Preliminary Draft

Intergenerational Earnings Mobility of Immigrants and Ethnic Minorities in the UK

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Abstract: This paper analyzes intergenerational earnings mobility of immigrants and ethnic minorities in the UK. It has used a two sample instrumental variable technique, and utilized British Household Panel Survey for estimating mobility coefficient. Our estimation provides the evidence of differences in generational mobility based on immigration status and ethnic origin. Earnings of indigenous people tend to have a strong correlation with that of the father with a mobility coefficient of 0.34. However for immigrants as well as ethnic minorities, the father's income has a lesser effect on children's earnings with a much lower coefficient estimate.

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Key Words: Intergenerational Mobility, Immigrant, Ethnic Minority, 2 Sample Instruemental Variable.

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1. Introduction

Since the 1990s there has been a growing concern over the increase in income inequality in the industrialized countries. Such an increase has thought to have been contributed by the changes in wage structure (Corak, 2004), changes in the returns to education and skill (Gottschalk and Smeeding, 1997; Katz and Autor, 1999), changes in institutional structure (Corak, 2004) etc. These factors may have caused important alterations to the earnings profile over time, with the result that the position of a child in his/her generation's earnings distribution could be quite different than that of his/her parent. In addition, family background, in particular parental income itself, is argued to play an important role in determining a child's earnings potential and income disadvantages may pass from one generation to the next. It is therefore an important policy issue to understand the extent to which family background influences the income of an individual in his/her adulthood and the way earnings patterns have changed over generations.

The term intergenerational mobility refers to the relationship between the socio-economic status of parents-particularly to income, and the status of children in their adulthoods (Corak, 2004). An economy can be characterized as highly mobile (low intergenerational correlation/high generational mobility) if a child's income is determined primarily by his/her own endowments rather than by his/her parent's earnings and social status. The issue of generational mobility has further significance when considered in the context of immigrants or ethnic minorities. In case of immigrants, they might be unable to transfer their education received in their home countries, might face discrimination, lack good networking, suffer from language difficulty in the labour market and this could transmit to the next generation as well. As for ethnic minorities, discrimination in the labour market, unobservable attributes related to skill or earnings (e.g. certain ethnic groups might have comparative advantage over other groups in performing certain tasks), certain cultural/social norms influencing earnings capacity (people of certain ethnic groups might be prejudiced against certain types of education/jobs) might result in differences in the intergenerational mobility from that of the white ethnic group. For the host countries, the performance of immigrants and the changes in their earnings profile over generations could be

indicative of the degree of equity and economic justice prevailing in the host country. A higher intergenerational correlation of immigrants could partly be a result of the obstacles against equal opportunity in the labour market. The issue of generational mobility of the ethnic minorities in this context could represent the performance of 2nd generation (non-white) immigrants as opposed to the children of white indigenous people.

In the context of the UK, the growing inequality over time along with the increased presence of immigrants of different background and skill mix have made it a particularly important case in terms of immigrants' intergenerational transmission of income. The existing literature however focuses mainly on the performance of current immigrants and analyzes it from a specific point in time. But the economic performance of immigrants can better be understood from a longer term dimension and the assimilation of immigrants and the issue of equal opportunity in the host country can best be addressed from an intergenerational view point.

In the literature, Dustman and Theoderpoulos (2006) are the only authors to analyze the performance of immigrants/ethnic minorities in the UK across generations. They concluded that the ethnic minority 2nd generation immigrants were more educated than 1st generation immigrants and their white peers. However in terms of employment both generations of immigrants were lagging behind the white natives. In the context of other countries, Aydemir *et al.* (2006) concluded that, Canadians fathers' earnings could explain only 18%-27% of the earnings of 2nd generation immigrants. On the contrary, Borjas (1996) found significant positive relationship between the earnings of 1st and 2nd generation immigrants in the US. Like Borjas (1993), Card *et al.* (1998) also found high intergenerational income correlation for immigrants, which was within the range of 0.4 to 0.6. The existing literature therefore suggests striking differences in intergenerational mobility across countries. In this backdrop we have attempted to analyze the issue of intergenerational mobility, with particular emphasis on ethnic background and immigration status. To our knowledge there exists no study estimating intergenerational mobility coefficient for different groups, therefore this analysis is expected to shed light on the performance of immigrants (both 1st and 2nd generation) and ethnic minorities (1st /higher generation immigrants) in British economy.

One crucial constraint of analyzing generational mobility of immigrants is the lack of data sets with information on both father's and children's earnings. In such a context, we applied 2 sample 2 stage least square/ 2 sample instrumental variable and utilized the British Household Panel Survey (BHPS) to estimate intergenerational mobility coefficient. According to the analysis, for natives around 30%-35% of children's earnings can be explained by that of their fathers. For immigrants as well as minorities the result however shows a mobility coefficient which is significantly different and much smaller in magnitude. For immigrants, only 13% of their earnings can be explained by that of their fathers' and as for non whites the mobility coefficient is as low as 0.08.

The paper is organized as follows: in section 2 the theoretical motivation of the paper is outlined. In section 3 the econmetric specification is outlined. Section 4 discusses the data and methodological issues and in section 5 the empirical results are provided. Finally section 6 concludes.

2. Theoretical Background

The issue of intergenerational mobility can be modelled in the light of the theories related to human capital investment and intergenerational utility. Based on the theoretical models provided by Becker and Tomes (1979) and Solon (1999), in a family of one parent (let it be father) and one child, the father's lifetime earnings Y^f is allocated between his own consumption and investment in child's human capital. The budget constraint for the father can therefore be defined as:

$$Y^f = C^f + I^f \qquad (1)$$

The earnings of the child, on the other hand is a function of the investment made by his/her father along with all other factors that could influence earnings.

$$Y^c = (1+r)I^f + E^c \qquad (2)$$

where r is the return to investment in human capital. The father maximizes a Cobb-Douglas utility function of the following form:

$$U = (1-\gamma)\log C^f + \gamma \log Y^c \qquad (3)$$

where γ ($0< \gamma <1$) indicates the weight that the father attaches to the earnings of child (therefore investment on the child) relative to his own consumption. Maximizing the utility function, and arranging the terms yields the following expression of child's earnings (Solon, 1999):

$$Y^c = BY^f + \gamma E^c \qquad (4)$$

where $B = \gamma(1+r)$. In equation (4) if we assume the variance of earnings is the same in each generation, then B would represent the correlation between the lifetime earnings of the child and the father. However as discussed by Solon (1999), it can only hold under the strict condition of orthogonality between E^c and Y^f. In this aspect, Becker and Tomes (1979) and Solon (1999) suggested that the 'other contributors' of child's earnings, that is E^c can be expressed as a sum of child's endowment e^c (which is unconditional of I^f), factors transferred from the family and partially determining children's earnings capacity and features independent of Y^f and E^c but acting as a determinant of child's earnings capacity, referred as 'market luck' or u^c by Solon (1999):

$$E^c = e^c + u^c \qquad (5)$$

where e^c is composed of features such as race, family culture, caste, reputation and connection of families (Becker and Tomes, 1979). It could be thought to follow the 1st order autoregressive process:

$$e^t = \lambda e^{t-1} + \nu^t \qquad (6)$$

here $0 \leq \lambda < 1$ and v^t is serially uncorrelated. In this set up, as suggested by Solon (1999), intergenerational earnings correlation can be expressed in the following manner:

$$Y^t = BY^{t-1} + \gamma e^t + \gamma u^t \qquad (7)$$

where $0 < B < 1$ and the population variances of u^t and e^t are respectively σ_u^2 and $\sigma_e^2 = \sigma_v^2/(1-\lambda^2)$. Depending on the values of intergenerational correlation in two extreme cases, i.e. when $\sigma_e^2 = 0$ and, when $\sigma_u^2 = 0$ the intergenerational earnings correlation is suggested as a weighted average of these two cases.

Therefore, the degree of intergenerational mobility is determined by several factors: the importance that fathers attach to investment in children, the return to investment in human capital, the degree of correlation between children and fathers' endowments of earnings capacity, and the relative magnitudes of the variances of *luck* in market (σ_u^2) as well as in their *endowment* (σ_e^2) (Solon, 1999, pp. 1766). In this set up, while modelling intergenerational earnings mobility the issue of ethnicity and immigration is expected to play important role through several avenues:

- If immigrant/ethnic minority fathers have high (low) weights to the investment in children (γ) other things remaining constant, we expect children to have high (low) income as well and that would result in high (low) intergenerational correlation.

- If immigrant fathers are less acquainted about the education system, have difficulty in language, prefers certain ethnic schooling system, lack good networking, prejudiced against certain education it could result in lower return to human capital r and consequently we might observe lower mobility coefficient.

- Certain immigrant/ethnic groups might have better (worse) unobservable characteristics (ability, skill, motivation etc.). It might result in higher (lower) return to the same level of investment in human capital r and would lead to high (low) intergenerational correlation.

- Children's endowments are partially determined by their father's endowments and certain genetic/cultural/family/ethnic characteristics (e.g. entrepreneurial skill, talents related to certain occupations, certain cultural/social norms associated with earning capacity) might transmit from immigrant fathers to the next generation through the correlation of endowments of capacities (λ). Persistence of such features over generation might result in high intergenerational correlation.[2] However, it can be argued that to certain extent such the effect might fade away in the next generation and it might not be influential for the children.

- If there exists discrimination in the labour market, affecting the labour market outcome of immigrants/minorities (u^c) then we might expect a higher intergenerational correlation of earnings.[3] If such a discrimination is based on certain ethnic attributes like skin colour, it is expected to persist over generations. However, it is plausible that over time such discrimination could fade away and/or the 2nd generation immigrants/minorities might be in possession of better attributes (e.g. language skill, better network etc.) and that might result in low correlation of earnings.

- If immigrant fathers have received education abroad but their sons/daughters receive it in the host country, the former's earnings could be affected by imperfect information of their educational qualification and that might not prevail for the latter. In such case we expect low mobility coefficient.

3. Econometric Specification

The literature of intergenerational mobility purports primarily to estimate an earnings equation of children with father's earnings being the key explanatory variable. Therefore the following equation is estimated to capture intergenerational mobility:

$$Y_i^c = \alpha + \beta Y_i^f + \kappa X_i + \omega_i \qquad (8)$$

[2] According to Becker and Tomes (1979) "children's endowments are determined by the reputation and 'connections' of their families, the contribution to the ability, race, and other characteristics of children from the genetic constitutions of their families, and the learning, skills, goals, and other 'family commodities' acquired through belonging to a particular family culture".

[3] If the discrimination is based on certain ethnic attributes like skin colour, it is expected to persist over generation.

where Y_i^c is the logarithm of children's permanent income who belongs to family i, α is the intercept term, Y_i^f is the log of fathers' permanent income, X_i is a vector of other controls, κ is the associated coefficient of X_i and ω_i is the error term. In intergenerational mobility, the researchers attempt to estimate the β coefficient associated with fathers' earnings and in log linear model, it is the elasticity of children's permanent income with respect to that of fathers.[4]

Provided the data of permanent income of both fathers and children are available, equation (8) can be estimated by OLS. However the key constraints of estimating such equation are two fold: (i) lack of information of both fathers and children's earnings in the same data set and (ii) absence of any information of permanent income.

As discussed in Lefranc and Trannoy (2003) and Bjorklund and Jantri (1997), ignoring permanent income and considering only current income might cause a downward inconsistency of β coefficient. In this analysis, in order to account for such life cycle biases, fathers' current income has been instrumented. In addition, as suggested by Haider and Solon (2005) and Ermisch and Nicoletti (2007), only individuals within a specific age range are chosen for minimizing the biases.

In order to tackle the second estimation issue of *missing* data, the two sample two stage least squares (TS2SLS) method as applied by Ermisch and Nicoletti (2007) has been followed.[5] According to the TS2SLS let us assume Z_i^f is a set of socio-demographic characteristics of fathers from family i and is available in sample I so that $i \epsilon I$ (I is labelled as the main sample). Although both Z_i^f and Y_i^c are observed in I Y_i^f is not. If

[4] If β=1 it denotes absolute immobility in the society and children's earnings are completely determined by that of fathers. Whereas if β=0 their earnings are determined *solely* by their own characteristics.

[5] The TS2SLS is asymptotically equivalent to the 2 sample instrumental variable (2SIV) estimator where the latter concept has been discussed by Rider and Moffit (2005) and applied by Arellano and Meghir (1992) and Angrist and Krueger (1992) in particular. In the TS2SLS method, two independently distributed random samples are constructed from the same population where the dependent variable Y along with a vector of independent variables X are present in one sample but only some of the independent variables are present in the other sample and not Y. If a set of instruments Z is defined, which is common to both of the samples, then if both of the samples are drawn from the same population but are independent and random and if the variables in vector Z are identically and independently distributed in the samples, consistent estimators can be obtained by applying 2SIV method. For detailed discussion, see Rider and Moffit (2005).

there exists a sample J (defined as the supplement sample) originated from the same population as I and contains information of Z^f, predicted value of Y^f can be obtained and the following model of Y^f can be estimated on sample J:

$$Y_{jt}^f = \gamma Z_j^f + \mu_j^f + u_{jt}^f \qquad (9)$$

where $j \epsilon J$. In this framework, equation (8) can be estimated in the following manner:

$$Y_{it}^c = \alpha + \beta(\hat{\gamma} Z_i^f) + \kappa X_{it} + \varepsilon_{it} \qquad (10)$$

where $\varepsilon_{it} = \omega_i + u_{it}^c + \beta\mu_i^f + \beta(\gamma Z_i^f) - \beta(\hat{\gamma} Z_i^f)$

In this analysis the supplement sample is utilized to estimate a log earnings equation for father (equation (9)). In the next step, the intergenerational mobility equation (equation (8)) is estimated while using the main sample but by replacing fathers' earnings by its predicted value obtained in the 1st stage.[6]

4. Description of Data

In this analysis the British Household Panel Survey (BHPS) from 1991-2005 has been utilized which consists of around 5,500 households covering more than 10,000 individuals each year. For the purpose of estimating the mobility coefficient, the sample is split into two sub-samples (the main and the supplement sample). In the main sample, respondents (both sons and daughters) who were born between 1946 and 1974 and whose father's year of birth ranges from 1905 to 1945 are included. In addition, only the wage employed and the self employed people with positive earnings are considered as a candidate of the main sample and the sample is also restricted to the full timers. In order to control the problem of life cycle bias, those aged between 31 and 45 with fathers aged between 31 and 55 (when the respondent was 14 years old) are chosen. All of the individuals who satisfy such criteria are included as a potential candidate of the main

[6] In case of the two stage least square the standard errors are incorrect and in order to get correct standard error a bootstrapping procedure has been followed. As we use 2 separate samples for estimating the 1st and the 2nd stage regressions the bootstrapping is done in a way that the predicted values obtained in the 1st stage are explicitly taken into account while bootstrapping the 2nd stage estimates.

sample. The earnings as well as the age variable used in the analysis are the average of these variables over the panel. Finally in order to avoid repetition, in the final stage each individual is considered only once when they first appear in the panel.

For the supplement sample, a sample comprising of *synthetic* father of these children and considered and those men who were born between 1905 to 1945 in wave 1 (year 1991) of the BHPS are included. They are also restricted to the wage employed and the self employed with positive earnings.

In the *supplement sample* individual's (father's) socio-demographic characteristics (e.g. age, education) are observed and these characteristics can be utilized to construct their (synthetic father's) earnings. In the *main sample* there is information on the same socio-demographic characteristics of respondent's (children's) father and therefore the earnings of the father in the main sample can be predicted while combining information of father's earnings from the supplement sample and father's socio-demographic characteristics reported in the main sample.

While estimating father's earnings, father's age, age square, two cohort dummies (cohort 1 if born between 1905 and 1934, cohort 2 if date of birth falls within 1935 and 1945) and the interaction of cohort dummies with Hope-Goldthrope score are considered as explanatory variables. In addition, the interaction of cohort dummies with three dummies of educational qualifications (no education, mid education and high education) and interaction of the cohort dummies with the type of occupation (self employed, professional, skilled and unskilled) are incorporated.[7]

For estimating intergenerational mobility, father's earnings is considered as the key variable but children's age and age squared are also included. Depending on the specification additional dummy variable indicating immigration status and two broad

[7] No education is defined when individual never went to school or left school without any qualification; some education is referred when individual left school with some qualification or got further education but not high degree; high education is defined when he/she possess university/high degree. Professional occupations are those of (i) managers and senior officials and (ii) other professional occupations. Skilled jobs are those of (i) associate professionals and technical occupations, (ii) administrative and secretarial, (iii) skilled trade occupations, (iv) personal care/service occupations and (v) sales and customer services. The remaining categories of occupations, e.g. (i) process, plant and machine operatives and (ii) elementary occupations are considered as unskilled occupations.

ethnic backgrounds are considered. [8] In one of the formulation, detailed ethnic background and immigration status are used. [9]

The dependent variable, *earnings* is the monthly gross payment of wage, salary or self-employment income received on the month the survey is conducted. It is then deflated by the consumer price index and is expressed in 2005 pounds.

5. Empirical Analysis

5.1 Descriptive Statistics

In column 1 of Table 1, using the supplement sample father's characteristics is shown. In the next column (column 2) information of the main sample is utilized and father's characteristics as reported by children are presented. Column 3 depicts children's characteristics on the basis of the main sample.

According to column 3 of Table 1, the main sample has 3823 individuals with mean age of 38 years and around 5% of them are immigrants. The sample is overwhelmingly white (97%) with a small percentage of black, south Asian, mixed and other ethnic groups. Around half of the employed people of the sample are skilled and one-third of them (27%) work in professional occupations. According to the main sample, on average children earn around £1729 per month. This sample is used for estimating the intergenerational mobility equation.

The main sample is also utilized to predict father's earnings while using the child's report of his/her father's characteristics as instruments (column 2). The child's report of his/her father's HG score is around 47, very close to the actual HG score of 49 reported by the father himself. The child's report of the education level of his/her father is however quite different from that reported by the father. Similar discrepancies are also found in terms of occupational categorization and the child's report of his/her father's occupation suggests greater proportion in unskilled and lesser proportion in professional

[8] This classification is between whites and the remaining, i.e. non-whites (comprising of black, south Asian, Chinese, mixed and other ethnicities).
[9] The respondents are divided into eight broad categories: white, black, South Asian and other ethnic groups of indigenous people and the corresponding immigrant categories

occupation than those revealed by the father. For father's earnings, the predicted value based on the instruments reported by the child is £1560 which is lower than his actual earnings of £1624, found directly from the responses of the father.

Table 1: Descriptive Statistics

	(1)	(2)	(3)
	Father's Own Report of Characteristics	***Child's Report of Father's Characteristics***	***Child's Own Characteristics***
Relevant Sample	Supplement	Main	Main
No. of Observation/Person	935	3823	3823
Mean Monthly Earnings (£)	1624	1560	1729
Mean Age (year)	53.94		38.23
Mean Age when Son is 14		43.71	
Mean HG score	48.68	46.75	50.59
% of People without Education	35.98	46.01	8.86
% of People with Mid Level Education	33.51	46.56	40.34
% of People with High Education	30.50	7.44	50.80
% of People Self Employed	24.28	16.95	11.01
% of People Wage Employed			88.99
% of People Unemployed			
% of People Non-employed			
% of People Unskilled	19.16	27.30	12.99
% of People Skilled	34.58	38.25	48.23
% of People Professional	21.95	17.49	26.57
% of Immigrant	5.28	7.68	5.27
% of White	96.89		96.99
% of Non-white	3.11		3.01
% of White Native	93.94		93.47
% of White Immigrant	2.87		3.38
% of Non-white Native	0.64		1.13
% of Non-white Immigrant	2.43		1.89

5.2 Transition Matrix

In the context of intergenerational mobility, it is a common practice to use transition matrix which show the proportion of children reaching a particular status, given the status of their fathers. In this analysis, transition matrices of earnings for different ethnic/immigrants groups have been constructed to understand the differences in the relationship between fathers and children's earnings across these groups. In this context, earnings of both fathers (predicted) and children (actual) are categorized into three income-groups (low, middle and high) and the base-group (father's earnings) terciles are arranged in rows and the destination-group (children's earnings) terciles are classified in columns.

In Table 2 the transition matrix for natives and immigrants are shown. For natives, it indicates a rather symmetric distribution of earnings for children, given a specific status of their fathers. However, greater proportion of people tends to be accumulated in the diagonal and except for those with middle income fathers it is most probable that children will end up in the same tercile as their fathers. Table 2 reveals high chi-square value for natives, indicating high correlation between the distribution in rows and the distribution in columns.[10] The scenario is not so clear cut for immigrants though-for the low-income group there is a tendency of upward mobility and in 37% cases children with low-income fathers are expected to end up in middle-income group. For those with middle-income father, in 38% cases they are expected to experience upward mobility in earnings, which is in contrast with that of natives. For the high income group father's earnings tend to have important impact, which is similar to the pattern of the indigenous group as well. The low values of Pearson chi-square and likelihood-ratio chi-square also suggests greater generational mobility for immigrants.

Table 2: Transition Matrix for Natives and Immigrants

Father's Earnings Distribution (in rows)	Children's Earnings Distribution (in columns)		
	Bottom Tercile	Middle Tercile	Upper Tercile

[10] Pearson chi-square and likelihood ratio chi-square statistics compare expected frequencies under perfect mobility with the observed frequencies.

	Native	*Immigrant*	*Native*	*Immigrant*	*Native*	*Immigrant*
Bottom Tercile	39.18	38.78	33.51	36.73	27.32	24.49
Middle Tercile	37.07	35.29	34.78	26.47	28.15	38.24
Upper Tercile	23.74	32	30.45	30	45.81	38
Natives: Pearson chi2(4) = 85.1435 Pr = 0.000 ; likelihood-ratio chi2(4) = 84.7408 Pr = 0.000 Immigrants: Pearson chi2(4) = 2.7863 Pr = 0.594 ; likelihood-ratio chi2(4) = 2.8622 Pr = 0.581						

Table 3 shows transition matrices for white and non-white groups. The matrix of whites is very similar to that of natives. For non-whites although children of rich non-whites are more likely to be rich, the transition matrix reflects upward mobility for those with low and middle income fathers. Table 3 shows that, the non-white child of a poor non-white father is likely to improve his/her status and attain higher position in earnings distribution. For the middle income group such upward mobility appears even stronger and in half of the cases, children of middle income non whites are expected to climb one step up to the ladder.

Table 3: Transition Matrix for Whites and Non-whites

Father's Earnings Distribution (in rows)	Children's Earnings Distribution (in columns)					
	Bottom Tercile		Middle Tercile		Upper Tercile	
	Whites	Non-whites	Whites	Non-whites	Whites	Non-whites
Bottom Tercile	40.12	34	33.7	36	26.17	30
Middle Tercile	36.61	16.67	35.66	33.33	27.73	50
Upper Tercile	23.89	28.57	30.70	23.81	45.40	47.62
Whites: Pearson chi2(4) = 96.5197 Pr = 0.000 ; likelihood-ratio chi2(4) = 95.8330 Pr = 0.000 Non-whites: Pearson chi2(4) = 4.0672 Pr = 0.397 ; likelihood-ratio chi2(4) = 4.2491 Pr = 0.373						

In order to analyze the transition matrices in detail, a multinomial logit regression analyzing five plausible cases of the relative position of a child in the earnings distribution is applied (Table 4).[11] [12] Given the fact that children of immigrants are

[11] Similar technique has been adopted by Mckay *et al.* (2005) in the context of poverty analysis.

[12] There could be five plausible cases in terms of father-children earnings correlation: (i) both the father and the child are in bottom tercile (outcome 1), (ii) both are in middle tercile (outcome 2), (iii) both are in

likely to be born in the UK, it is interesting to compare their relative position vis-`a-vis the position of the children of natives. Table 4 essentially analyzes whether father's ethnicity (or immigration status) affects the relative position of a child (irrespective of his/her own ethnicity/immigration status) in the earnings distribution to that of his/her father.[13] [14]

According to the first sets of results (father being an immigrant), *ceteris paribus*, if a child has an immigrant father, it is expected to reduce the probability of both being in the middle tercile of the distribution (Table 4). In addition, children of immigrants (as opposed to that of natives) have 8% higher probability to be in higher stages of the earnings distribution than that of their fathers. The second sets of results show that non-white fathers (in comparison to white fathers) have strong influence on the relative earnings of children and for all of the five cases fathers' ethnicity is found to play a significant role. Children of non-whites have 13% lower probability of ending up in a lower tercile than their fathers. On the contrary, if the father is a non-white it would increase the probability of the child to be in a higher tercile (than his/her father) by 13%. In comparison to a white father-child pair, there is lower probability for the non-white father-child to be placed together in the middle or higher tercile of distribution. However, in the bottom tercile, there is high intergenerational correlation and the child of a non-white poor father has 12% greater probability to end up as poor as well, indicating asymmetric correlation between non-white father-child pair depending on the position of the father in earnings distribution.

upper tercile (outcome 3), (iv) the father is in higher tercile than the child (outcome 4) and (v) the child is in higher tercile than the father (outcome 5).

[13] In the BHPS, there is information on father's place of birth but no information is available for father's ethnic origin. Therefore, we consider father to have the same ethnic origin of child. Except for those of mixed ethnicity, this is a reasonable assumption to make.

[14] The regression includes age, age squared, gender dummy and two education dummies. In addition it includes a dummy variable of father being immigrant (and/or father being non-white) as additional covariate.

Table 4: Multinomial Logit Analysis of Relative Earnings (Marginal effects of respective outcomes)

	Father is Immigrant (irrespective of ethnicity)					*Father is Non-white (irrespective of immigration status)*				
	(outcome1)	(outcome2)	(outcome3)	(outcome4)	(outcome5)	(outcome1)	(outcome2)	(outcome3)	(outcome4)	(outcome5)
Age	0.046	-0.036	-0.024	0.059	-0.045	0.048*	-0.037	-0.026	0.057	-0.043
	(1.641)	(-1.195)	(-0.959)	(1.368)	(-1.046)	(1.709)	(-1.216)	(-1.020)	(1.326)	(-0.990)
Age square	-0.001	0.000	0.000	-0.001	0.001	-0.001*	0.000	0.000	-0.001	0.001
	(-1.598)	(1.152)	(0.920)	(-1.291)	(0.984)	(-1.666)	(1.170)	(0.975)	(-1.251)	(0.937)
Male	-0.107***	0.067***	0.071***	-0.245***	0.215***	-0.108***	0.068***	0.072***	-0.244***	0.212***
	(-8.034)	(5.010)	(6.096)	(-13.03)	(11.59)	(-8.059)	(5.092)	(6.157)	(-12.95)	(11.41)
Higher education	-0.210***	0.033	0.366***	-0.232***	0.043	-0.215***	0.033	0.367***	-0.228***	0.043
	(-9.379)	(1.108)	(4.905)	(-6.264)	(0.937)	(-9.549)	(1.099)	(4.918)	(-6.162)	(0.936)
Mid education	-0.088***	0.054	0.207**	-0.157***	-0.016	-0.088***	0.054	0.206**	-0.157***	-0.016
	(-4.660)	(1.405)	(2.111)	(-3.672)	(-0.307)	(-4.685)	(1.397)	(2.109)	(-3.669)	(-0.295)
Father immigrant	-0.019	-0.049**	-0.007	-0.007	0.082**					
	(-0.812)	(-2.158)	(-0.352)	(-0.182)	(2.113)					
Father non-white						0.119**	-0.065**	-0.057***	-0.132***	0.134**
						(2.271)	(-2.281)	(-2.830)	(-2.806)	(2.309)
Observations	2553	2553	2553	2553	2553	2553	2553	2553	2553	2553

*** p<0.01, ** p<0.05, * p<0.1; z statistics in parentheses

5.3 Estimation of the Mobility Coefficient

The following table (Table 5) summarizes the main results of the estimation of intergenerational mobility coefficient. In Appendix A the 1st stage regression results of fathers' earnings equation is shown.

In column 1 of Table 5 the 2nd stage model including immigration dummy as the relevant covariate is shown. According to the estimates, for natives fathers' earnings have a strong positive impact on children's earnings profile and the mobility co-efficient is 0.34 which is consistent with other studies of the UK. The mobility coefficient for immigrants is different from natives and is as low as 0.13. Therefore although father's earnings could explain around one-third of earnings for indigenous people, for immigrants it does not seem to play important role. This finding is also consistent with the transition matrix which fails to establish any strong linkage between the earnings of immigrant fathers and their offspring. Therefore offspring of poor immigrants are expected to be able to encompass their background and to perform better than their in terms of earnings. Based on the theoretical model several possible explanations of the mobility coefficient of immigrants could be considered: (i) immigrant fathers might have low weight to the investment in children (γ) resulting in low intergenerational correlation, (ii) even with the same level of investment as that of natives, immigrant children might have lesser return to education (r), (iii) if the labour market is equitable and discrimination free and education is transferable for then we would find low generational correlation, and (iv) if the cultural/ethnic effect that could have negatively influenced the earnings capacity of immigrant fathers fades away for children we might observe low correlation of endowment (λ) and therefore low beta coefficient. This low mobility coefficient of immigrants although not supported by the studies done in the US (Borjas, 1993; Card *et al.* 1998) it is consistent with the findings of Aydemir *et al.* (2006) who found low value of intergenerational correlation for Canadian immigrants.

For natives, fathers-daughters intergenerational correlation appears to be stronger than for fathers-sons pairs although both are statistically significant and quite close in terms of magnitude (column 2 and column 3). The result for immigrants again shows insignificant and weak effect of fathers' earnings for both sons and daughters.

As shown in Column 4, for ethnic-minorities (non-whites), fathers' earnings have lesser effect on children's earnings (mobility coefficient is only 0.08) implying high earnings mobility for non-whites, in comparison to whites. Therefore, fathers' earnings is virtually immaterial for non-whites and such a finding is consistent with the transition matrix analysis as well. The case of non-whites can be considered as either that of 1st generation non-white immigrants or of non-white natives. In the former case, their low mobility coefficient can be explained in the similar manner to that of immigrants (column 1). Alternatively if they are non-white natives (born in the UK), they could be considered as 2nd or higher generation immigrants and for this group, greater assimilation to the host country (in comparison to their parents), better transferability of education and skill to the job market might especially act behind their low generational correlation of earnings.

Column 5 extends the results by classifying the non-whites into three categories: black, South Asian and other ethnic groups (mixed, Chinese and remaining ethnicities). Although the small sample sizes constrain us from making any strong inference, the result of this model provides further evidence in support of previous estimates. In comparison to white natives, most of the groups (except other natives) have low intergenerational correlation with blacks and South Asians (both natives and immigrants) having almost no correlation with their fathers' earnings. Among the immigrants, it is other ethnic groups (beta coefficient is 0.15) along with whites (0.19) who have some degree of intergenerational correlation, which is however much smaller in magnitude in comparison to white natives. However due to smaller sample size most of the immigrant/ethnicity dummies has come as insignificant, therefore the results of this model should be interpreted with caution.

Table 7: Estimation Results

	(1)	(2)	(3)	(4)	(5)
	Main Model	***Male***	***Female***	***Non-white***	***Detailed ethnic grouping***
Age	-0.067	-0.063	-0.053	-0.057	-0.068
	(1.11)	(0.77)	(0.58)	(0.90)	(1.11)
Age square	0.001	0.001	0.000	0.001	0.001
	(0.88)	(0.71)	(0.34)	(0.71)	(0.89)
Immigrant	1.630	1.569	1.943		
	(1.73)*	(1.26)	(1.35)		
Non-white				1.983	
				(1.93)*	
Male	0.389			0.381	0.390
	(21.02)***			(21.50)***	(20.81)***
LnEarning_Father	**0.343**	**0.330**	**0.362**	**0.351**	**0.350**
	(5.93)***	(5.78)***	(4.88)***	(7.37)***	(5.85)***
LnEarning_Father*Immigrant	-0.217	-0.214	-0.255		
	(1.69)*	(1.25)	(1.30)		
LnEarning_Father*Non-white				-0.265	
				(1.84)*	
White Immigrarnt					1.165
					(0.76)
Black Immigrant					6.370
					(0.31)
SouthAsian Immigrant					-0.549
					(0.04)
Other Immigrant					5.603
					(1.37)
Black					4.789
					(1.23)
South Asian					2.690
					(0.22)
Other ethnicity					-4.031
					(1.25)
lnEarning_Father*WhiteImmigrant					-0.156
					(0.76)
lnEarning_Father*BlackImmigrant					-0.857

					(0.30)
lnEarning_Father*SAsianImmigrant					0.078
					(0.04)
lnEarning_Father*OtherImmigrant					-0.788
					(1.35)
LnEarning_Father*Black					-0.651
					(1.16)
LnEarning_Father*SouthAsian					-0.371
					(0.21)
LnEarning_Father*Other ethnicity					0.588
					(1.28)
Constant	6.162	6.398	5.936	5.884	6.118
	(4.99)***	(4.09)***	(3.24)***	(4.82)***	(4.93)***
Observations	2469	1339	1130	2580	2469
R-squared	0.194	0.055	0.089	0.192	0.198

6. Conclusion

Given the fact that immigrants/minorities are likely to have differences in preference pattern and socio-economic structure, in comparison to natives/whites they could have greater/lesser earnings mobility as well. In addition, in terms of generational mobility across countries, the empirical evidences thus far have provided interesting divergences with Canada and Nordic countries having lower intergenerational correlation of earnings whereas the US and the UK are considered to be countries with lower social mobility. In this backdrop, it is interesting to analyze if the immigrants/ethnic minorities in the UK show similar generational mobility to that of the indigenous/white people or there are differences due to country of birth/ethnicity per se.

In this analysis, intergenerational earnings mobility of immigrants and non-whites in the UK has been examined. For this purpose, the British Household Panel Survey (BHPS) from 1991 to 2005 is utilized and two sample two stage least squares method is applied. The estimation result suggests high intergenerational correlation of earnings for the indigenous people with a mobility coefficient of 0.34. In comparison to the existing literature, this estimate although in a lower range, is consistent in its magnitude and provides additional evidence in support of low intergenerational mobility in the UK. The mobility coefficient for immigrants on the other hand is found to be 0.13, indicating greater generational mobility of immigrants in comparison to their native peers. In terms of ethnicity, father's earnings can explain only 9% of a non-white child's earnings. Low generational correlation of immigrants as suggested by this analysis contradicts to the strong positive association of father and child's earnings as found in the literature of the US. It is however consistent with that of Canada, as the existing literature on Canada suggests high intergenerational mobility of immigrants.[15] Therefore, this analysis indicates that, on an average although there is lesser earnings mobility in the UK, ethnic minorities and immigrants experience greater mobility in terms of earnings.

[15] Borjas (1993), for the US found strong positive association between the 1st and 2nd generation immigrants whereas Card *et al.* (2000) found an intergenerational elasticity of 0.5-0.6, which is no lower than that of the US population as a whole. Aydemir *et al.* (2006) found the immigrants of Canada having intergenerational elasticity of 0.18.

The transition matrices also support the regression analysis: compared to their native counterparts, immigrants appear to have asymmetric distribution, indicating lesser correlation of father-child earnings. The earnings distribution of non-whites as opposed to whites shows strong upward mobility. The multinomial logit analysis on the basis of transition matrix suggests significant effect of father's ethnicity/immigration status on intergenerational correlation of earnings. Children of immigrants (in comparison to that of natives) have 8% higher probability to experience upward mobility in earnings where the corresponding figure for non-whites is 13%. Having a non-white father also reduces the probability of downward mobility. However children with poor non-white fathers are expected to have greater probability to remain poor as well. Therefore for immigrants although the findings suggest optimistic scenario with greater probability of upward mobility, depending on the position of fathers on earnings distribution, children of non-whites might either experience upward mobility or could be trapped into lower stages of distribution in their adulthood.

Appendix: Estimation Results of 1st Stage Regression (Father's Earnings)

Variable	*Coefficient**
Dependent variable	LnEarnings
Age	0.181
	(3.69)***
Age square	-0.002
	(4.66)***
Immigrant	0.124
	(0.97)
Non White	-0.257
	(1.59)
Cohort_2	1.082
	(1.53)
HGS*Cohort1	0.823
	(5.76)***
HGS*Cohort2	0.597
	(5.17)***
Professional*Cohort1	0.526
	(4.16)***
Professional*Cohort2	0.310
	(3.60)***
Skilled*Cohort1	0.421
	(4.27)***
Skilled*Cohort2	0.152
	(2.04)**
Unskilled*Cohort1	0.656
	(5.14)***
Unskilled*Cohort2	0.257
	(2.58)***
MidEducation*Cohort1	0.022
	(0.24)
MidEducation*Cohort2	-0.040
	(0.56)
HighEducation*Cohort1	0.217
	(1.93)*
HighEducation*Cohort2	0.149
	(1.93)*
Constant	-0.382
	(0.25)
Observations	866
R-squared	0.323

*t-statistics are in parenthesis.

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