wage and employment growth we use a comparison year of 1997 for immigrants and natives. We then allow our typical immigrant's predicted earnings and employment

probabilities to evolve in line with the semi-parametric estimate of their experience profile. This exercise is conducted for both whites and non-whites[9].

Figure 2 shows the results for immigrant labour market entrants. Panel (a) refers to (log) gross weekly earnings while panel (b) refers to the employment probability. The horizontal lines are the predicted earnings and employment probabilities for white and non-white natives.

The earnings profiles in Figure 2(a) for whites and non-whites have a very similar shape rising gradually to a peak at around 30 years after migration. There is therefore evidence of assimilation relative to the fixed baseline of the average native individuals. Between arrival and 30 years since migration real white immigrant earnings are estimated to rise by 0.19 log points while for non-whites the equivalent figure is around 0.22 log points. The big difference between the white and non-white immigrants is in the intercept of the earnings profile rather than its slope with white immigrants earnings 0.27 log points higher on average than non-white earnings. This compares to a 0.18 log point difference between the white native comparison individual and the non-white native comparison individual.

As the figure demonstrates, white immigrants earn more than non-white natives on arrival and overtake the comparison white native worker after 7 years since migration. Our non-white immigrant take something approaching 20 years to achieve parity with the comparison non-white native and never reaches the earnings level of the white native. Thus while earnings assimilation, in the sense of higher earnings growth with

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[9] In the non-white simulations, the immigrant is assumed to be of Caribbean ethnic origin as is the non-white native baseline individual.

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UK experience, takes place for both white and non-white immigrants, there is a significant ethnic differential between white and non-white immigrants which is not eroded as time in the UK increases.

Figure 2(b) undertakes the same exercise for the fitted employment probabilities. Here a quite different picture emerges. Non-white immigrant employment probabilities begin close to the white native level at over 95% and decline from around 20 years since migration. Such immigrants therefore experience what could be described as disassimilation. For the white immigrants, employment probabilities begin at a relatively low level – a white immigrant has an employment probability on arrival very similar to a non-white native – but gradually rise with years since migration. White immigrants, however, never reach the level of the comparison white natives.

3.1.1 Entrants to Education

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. Here the correspondence between years since migration and UK experience is broken and this needs to be accounted for when examining assimilation profiles. We consider four individual 'types' similar to those typical individuals used in the preceding sub-section but differentiated by their age at arrival in the UK and their UK educational attainment. Specifically the four types are:

- Type I: arrived aged 5, leaves education aged 15

- Type II: arrived aged 5, leaves education aged 21

- Type III: arrived aged 16, leaves education aged 18

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- Type IV: Arrived aged 18, leaves education aged 22.

The results of this exercise are shown in Figure 3 which has four panels. Consider panel (a) which examines earnings for white immigrants who entered education on arrival. The upper horizontal line is the level of (log) earnings for the white native comparison individual as described in the preceding sub-section and the lower horizontal line is the same for the non-white native comparison individual. Years since migration is plotted along the horizontal axis and predicted earnings profiles are plotted for each of the four types described above. These do not begin at zero as clearly these immigrants do not enter the labour market until after their UK education in complete and this varies by type. Thus we can see that the individual who arrives aged 5 and leaves school at 16 has lower earnings on entry to the labour market than any of the other groups while the immigrant who arrives at 18 and leaves education at 22 has the highest earnings when he enters the labour market. The most striking feature of this graph is the strong earnings growth that takes place over the first 15 or so years of UK labour market experience. From labour market entry to the peak of the profile is a log point difference of 0.81.

Panel (b) plots fitted earnings for non-whites on the same basis. A quite different picture emerges with much slower earnings growth over the range of UK experience. From labour market entry to the peak is a log point difference of 0.19 suggesting much lower earnings assimilation What dominates the differences in earnings in this picture are differences in entry level earnings. The 'best educated' non-white immigrants (types II and IV) are predicted to earn more than the comparison white native individual on entry to the labour market. The contrast with the 'best educated' white immigrants (the same types) in panel (a) is marked suggesting that non-white

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immigrants can achieve considerable progress in the labour market through investment in UK education.

Panels (c) and (d) complete the picture by plotting the evolution of employment probabilities for white and non-white immigrants respectively using the four types outlined above. For both whites and non-whites there is strong growth in employment probabilities over the first 10 years after arrival. For whites this flattens out while for non-whites it gradually declines again through time.

3.2 Arrival Year Effects

Tables 5 and 6 report the results of parametric least squares estimates of equation (1) where we replace the cohort effects with variables reflecting the state of the labour market and wider economy in the immigrant's first year in the British labour market. For immigrants who arrived with their education complete this is their year of arrival to the UK. For immigrants who arrived with their education incomplete this is the year that they left full time education[10].

Table 5 contains the key results for earnings, whilst Table 6 refers to the linear probability employment models. For non-white immigrants who were labour market entrants, the arrival effects are jointly significant. However, this appears to be driven entirely by the unemployment rate in the year of arrival, which is significantly negative. Furthermore, this finding is consistent when the unemployment rate on arrival is replaced by its 3 year moving average, although the latter has a slightly larger negative effect (0.017 compared to 0.014). Non-white immigrants who arrived

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[10] Assuming that this mops up the entire cohort effect we are also able to estimate a separate period (or secular wage growth) effect for each immigrant group. See Portrait et al. (2002).

with their education complete and in a period of labour market slack suffer an earnings penalty, which is presumably due to the scarring effects of early unemployment experience.

Our results for white immigrants who arrived with their education complete are counter-intuitive since the arrival effects are negative and significant for growth in GDP. This suggests that white labour market entrants who arrived in a period of economic growth suffer an earnings penalty. For the education entrant immigrants all the labour market entry effects are statistically insignificant.

Turning now to the linear probability models for employment in Table 6 we observe that for non-white labour market entrants, only growth in GDP is statistically significant. Non-white labour market entrants who arrived in a period of economic growth enjoy an employment premium. This is not true for their white counterparts, since all the arrival effects are statistically insignificant.

For the education entrant immigrants, all the labour market entry variables are statistically insignificant for non-whites, although whites appear to enjoy an employment premium for high unemployment. Again this is a counter-intuitive result.

6. Discussion and Conclusions

In this paper we use Labour Force Survey data to document the impact of arrival year economic conditions and assimilation on the labour market outcomes of immigrants to the UK. The innovative features of our work include the separate analysis of

immigrants who arrive in the UK with their education completed from those who have yet to complete their schooling, the use of a semi-parametric method to estimate assimilation profiles and the investigation of arrival year economic conditions on labour market outcomes for immigrants. Below we summarise our key conclusions.

Concerning assimilation, we find evidence that both white and non-white immigrants enjoy rising earnings in the early years of their time in the UK labour market. Earnings assimilation is particularly strong for those white immigrants who have completed their education in the UK. Both whites and non-whites who complete their education in the UK also enjoy considerable employment assimilation in the first 10 years in the UK however for non-whites who complete their education abroad and enter the labour market on arrival in the UK we find that employment probabilities decline with time in the UK labour market. This 'dis-assimilation' is somewhat puzzling. Bell (1997) observed earnings dis-assimilation for white immigrants and postulated that selective re-migration was the explanation. This could conceivably also be the explanation for our results however we would posit an alternative. Many non-white immigrants to the UK were recruited directly to public sector employment in the 1950s and 1960s. We would expect such immigrants to have very low unemployment risk on arrival and in the next few years. As time goes by this group would experience shocks and an 'equilibrium' rate of unemployment for those individuals given their skills and market opportunities would be established. Such a view would be consistent with some employment dis-assimilation as we observe.

We have also found some evidence of unemployment scarring, or the idea that labour market conditions in the year of entry may have permanent effects on labour market

earnings. Our results suggest that this applies mainly to non-white immigrants who completed their education overseas. We should be circumspect in our interpretation of this evidence as we also observe many insignificant coefficients in these regressions and even significantly positive effects of poor macroeconomic conditions. Nevertheless, if true, this suggests another burden that non-white immigrants face.

Underlying all these results, in fact, is the striking difference between non-whites and whites, whether native or immigrant. Non-whites suffer earnings and employment penalties in virtually every comparison made and these effects often dominate the impact of assimilation on labour market outcomes. Our only glimmer of hope for non-white immigrants is the strong impact that UK education can have on their labour market status. Given the high levels of participation of non-whites in the UK education system this may offer some optimism for the future.

Our main findings raise many issues which suggest a promising future research agenda on the economics of UK immigration. In particular, finding explanations for, rather than documentation of , the assimilation patterns discussed above is something that remains to be explored by researchers.

In addition we have neglected a number of issues which may shed further light on the labour market performance of these groups. For instance, are our results affected by the fact that employed immigrants are a selected sample of all immigrants? Does the fact that we do not observe English language fluency, which is known to have important labour market consequences, limit the robustness of our findings? Do we need to further subdivide our immigrants into specific ethnic groups to provide richer

detail on the determinants of labour market success? We leave these questions for future research.

Table 1. Sample Means of Key Variables by Immigration and Ethnic Status.
QLFS 1993-2002

	Natives		Immigrants: Labour Market Entrants		Immigrants: Education Entrants		Total
	Whites	Non-Whites	Whites	Non-Whites	Whites	Non-Whites	
Employment Rate	90.43 (0.2898)	75.13 (0.4323)	89.69 (0.3041)	79.39 (0.4045)	89.97 (0.3005)	81.77 (0.3862)	90.14 (0.2981)
Mean Gross Weekly Pay	376.28 (204.18)	342.66 (191.55)	454.99 (264.13)	363.36 (234.78)	434.25 (240.52)	390.89 (223.19)	378.23 (206.971)
Arrival Age	-	-	26.81 (8.000)	26.45 (7.232)	6.03 (6.446)	11.33 (6.453)	17.88* (11.758)
UK Potential Experience	21.51 (12.65)	10.07 (8.158)	14.03 (13.363)	15.99 (11.991)	18.39 (11.861)	15.85 (9.877)	20.97 (12.70)
Foreign Potential Experience	-	-	7.87 (7.260)	7.43 (6.585)	-	-	4.01* (6.304)
UK Schooling	13.02 (2.45)	14.29 (2.860)	-	-	11.24 (4.890)	8.06 (5.315)	12.46 (3.572)
Foreign Schooling	-	-	14.98 (4.027)	14.99 (3.811)	3.42 (5.407)	7.22 (5.807)	10.24* (7.035)
N	204338	3382	4046	4115	4356	3000	223237
N for employed and positive wage	146719	1809	2481	2185	3054	1734	157982

Notes: Standard deviations in parentheses.
* For the sample of immigrants only.

Table 2. Mean Gross Weekly Earnings by Arrival Cohort.
QLFS 1993-2002

	Immigrants: Labour Market Entrants		Immigrants: Education Entrants		Total
	Whites	Non-Whites	Whites	Non-Whites	
Arrived UK pre 1959	259.51 (134.62) [204]	232.36 (104.86) [59]	412.81 (212.32) [920]	382.76 (165.24) [77]	377.70 (205.28) [1260]
Arrived 1960-1969	338.31 (174.71) [330]	289.61 (139.85) [414]	402.34 (198.49) [1032]	343.16 (175.31) [706]	358.19 (184.72) [2482]
Arrived 1970-1979	392.00 (201.41) [314]	329.36 (188.93) [454]	343.58 (195.76) [720]	355.64 (196.66) [662]	351.36 (196.26) [2150]
Arrived 1980-1989	423.02 (218.04) [543]	306.84 (199.86) [520]	296.37 (207.23) [278]	290.74 (191.77) [227]	342.89 (214.48) [1568]
Arrived 1990-2002	423.04 (247.75) [1090]	333.43 (234.27) [738]	306.12 (145.56) [104]	261.91 (163.39) [62]	378.77 (241.41) [1994]
Total	394.39 (224.61) [2481]	315.23 (199.72) [2185]	378.72 (205.27) [3054]	339.92 (186.82) [1734]	361.04 (208.37) [9454]

Notes: *Standard deviations in parentheses.*
Sample sizes in square brackets.

Table 3. Mean Employment Rates by Arrival Cohort.
QLFS 1993-2002

	Immigrants: Labour Market Entrants		Immigrants: Education Entrants		Total
	Whites	Non-Whites	Whites	Non-Whites	
Arrived UK pre 1959	85.97 [335]	75.61 [123]	92.54 [1287]	85.82 [134]	89.78 [1879]
Arrived 1960-1969	86.12 [533]	75.85 [828]	91.80 [1414]	85.25 [1132]	85.74 [3907]
Arrived 1970-1979	88.55 [498]	84.68 [790]	90.00 [1010]	85.25 [1071]	87.03 [3369]
Arrived 1980-1989	90.81 [827]	81.05 [929]	81.78 [461]	75.10 [478]	83.12 [2695]
Arrived 1990-2002	91.20 [1853]	77.79 [1445]	78.26 [184]	54.59 [185]	83.42 [3667]
Total	89.69 [4046]	79.39 [4115]	89.97 [4356]	81.77 [3000]	85.51 [15517]

Notes: Sample sizes in square brackets.

Table 4. Returns to Human Capital: OLS Regression Results
(a) Log Gross Weekly Earnings

	Native Born		Immigrants			
			Labour Market Entrants		Education Entrants	
	White	Non-White	White	Non-White	White	Non-White
UK Experience	0.014** (0.000)	0.041** (0.002)	0.010** (0.003)	0.011** (0.003)	0.018** (0.002)	0.007** (0.003)
Foreign Experience	-	-	0.016** (0.002)	0.003 (0.003)	-	-
UK Schooling	0.083** (0.000)	0.090** (0.004)	-	-	0.072** (0.003)	0.061** (0.004)
Foreign Schooling	-	-	0.066** (0.003)	0.060** (0.004)	0.063** (0.003)	0.050** (0.003)
N	146719	1809	2481	2185	3054	1734
R^2	0.35	0.37	0.23	0.21	0.33	0.30

(b) Employment Status

	Native Born		Immigrants			
			Labour Market Entrants		Education Entrants	
	White	Non-White	White	Non-White	White	Non-White
UK Experience	0.0007** (0.00006)	0.020** (0.001)	0.002 (0.001)	-0.002 (0.002)	0.003** (0.001)	0.004** (0.001)
Foreign Experience	-	-	-0.002** (0.001)	-0.003** (0.001)	-	-
UK Schooling	0.010** (0.000)	0.026** (0.003)	-	-	0.010** (0.002)	0.012** (0.002)
Foreign Schooling	-	-	0.010** (0.001)	0.011** (0.002)	0.007** (0.001)	0.010** (0.002)
N	204338	3382	4046	4115	4356	3000

Notes:
1.   The excluded category for the immigrant arrival cohort dummy variables is those who arrived later than 1989. The returns to experience are based on a quadratic specification and are computed at the sample mean of the experience variable (foreign or UK) for the relevant group. The coefficients are based on separate regressions for each group containing the following additional explanatory variables: a time trend (survey year), immigrant cohort dummy variables, marital status, regional dummy variables, a manufacturing dummy and, for the non-white regressions, ethnic group dummy variables. For the immigrant equations the coefficient on the time trend variable is constrained to be equal to that for the white native group.
2.   ** indicates significance at the 5% level or lower while * indicates significance at between the 10% and 5% level.

Table 5. Arrival Year Effects: Earnings

| | Immigrants | | | |
| | Labour Market Entrants | | Education Entrants | |
	White	Non-White	White	Non-White
Model 1 Unemployment Rate	0.0063 (0.0047)	-0.0142* (0.0063)	0.0033 (0.0052)	0.0014 (0.0051)
GDP Growth	-0.8853* (0.3293)	0.4977* (0.2219)	-0.3423 (0.1835)	-0.1296 (0.3700)
Model 2 Unemployment Rate	0.0055 (0.0048)	-0.0138* (0.0062)	0.0027 (0.0050)	0.0013 (0.0051)
Model 3 GDP Growth	-0.8538* (0.3492)	0.4541 (0.2491)	-0.3191 (0.1766)	-0.1227 (0.3741)
Model 4 Unemployment Rate 3 Period MA	0.0059 (0.0054)	-0.0166* (0.0065)	0.0043 (0.0058)	-0.00134 (0.0053)
Model 5 GDP Growth Rate 3 Period MA	-0.4159 (0.6206)	0.1462 (0.6559)	-0.7556 (0.4960)	-0.4654 (0.7226)
Model 6 Unemployment Rate 3 Period MA GDP Growth Rate 3 Period MA	0.0056 (0.0054) -0.3441 (0.6328)	-0.0167* (0.0065) -0.0251 (0.6845)	0.0046 (0.0058) -0.7815 (0.4833)	-0.0010 (0.0053) -0.4573 (0.7338)
N	2481	2185	3054	1734
R^2	0.23	0.21	0.33	0.29

Table 6. Arrival Year Effects: Employment

	Immigrants			
	Labour Market Entrants		Education Entrants	
	White	Non-White	White	Non-White
Model 1 Unemployment Rate	0.0037 (0.0026)	-0.0029 (0.0036)	0.0077* (0.0030)	0.0067 (0.0037)
GDP Growth	-0.1645 (0.1663)	0.6302* (0.2420)	0.1221 (0.1762)	0.0317 (0.2761)
Model 2 Unemployment Rate	0.0036 (0.0026)	-0.0024 (0.0038)	0.0076* (0.0029)	0.0068 (0.0036)
Model 3 GDP Growth	-0.1509 (0.1752)	0.6177* (0.2467)	-0.0793 (0.1887)	0.0583 (0.2913)
Model 4 Unemployment Rate 3 Period MA	0.0032 (0.0028)	-0.0072 (0.0042)	0.0076* (0.0034)	0.0069 (0.0040)
Model 5 GDP Growth Rate 3 Period MA	-0.3457 (0.2830)	0.6376 (0.3876)	-0.6222 (0.5289)	-0.7311 (0.6855)
Model 6 Unemployment Rate 3 Period MA GDP Growth Rate 3 Period MA	0.0027 (0.0028) -0.3019 (0.2816)	-0.0066 (0.0040) 0.5556 (0.3849)	0.0075* (0.0033) -0.6171 (0.4902)	0.0068 (0.0039) -0.7178 (0.6252)
N	4046	4115	4356	3000

Figure 1. Experience Profiles: Native Born

(a) Earnings
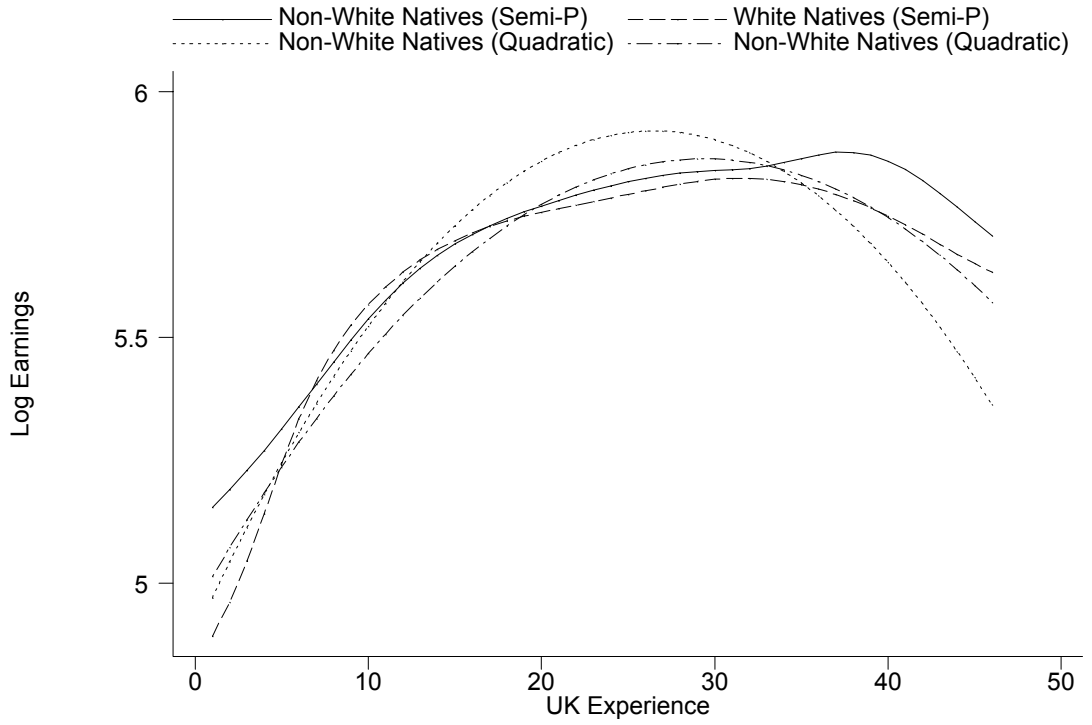
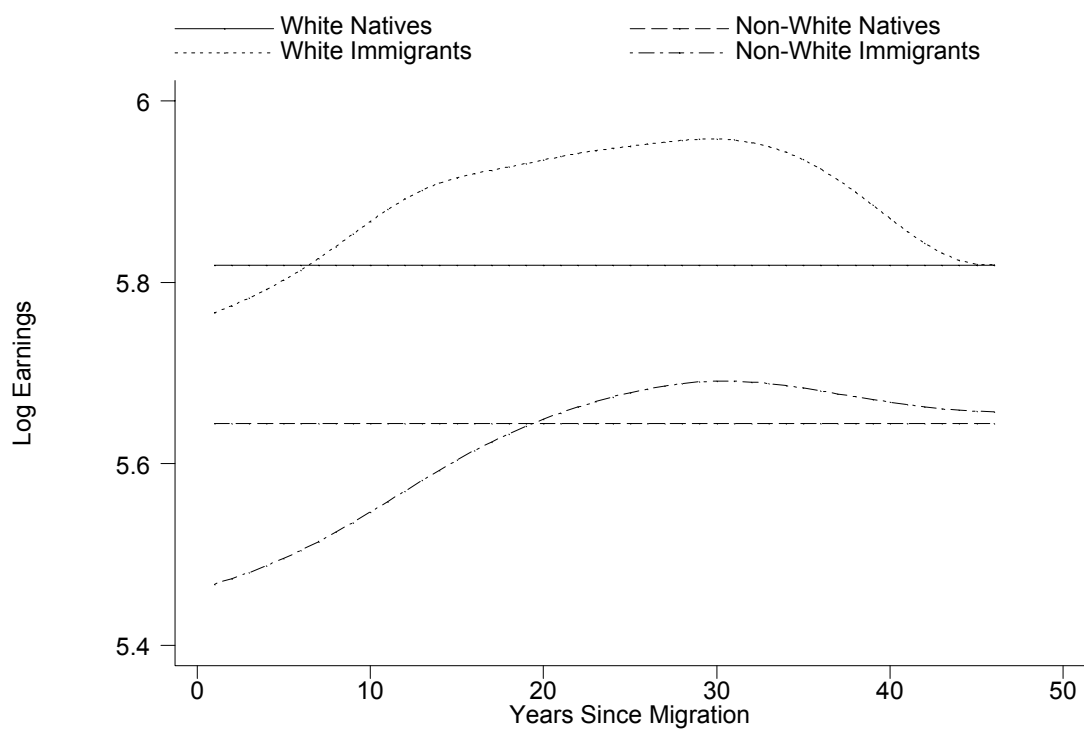## (b) Employment
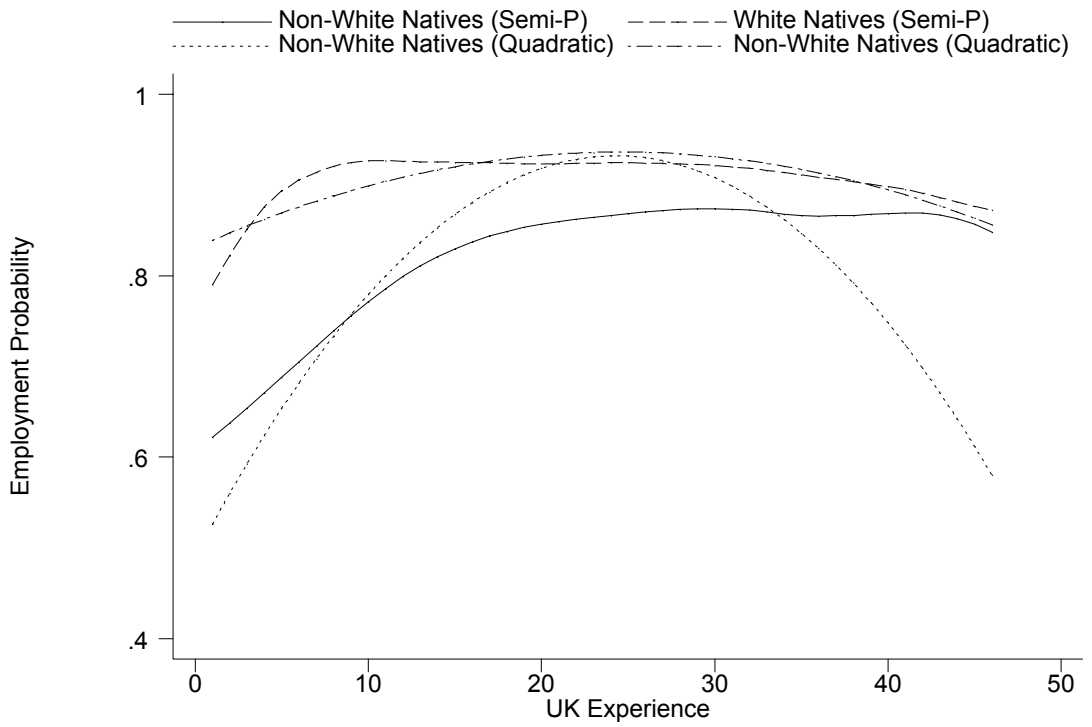
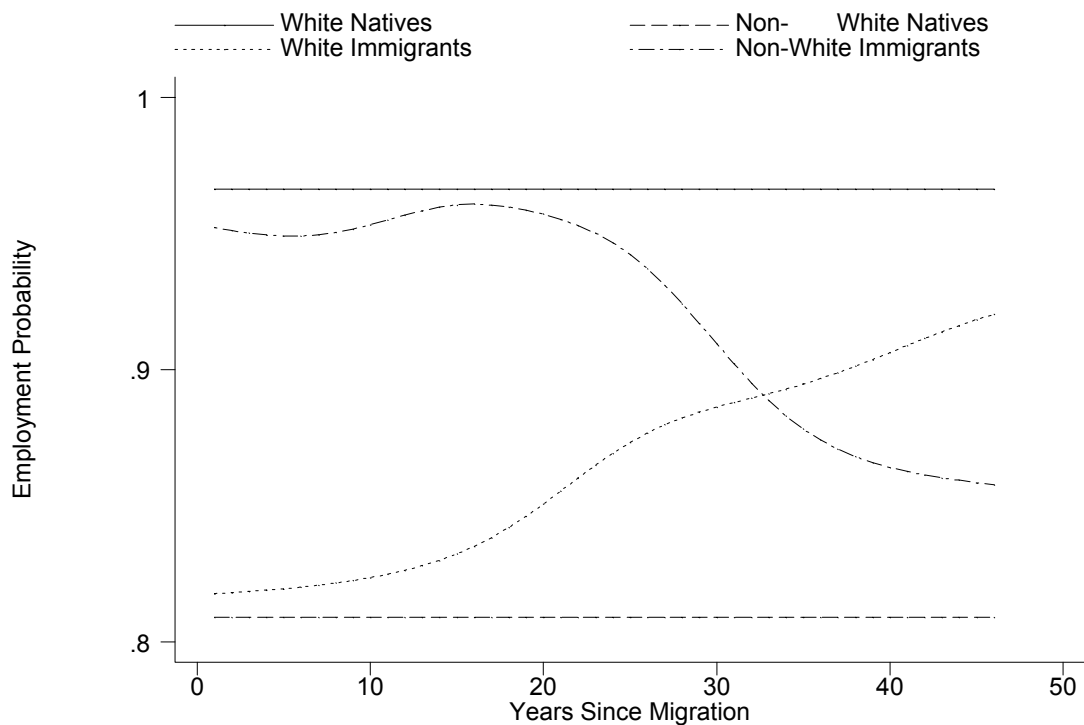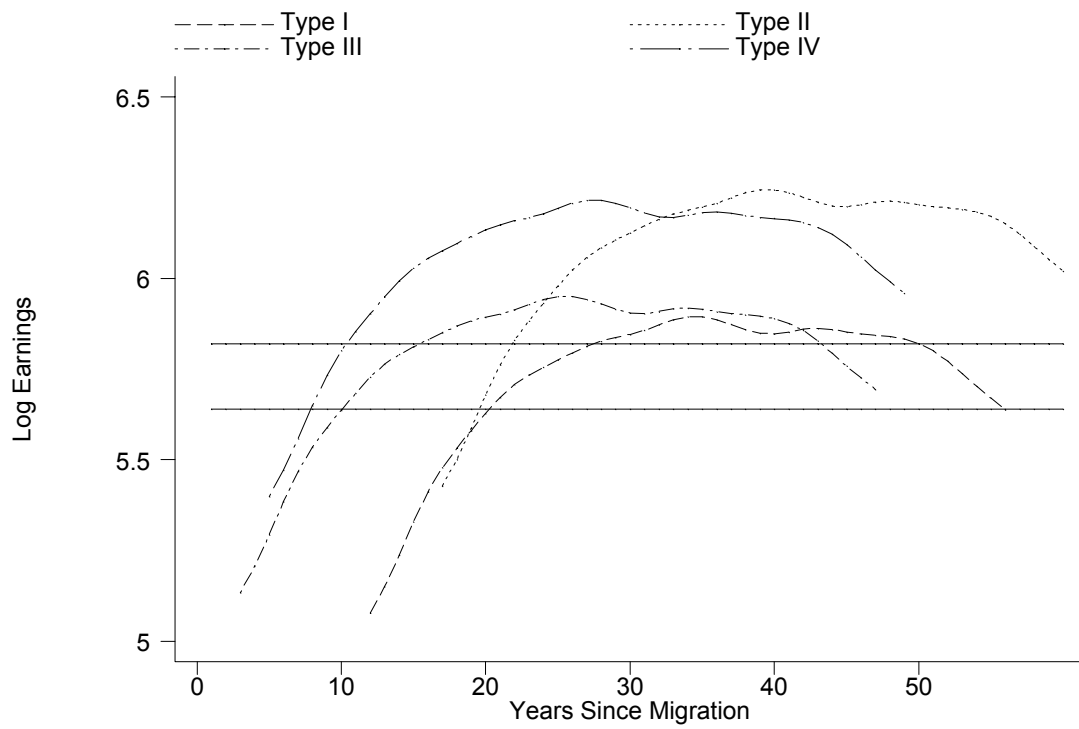# Figure 2. Assimilation: Labour Market Entrants
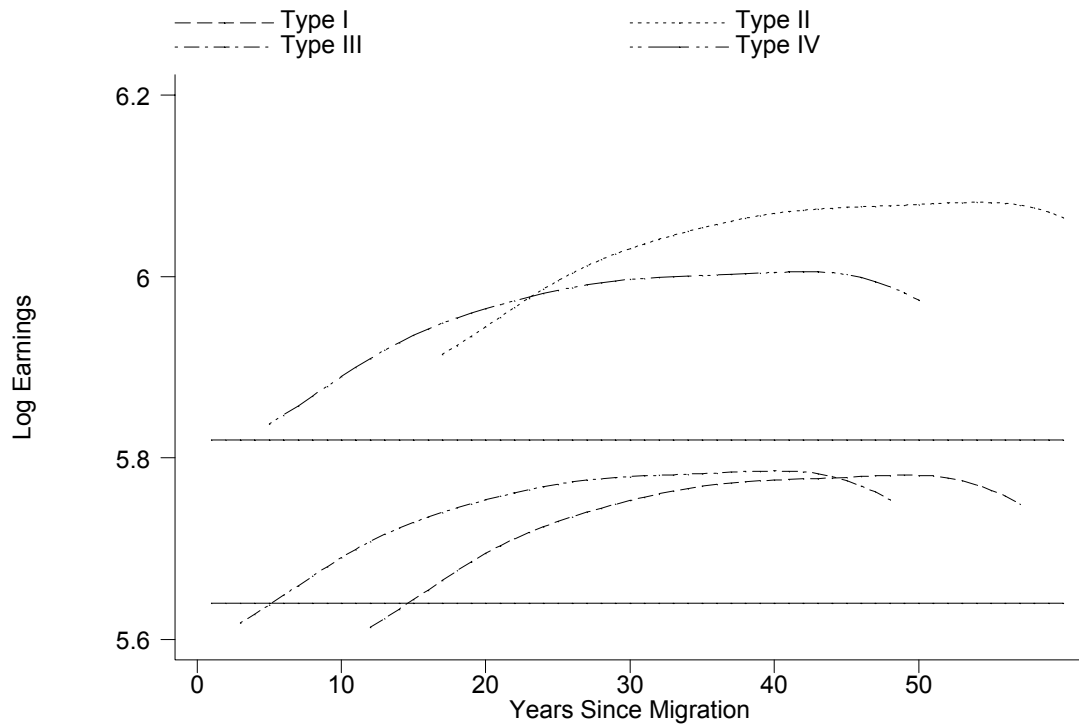
(a) Earnings

(b) Employment
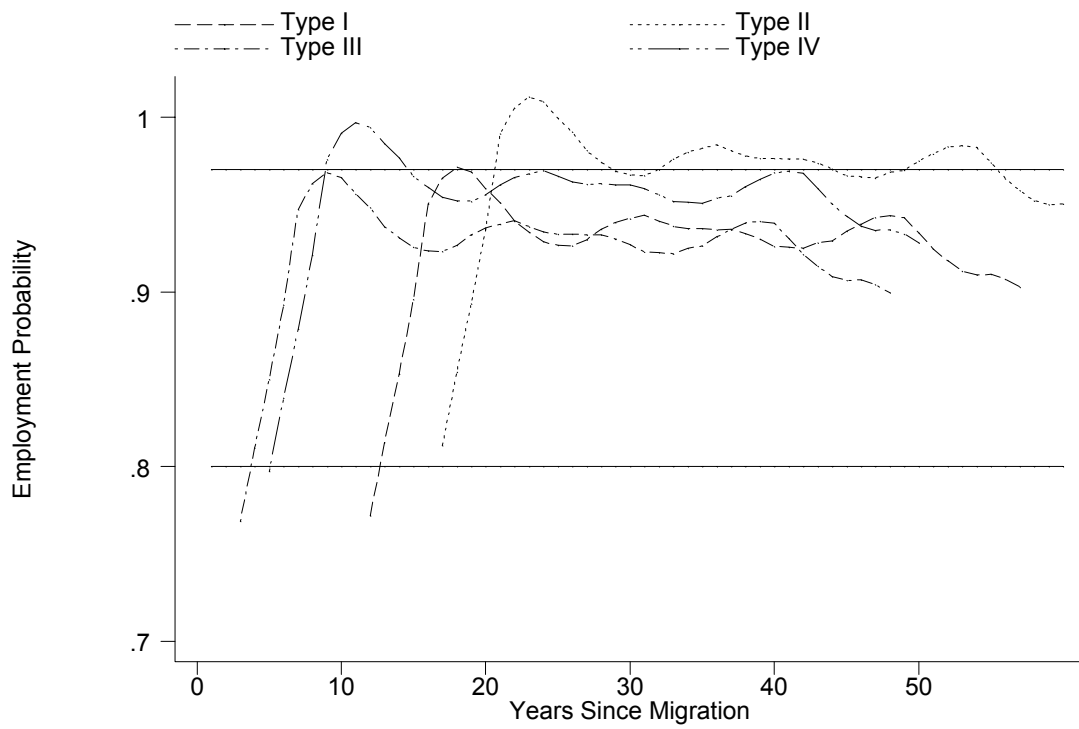
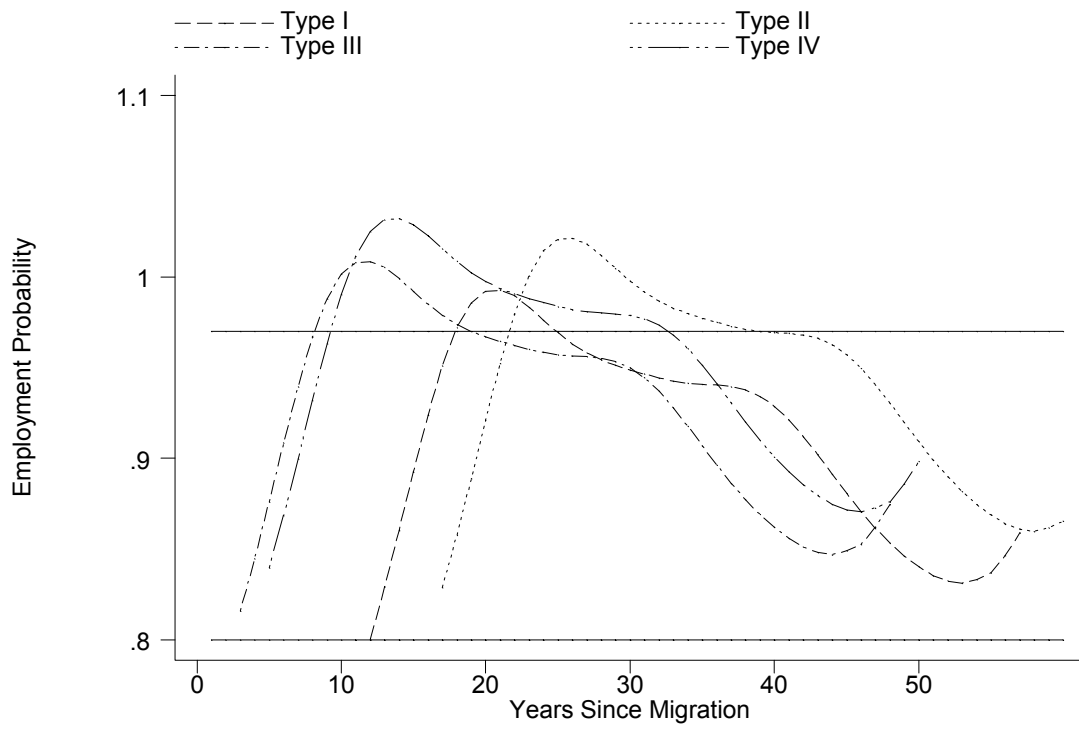# Figure 3. Assimilation: Education Entrants

(a) White Earnings

(b) Non-White Earnings

(c) WhiteEmployment

(d) Non-White Employment

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