

Do immigrants to the UK receive lower wage returns to education than observably similar British/Irish nationals?

Labour Economics (ECO-3A15C)

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1. ABSTRACT

This essay examines the hypothesis that immigrants to the UK receive lower wage returns to education than observably similar British/Irish nationals. I discuss how this may be attributable to discrimination, or to immigrants lacking UK-specific human capital.

This essay begins with a short description of the theories of Human Capital and Statistical Discrimination. This is followed by a review of the literature on immigrant assimilation into the labour market, and the international transferability of human capital. Following this I present my econometric analysis using data from the quarterly UK Labour Force Survey (LFS). This data is used to estimate an earnings regression that includes a dummy variable for non-British/Irish nationals (immigrants). Holding gender, ethnicity, age, location and education constant, I find strong evidence that immigrants earn less than natives in the UK labour market; if this does not reflect productivity differences, it can be interpreted as discrimination. I find evidence that there is a wage differential at each level of education, which I interpret as evidence for UK-specific human capital. I do not find evidence of convergence with native wages.

2. INTRODUCTION

Human capital is a determinant of worker productivity. Assuming a well-functioning labour market, labour is paid equal to its marginal product, and human capital thereby determines wages. If immigrants possess the same human capital as natives, then one would predict that they earn the same wage. This is not observed in the LFS data, and it is this observation that has prompted my research on this topic.

If wages differ, there are two possible interpretations: either immigrants have lower productivity and lower wages reflect this; or immigrants have equal (or higher) productivity, but the labour market does not price this correctly. The heterogeneity of immigrants presents a challenge in assessing which interpretation is correct. Given that immigrants are over-represented in low skill and high skill occupations (CfEP, 2012) it is likely that both interpretations have validity.

The economic progress of immigrants is an important topic given the increased levels of immigration to the UK (the UK has had positive net-migration every year since 1993). If there

is an observable immigrant-native wage gap, this has implications for tax revenue. Additionally, if migrants earn very low wages they may enrol on public assistance programmes and add to government expenditure (Borjas, 2011). Finally, if productive immigrants return to their origin country because of lower-than expected wage returns in the UK, this undermines any government motive for attracting immigrants in the first place.

3. THEORY

3.1 HUMAN CAPITAL

Human capital has many components, but two measurable and significant ones are education and experience. Human capital theory predicts that wages will increase with labour market experience and education. An explanation for the labour market not correctly pricing immigrant productivity is that human capital (or its components) is location-specific. Put differently: human capital cannot be perfectly transferred from origin to host country.

Relating this to education and experience, firms may discount education and experience gained in immigrants' origin country. If this is true, then one would expect immigrants' wages to be lower than natives on their entry to the UK. As immigrants gain more of the UK experience and education that UK employers' value, one would expect immigrants to increase their UK human capital stock. Several authors have observed immigrants' human capital increasing at a faster rate than natives, implying a catch-up in wages, and possibly convergence or over-taking. This 'Convergence effect' is discussed below in the literature review.

In looking for evidence of location-specific human capital, I try to establish two features in the data: an immigrant-native wage gap, and the respective age/earnings profiles for the two groups.

3.2 DISCRIMINATION

It is possible to interpret the immigrant-native wage differential as not being a function of productivity differences. If we control for human capital differences (education and experience, in the case of my regression analysis), and still observe a wage differential, this could be interpreted (partly, at least) as signifying discrimination against immigrants. This

interpretation is especially robust if we can also control for two common features of discrimination: ethnicity and gender.

Education level is not a perfect measure of productivity. But we can assume that immigrants with no qualifications are likely to have similar productivity to natives with no qualifications. If we detect a wage differential in this situation, this is strong evidence for taste-discrimination.

If we detect a wage differential between immigrants and natives with the same level of education, this may reflect differences in educational quality between countries. In this case, there may be an element of rational/statistical discrimination.

4. LITERATURE REVIEW

The landmark paper on UK immigrant labour market outcomes is Chiswick (1980). Using data from the 1972 General Household Survey, Chiswick showed white foreign-born workers as having similar wages to white native-born workers, but observed larger wage differences between non-white immigrants and other groups. Particularly relevant to this essay is Chiswick's evidence that returns to schooling are lower for non-white immigrants than white immigrants and white natives; this can be interpreted as evidence for UK-specific human capital.

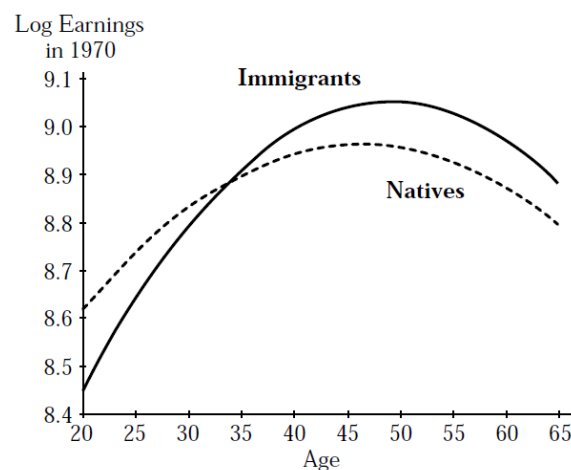
Chiswick uses the variables "years since migration (YSM)" and "YSM squared" to judge whether labour market experience gained in Britain has a different effect to that gained in the origin country. When these variables are added to the regression, Chiswick finds that they provide no additional explanatory power, suggesting that there is no difference in the productivity of labour market experience in origin country or Britain (Chiswick 1980). This results contrasts to Chiswick (1978, 1979), which found that in the US and Canada immigrants receive lower returns for their origin country labour market experience than they do for their host country experience. Computing a similar variable, YSM, in my regression did not produce statistically significant results.

Chiswick attributes the irrelevance of YSM partly to post-war immigrants to Britain being "well anglicised" (Chiswick, 1980) on arrival, with the majority of immigrants having

come from Commonwealth countries. While the LFS data does not specify every respondent's country of origin, other data show that fewer UK immigrants are from Commonwealth countries than in 1971 (CfEP, 2012).

Chiswick (1978) uses US Census data to provide evidence that in the US immigrants' wages start lower than similar natives', but then rise at a faster rate, overtaking natives after several years. I do not find evidence of such an effect in the LFS data. Borjas (1994) uses Chiswick's data to plot the graph in Figure 1 using the regression coefficients and mean values

Figure 1.



The Cross-Section Age-Earnings Profiles of Immigrants and Natives in the United States, 1970

Source: Chiswick (1978, Table 2, Column 3). All the variables in the regression are evaluated at the means of the immigrant sample, and immigrants are assumed to enter the United States at age 20.

Source: Borjas (1994)

for immigrants. Repeating this exercise with the LFS data does not yield a similar graph. (shown later in Section 8 – Interpreting the Results).

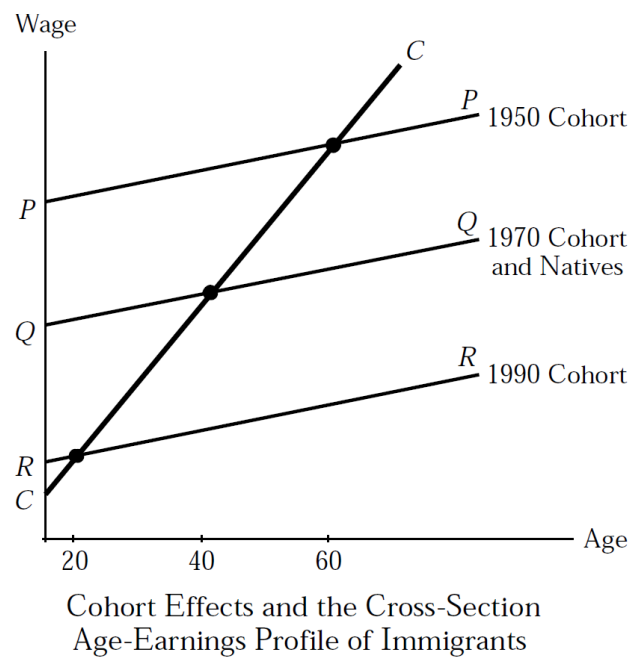
Chiswick (1978) suggests that immigrants will invest proportionately more in human capital, and increase their stock at a faster rate relative to natives, but observes that this investment by itself does not suggest an 'over-taking point', as seen in Figure 1. Borjas (1994) interprets this as evidence for two types of selection bias. The first is that immigrants are "more able and more highly motivated" than natives, since they have the ambition and

wherewithal to move countries in search of better opportunities. The second form of selection bias can be termed ‘survivor bias’, which reflects that immigrants who do not experience high wage returns in the host country simply return to their origin country, and the remaining immigrants are the successful ones with high wages. If Borjas’ interpretation holds in the current UK data, one would expect to see a comparatively steep age-earnings profile for immigrants, but this is not the case (Section 8).

Borjas (1985) makes a criticism of interpreting too much from cross-sectional data, arguing for what he terms “cohort effects”. Over time the characteristics of typical immigrants change, one cohort may be observably different from another. Newly arrived immigrants may be inherently different from those who migrated decades ago. Borjas (1994) presents the graph shown in Figure 2, demonstrating how changes in the skill level of migrant cohorts could produce the effect shown earlier in Figure 1.

Figure 2 shows the effect of variation in human capital between cohorts. Say the 1970 Cohort has more human capital than the 1990 Cohort, and therefore has proportionately higher wages. And say the same is true of the 1950 Cohort relative to the 1970 Cohort. Even with the same slope for their respective age-earnings profiles (P , Q , R), observing the three cohorts in one cross-sectional dataset would give the impression that the population’s age-earnings profile is much steeper, the line C .

Figure 2.



Source: Borjas (1994)

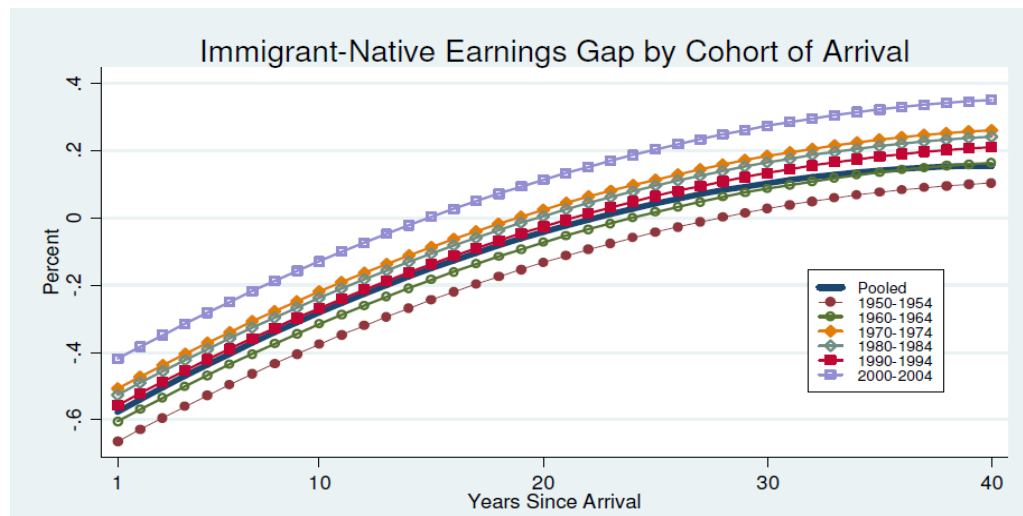
In light of this, I make an attempt to distinguish between immigrant cohorts in the LFS data. However, this is used only descriptively, since the sub-samples of immigrants grouped by age are not large enough to provide significant results for the age-earnings profile.

Lemos (2011) is more effective in looking at the Cohort effect in recent UK data; using the UK Lifetime Labour Market Database (LLMDB), which contains longitudinal data from anonymised National Insurance records. Using a random sample of 647,000 individuals between 1978 and 2006, Lemos finds evidence that those immigrants from recent cohorts fare better than earlier ones at entry. I find some evidence to support this when I ran regressions for separate age groups, which are rough proxies for immigrant cohorts.

Lemos finds evidence for convergence and over-taking amongst all Cohorts (Figure 3). I do not find evidence for any over-taking in my main regression analysis. The cross-sectional nature of the LFS dataset means I would observe convergence if immigrant returns to labour

Figure 3. *Immigrant-Native Earnings Gap*

market experience were higher than native returns; this is not the case.



Source: Lemos (2011)

Lemos asserts that because immigrants vary so much in their characteristics, “such as English proficiency, work ethics, skills (formal education) transferability, etc.” (Lemos, 2011), this means that not all immigrants are perfect labour substitutes. Lemos observes that the immigrant-native wage gap is greater for cohorts with proportionately more non-white immigrants. While the LFS dataset does not allow this level of Cohort distinction, there is an observably larger wage discount for non-white immigrants than there is for non-white natives (results, column X and Y), holding all else constant. Therefore Lemos’ ethnicity/Cohort insight has some validity in interpreting the LFS results.

In summary, the existing literature provides examples of a Convergence effect, but the UK evidence of this is mixed. Any results from my regression need to be viewed with the restriction that cross-sectional data may not give the best measure of assimilation, due to Cohort effect.

5. SAMPLE CHARACTERISTICS

Figure 4 describes how manipulating the LFS dataset for the desired variables had an effect on the characteristics of the sample.

Figure 4. *Changes to the original LFS sample*

Sample description	n	Mean Age	The proportion of observations...			
			That are male	That are female	That are British/Irish nationals	That have a degree
Whole LFS dataset	106,201	38.1	48.93%	51.07%	89.81%	13.99%
Observations with values for 'Nationality'	101,614	38.3	48.54%	51.46%	89.82%	14.61%
Observations with non-zero values for 'Hourly Wage'	11,047	41.8	47.80%	52.20%	90.20%	28.27%
Observations that are 'Prime Working Age' (25-64)	9,617	43.6	47.81%	52.19%	90.06%	30.38%

On the basis of Figure 3, it is possible to say the working sample (comprised of prime-age workers who report hourly wage and nationality) has a slight female-bias, an older-worker bias and a large degree-bias.

The largest of these is the degree bias, and there is reason to believe that this affects some of the regression models. 13.99% of all LFS respondents have degrees, whereas the figure is 30.38% of the prime-age sample with values for nationality and hourly wage. The size of the sample means the results for non-degree respondents are still robust, with high significance. But it should be noted that the regression results may attribute more wage variation to education than is the case. When the sample is split into smaller groups (such as 'non-white immigrants'), the coefficients for secondary education are not significant. This may be attributable to the degree-bias in the sample.

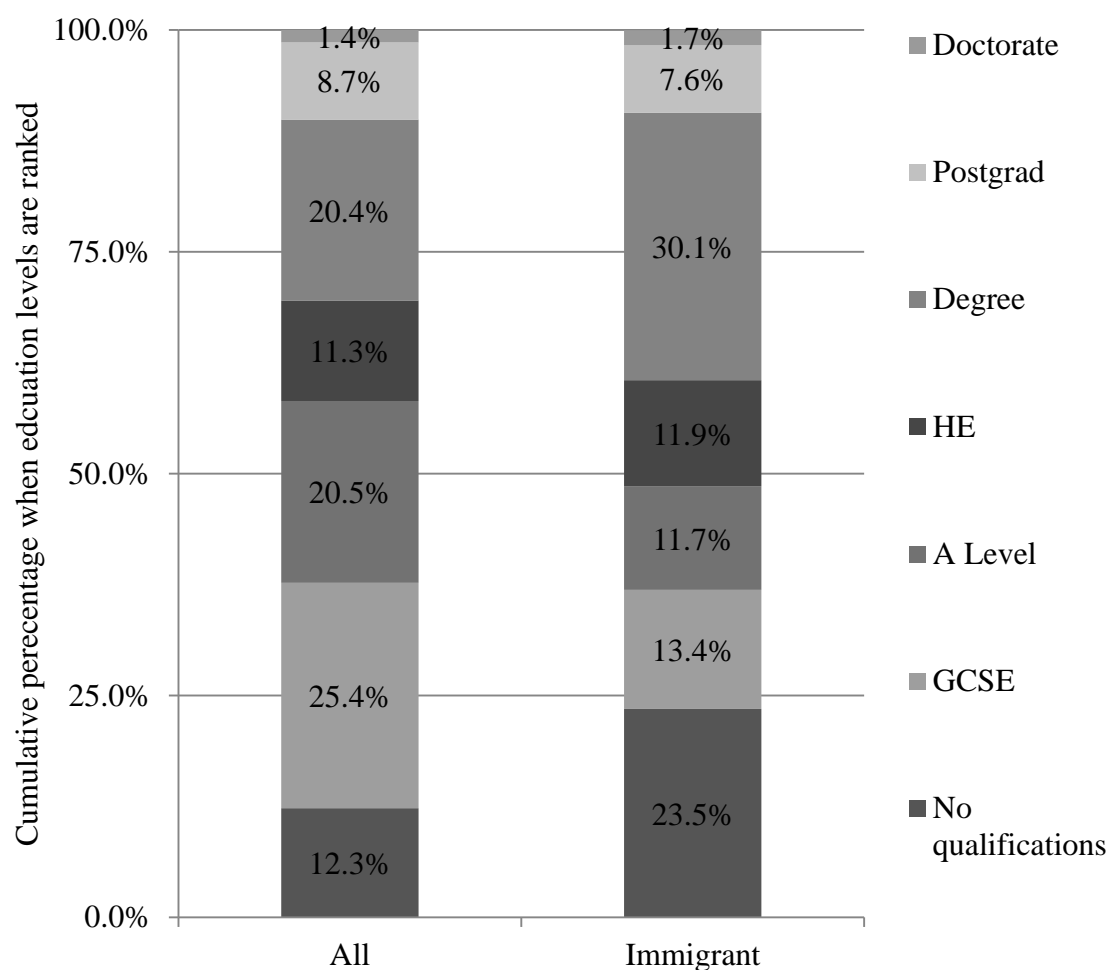
Figure 5: *Means for selected variables of the working sample*

Means or per cent	All	Immigrant
Hourly pay (£)	13.77	12.59
Ln (hourly pay)	2.45	2.36
Age (years)	43.6	39.68
Males	47.7%	49.2%
White	94.6%	79.6%
No qualifications	12.3%	23.5%
GCSE	25.4%	13.4%
A Level	20.5%	11.7%
HE	11.3%	11.9%
Degree	20.4%	30.1%
Postgrad	8.7%	7.6%
Doctorate	1.4%	1.7%
London	10.0%	21.4%
Number of observations	9,617	956

Migrants are younger and more highly educated than natives. The median migrant has a lower wage than the median native, but has studied to a higher level. The mean age of migrants in the sample is 39.68 years, compared 44.03 for natives.

A larger proportion of migrants report having no qualifications, or qualifications other than the options offered (Figure 6). But taken as a group, more migrants are educated to a post-secondary level (51.4%) than the population as a whole (41.8%).

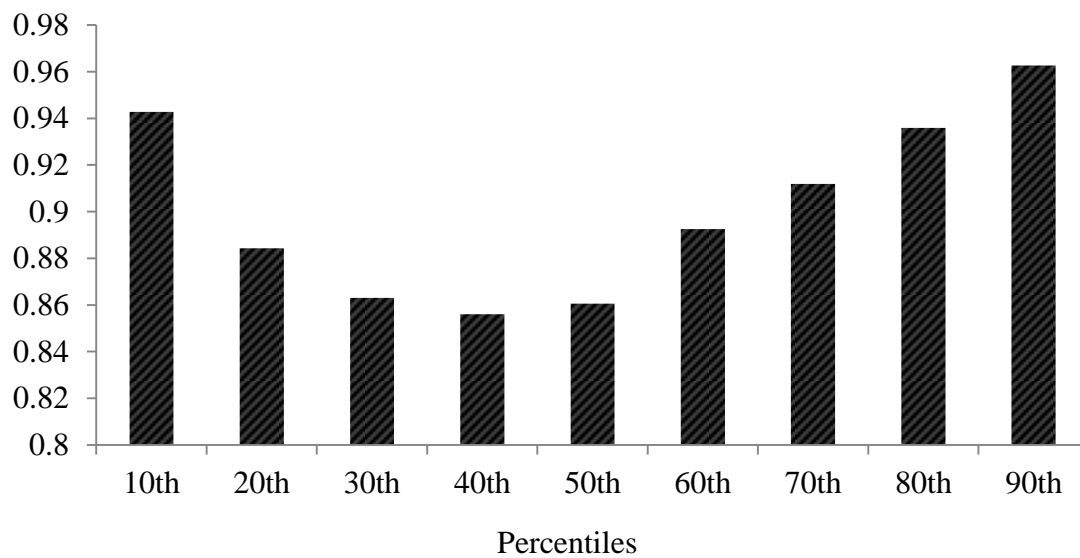
If one ranked the samples by level of education, the median native would be educated to A Level, where the median immigrant would be educated to Higher Education level. An immigrant at the 25th percentile for that group would have no qualifications; a native at the same point in the native ranking would have GCSE qualifications.

Figure 6. *Levels of education for Immigrants and the population*Figure 7: *Percentile values for wage distributions*

Percentile	Hourly wage (£)	
	Natives	Immigrants
10th	6.10	5.75
20th	7.34	6.49
30th	8.61	7.43
40th	9.86	8.44
50th	11.36	9.78
60th	13.20	11.78
70th	15.49	14.13
80th	18.70	17.50
90th	23.51	22.63
95th	29.87	26.71
99th	50.00	48.31

Figure 7 shows that at all levels on the income scale, immigrants earn less than natives. That difference is greatest in the middle of each group's distribution, as shown in Figure 8.

Figure 8. *Wage distributions; immigrant percentile values as a proportion of native percentile values*



The data shown in Figure 8 offers some support for the idea that immigrants compete with natives principally at the bottom and top of the skills distribution. At the bottom of the skill distribution, education and experience components of human capital are less relevant to productivity. At the top of the skills distribution, education and experience may be more perfectly transferable between countries, reducing the effect of UK-specific human-capital on wages.

6. METHODOLOGY

To establish the wage returns to education for natives and immigrants, I regressed an earnings function (Section 7) for British/Irish and non-British nationalities.

I used the Nationality variable to code LFS respondents as 0 if they were of British or Irish nationality and as 1 if they had any other nationality.

I restricted the sample to those of prime-working age, 25-64. This removed the potential for the data to be affected by those in the later stages of their education.

For level of education, I experimented with the variable Years of Schooling; calculated as the age when observations left full-time education, minus 6). However, this had less explanatory power than creating dummies for each observation's highest level of qualification. Another advantage of the dummy variables is that they capture the fact that people may return to education later in life. The base case consists of observations that have 'no qualifications', qualifications different to the presented options, and observations that have no recorded answer.

I experimented with using the variable 'Years Since Migration' to try and capture UK labour market experience. When this was entered into the regression it had less explanatory power than 'Age'. Moreover, when 'Age' and 'YSM' were both included, the coefficient on YSM was highly insignificant. This mirrors the result from Chiswick (1980). There is an additional problem in using 'YSM', in that only 70% of immigrants gave a response for this question in the LFS; to include this variable is to reduce the sample size further. Finally, the average age for immigrants in the sample is 37, and the average number of years since migration is 10, implying that the average age of entry is 27. Since the sample is restricted to those over 25, using YSM means colinearity with AGE.

I find that the AGE variable is the best proxy for experience, especially when the prime-age restriction means there are few students in the working sample. The variable AGE SQUARED is significant beyond the 0.001 level, and adds explanatory power to the model. It captures the quadratic relationship between age and earnings that is present in Chiswick (1978, 1980) and Borjas (1994).

For earnings I used the HOURLY PAY variable to allow inclusion of both full and part time workers

7. ESTIMATING THE EARNINGS FUNCTION

Taking the log of hourly wages, I estimated the following regression equation.

$\ln(\text{Hourly Wage}_i) =$

$$\begin{aligned} &\beta_0 + \beta_1 \text{AGE} + \beta_2 \text{AGE SQUARED} + \beta_3 \text{FOREIGN NATIONALITY} + \beta_4 \text{FEMALE} + \\ &\beta_5 \text{NON-WHITE} + \beta_6 \text{LONDON} + \beta_7 \text{GCSE} + \beta_8 \text{A LEVEL} + \\ &\beta_9 \text{HIGHER EDUCATION} + \beta_{10} \text{DEGREE} + \beta_{11} \text{POSTGRADUATE} + \beta_{12} \text{DOCTORATE} \end{aligned}$$

where the variables are as shown in Figure 9.

Figure 9. *List of variables used in regression analysis*

Variable	Description
AGE	Age in years
AGE SQUARED	Age in years, squared
FOREIGN NATIONALITY	Nationality of respondents (by coding British and Irish nationals as 0 and all other nationalities as 1)
FEMALE	Gender of respondents (by coding Males as 0 and Females as 1)
NON-WHITE	Ethnicity of respondents (by coding White and White Other as 0, and all other ethnicities as 1)
LONDON	Location of respondents (by coding non-London residents as 0, and London residents as 1)
GCSE	Highest level of education is GCSE A*-C, or equivalent (by coding those with this attainment as 1, and all others as 0)
A LEVEL	Highest level of education is A Level, or equivalent (by coding those with this attainment as 1, and all others as 0)
HIGHER EDUCATION	Highest level of education is Higher Education (by coding those with this attainment as 1, and all others as 0)
DEGREE	Highest level of education is an Undergraduate Degree (by coding those with this attainment as 1, and all others as 0)
POSTGRADUATE	Highest level of education is Masters or other Postgraduate Degree (by coding those with this attainment as 1, and all others as 0)
DOCTORATE	Highest level of education is Doctorate (by coding those with this attainment as 1, and all others as 0)

The base-case scenario is a white male living outside of London, with British or Irish nationality and no educational qualifications.

8. REGRESSION RESULTS

The results for this regression are shown in Figure 10. For the full specification (one sample, consisting of immigrants and natives) the R^2 value is 0.29, and all variables are significant beyond the 0.001 level.

Three characteristics are predicted to reduce an individual's hourly wage: FOREIGN NATIONALITY (-9.9%); FEMALE (-22.0%); NON-WHITE (-18.4%). We will focus mainly on the findings for nationality.

All education dummies are predicted to increase hourly wage, and each by a greater amount than the level of education that precedes it: GCSE (13.9%); A LEVEL (28.1%); HIGHER EDUCATION (45.0%); DEGREE (68.0%); POSTGRADUATE (82.3%); DOCTORATE (83.5%). The presence of the LONDON dummy is also predicted to increase hourly wage (22.7%)

Figure 10. *Main regression results*

Variable	<i>Model 1</i>	<i>Model 2</i>	
	Working Sample	Foreign Nationals	British Nationals
AGE	0.057 (0.004)***	0.049 (0.013)***	0.058 (0.004)***
AGE SQUARED	-0.001 (0.000)***	-0.001 (.001) (0.000)***	-0.001 (0.000)***
FOREIGN NATIONALITY	-0.099 (0.017)***	-	-
FEMALE	-0.22 (0.010)***	-0.169 (0.033)***	-0.225 (0.010)***
NON-WHITE	-0.184 (0.023)***	-0.187 (0.041)***	-0.179 (0.028)***
LONDON	0.227 (0.017)***	0.184 (0.041)***	0.235 (0.019)***

GCSE	0.139 (0.017)***	0.057 (0.056)	0.162 (0.019)***
A LEVEL	0.281 (0.018)***	0.160 (0.059)	0.307 (0.019)***
HIGHER EDUCATION	0.45 (0.020)***	0.259 (0.058)***	0.485 (0.022)***
DEGREE	0.68 (0.018)***	0.537 (0.045)***	0.712 (0.020)***
POSTGRADUATE	0.823 (0.022)***	0.709 (0.068)***	0.849 (0.023)***
DOCTORATE	0.835 (0.044)***	0.693 (0.130)***	0.865 (0.047)***
CONSTANT	0.907 (0.086)***	1.073 (0.271)***	0.856 (0.090)***
R^2	0.296	0.249	0.301
N	9617	956	8661

Notes: - The dependent variable is log of Hourly Wage. The base groups are: British, for nationality; Male, for gender; White, for ethnicity; Outside London, for location; No Education, for level of education.

- Standard errors are in parentheses.

- Asterisks denote level of significance: *** 0.001, **0.01. *0.05

9. INTERPRETING THE RESULTS

MODEL 1 –Single regression for working sample (natives and immigrants)

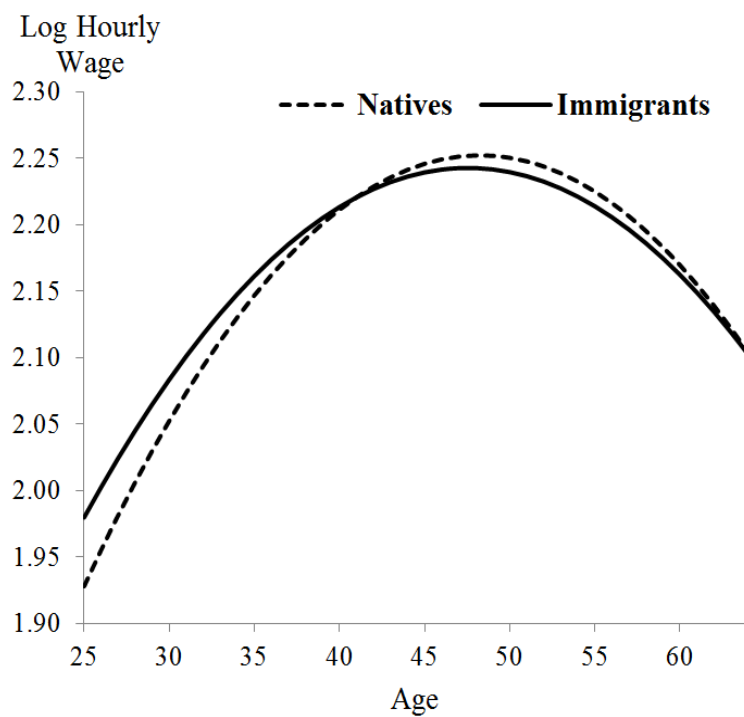
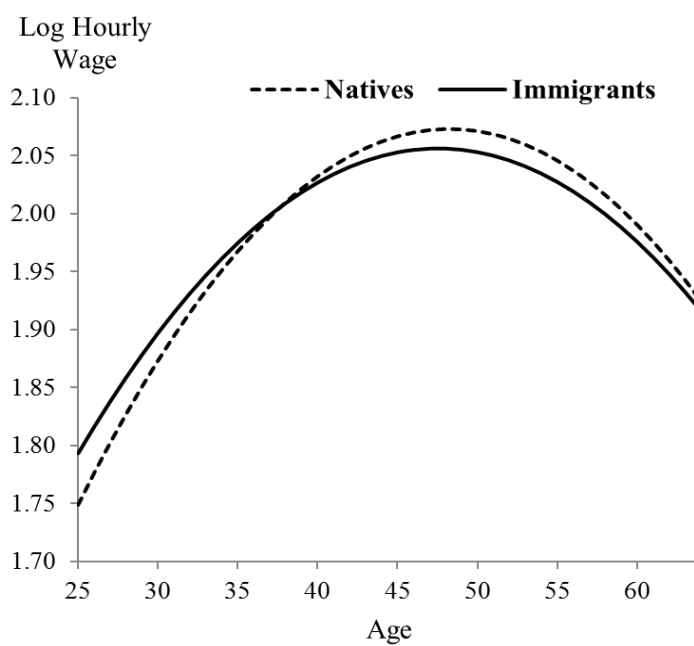
Regressing the earnings function for the whole sample gives a coefficient for non-British nationality of -0.099, meaning an immigrant is predicted on average to earn 9.9% less than a native, holding gender, education, location, age and ethnicity constant. This is consistent with the literature, which generally records migrants as earning less than natives on entry. However, to establish the age/earnings profile of migrants as a distinct group, Model 2 is required.

MODEL 2 –Separate regressions for natives and immigrants

When running separate regressions for natives and non-natives, the AGE coefficient is higher for natives (0.058) than non-natives (0.049). The implication of this is that immigrant age/earnings profile is not as steep as natives (immigrants' wages rise more slowly). This

matches the UK findings for Chiswick (1980), but contrasts with the US finding in Chiswick (1978). It also contrasts with Lemos (2011).

The CONSTANT term is higher for non-natives (1.073) than natives (0.856); under the base case scenario of white, uneducated male living outside of London, the difference in constant terms is such that immigrant wages are predicted to exceed native wages at age 25, and remain higher until age 41 (Figure 11). At ages 41 and 64, the wage are equal, with native wages higher than immigrant between 41 and 64. Both groups are predicted to maximise their hourly wage between the age of 48 and 49. For the base-case scenario, the average native-immigrant wage gap between ages 25 and 64 is predicted to be -0.5% (which is to say, across prime-age working years, immigrant Hourly Pay is predicted on average to be 0.5% higher than native Hourly Pay). The mean of absolute variance over the lifecycle is 1.4%.

Figure 11. *Base-case prediction for Log Hourly Wage*Figure 12. *Base-case, plus 'NON-WHITE' ethnicity*

The addition of the NON-WHITE coefficient to the base-case produces a similar result (Figure 12). But the addition of any other combination of coefficients (LONDON residency, or

any level of education) is predicted to see natives earn significantly more than immigrants

Figure 13. *Base case, plus 'DEGREE' education*

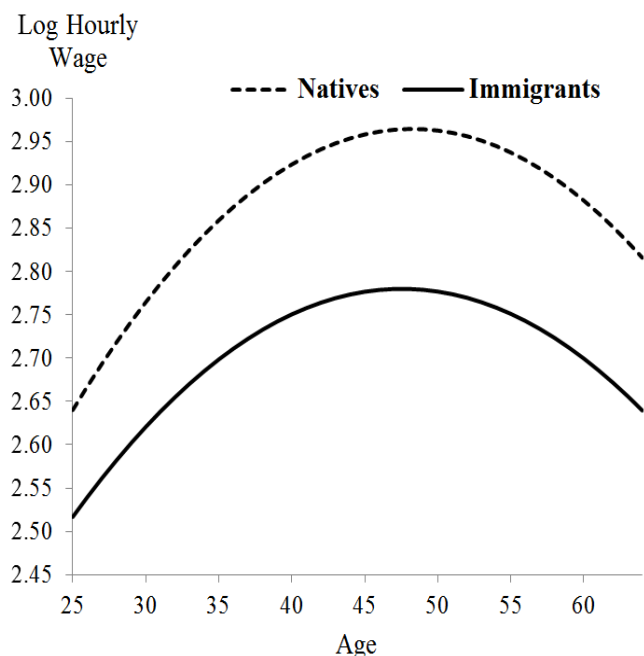
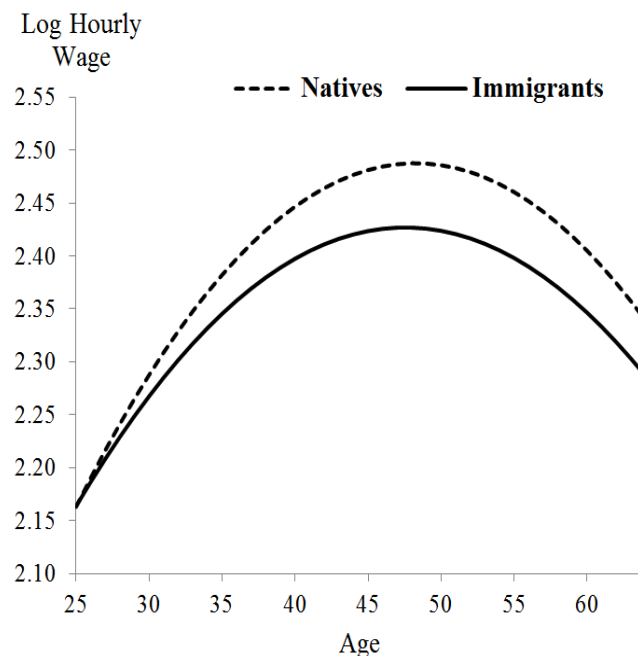


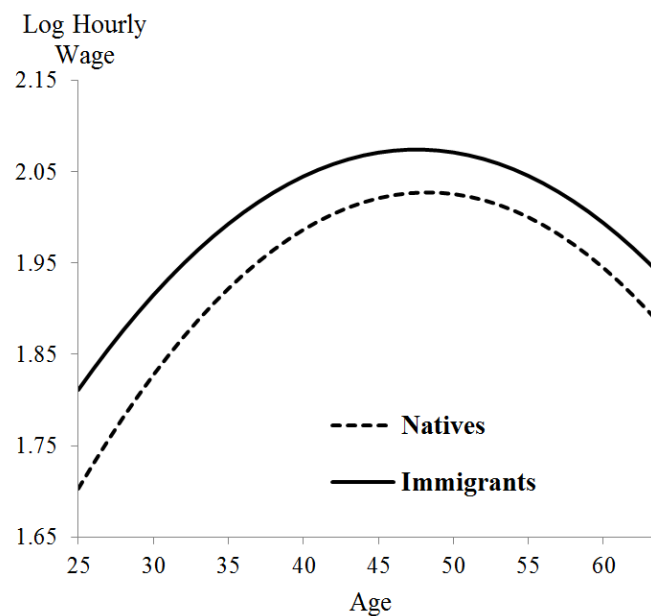
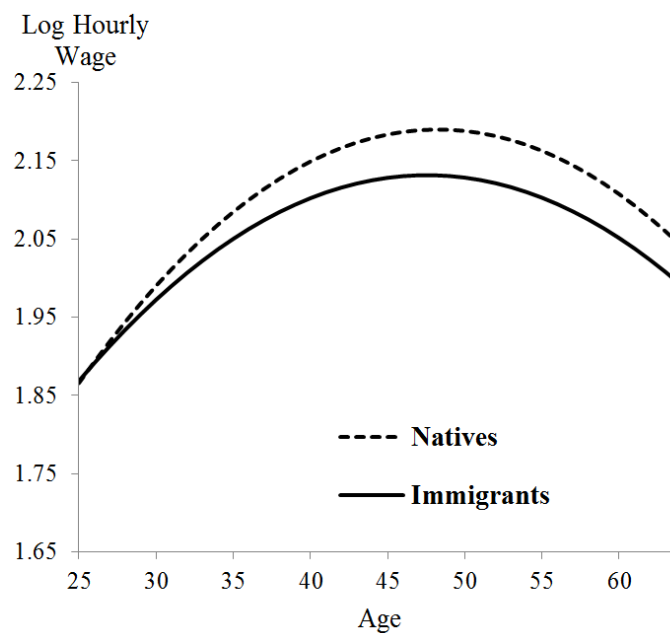
Figure 14. *Base case, plus 'LONDON' residency*



(Figures 13 and 14, for example).

For each positive coefficient, the native figure is higher than the immigrant figure. The negative, NON-WHITE coefficient is lower for migrants (-18.7%) than for natives (-17.9%). However, the negative female coefficient is lower for natives (-22.5%) than it is for migrants (-18.7%).

The difference in FEMALE has the effect that for white women with no qualifications, outside of London, the average immigrant is predicted to earn more than the average native (Figure 15). However, the higher returns to education for natives mean that the addition of other variables (such as GCSE education, Figure 16) means natives are predicted on average to maintain a positive wage gap with immigrants.

Figure 15. *Base case, plus 'FEMALE'*Figure 16. *Base case, plus 'FEMALE' and 'GCSE' education*

With three exceptions, each combination of variables predicts hourly wages are higher for natives than immigrants, for all ages. For two of those exceptions ('base case', and 'base case plus NON-WHITE'), the regression predicts that within the lifecycle natives and immigrants each have a period of higher Hourly Pay (Figure 8 and Figure 9). Only one

combination of variables (base case plus FEMALE) produces an age-earnings profile that is predicted to be higher for migrants than natives through the lifecycle (Figure 12)

10.CONCLUSION

This essay examined the hypothesis that immigrants to the UK receive lower wage returns to education than observably similar British nationals. The regression results support this hypothesis.

I offered two ways of interpreting this result: either immigrants have lower productivity and lower wages reflect this; or immigrants have equal (or higher productivity), but the labour market does not price this correctly. There is some evidence for both, but on the basis of the LFS data and my regression it is not possible to assert which is more valid. Given the heterogeneity of immigrants, both may be true. The argument for lower productivity is supported by the evidence for location-specific human capital.

The interpretation rests on the extent to which the education dummies are sufficient for identifying 'observably similar' workers. If, for example, a British degree increases productivity more than a foreign degree, then immigrants and natives with degrees are not 'observably similar'. In that case, the conclusion from the results must be that immigrants experience lower returns because they have lower human capital stocks, as a result of lower investments than the native group they are being compared to.

If, however, immigrants have the same productivity as natives, then the results showing lower wage returns may indicate discrimination or imperfect transferability of human capital. These are overlapping effects: human capital cannot be transferred if host-country firms engage in discrimination.

The age-earnings profiles of skilled migrants provide evidence for these two effects. First, the age-earnings profiles of unskilled workers appear to rule out significant taste-discrimination amongst UK firms. Observations with no qualifications serve as a control group: the lack of qualifications means worker productivity cannot vary according to education. With unskilled productivity assumed to be the same, employers are predicted to pay natives and immigrants similar wages, suggesting that firms have a low propensity for taste-discrimination against immigrants, holding other characteristics constant.

Second, we can assert that the lower age-earnings profiles for skilled migrants are attributable to firms engaging in statistical discrimination. Firms will do this if they think the costs are too high for acquiring information on different countries' education systems. The implication is that immigrants cannot fully transfer their human capital to the UK.

Elsewhere in the results I find some evidence to support the idea of internationally transferable human capital. The fact that 'YSM' and 'YSM squared' were insignificant, and reduced explanatory power, was interpreted as evidence that origin-country labour market experience is not significantly different to UK labour market experience.

In summary: immigrants are predicted to earn similar wages to natives when the workers have no qualifications; and are predicted to earn less when compared to natives with the same level of education. This is attributable to statistical discrimination and differences in the quality of education. Human capital is not fully transferable between origin countries and the UK, but there is evidence to suggest some transfer takes place.

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