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ETHNIC CAPITAL AND INTERGENERATIONAL MOBILITY

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ABSTRACT

This paper analyzes the extent to which ethnic skill differentials are transmitted across generations. I assume that ethnicity acts as an externality in the human capital accumulation process. The skills of the next generation depend on parental inputs and on the quality of the ethnic environment in which parents make their investments, or "ethnic capital." The empirical evidence reveals that the skills of today's generation depend not only on the skills of their parents, but also on the average skills of the ethnic group in the parent's generation.

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ETHNIC CAPITAL AND INTERGENERATIONAL MOBILITY

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I. Introduction

The notion that social, cultural, and economic differences between immigrants and natives fade over the course of a few generations is the essence of the assimilation hypothesis.[1] For many years, it was generally believed that the melting-pot metaphor correctly described important aspects of the ethnic experience in the United States. Over time, the children and grandchildren of immigrants moved out of ethnic enclaves, discarded their social and cultural background, and experienced economic mobility. After a few generations, the American-born descendants of the immigrants became indistinguishable from the native population.

Recent sociological and historical research rejects the hypothesis that full assimilation is an unavoidable outcome of the ethnic experience. As Glazer and Moynihan [1963, p. xcvii] conclude in their classic study Beyond the Melting Pot: "The point about the melting pot...is that it did not happen...The American ethos is nowhere better perceived than in the disinclination of the third and fourth generation of newcomers to blend into a standard, uniform national type." Current research in this literature [Perlmann, 1988; Steinberg, 1989] stresses the fact that the United States remains a multicultural, pluralistic society and cites as evidence the social, cultural, and economic differences that exist and persist among ethnic groups. For instance, Farley [1990] reports that in 1980 U.S.-born workers of Hungarian or Austrian origin earn about 20 percent more than workers of English or Canadian origin, who in turn earn about 20 percent

more than workers of Mexican or Puerto Rican origin.[2]

This paper presents a theoretical and empirical analysis of the extent to which these ethnic differences in skills and earnings are transmitted across generations.[3] The operational hypothesis of the study is that ethnicity acts as an externality in the human capital accumulation process. In particular, the skills of the next generation depend not only on parental inputs, but also on the average quality of the ethnic environment in which parents make their investments, or "ethnic capital." The introduction of ethnic capital into an economic model of intergenerational mobility has one important implication: If the external effect of ethnicity is sufficiently strong, ethnic differences in skills observed in this generation are likely to persist for many generations (and may never disappear).

The empirical analysis uses the General Social Surveys and the National Longitudinal Surveys of Youth. The main insight provided by the evidence is that ethnic capital, as measured by the average skill level of the ethnic group in the father's generation, plays a crucial role in intergenerational mobility, and slows down the convergence in the average skills of ethnic groups across generations. Put differently, the data reveal that the intergenerational progress of workers belonging to ethnic groups that have relatively low levels of human capital is retarded by the low average quality of the group. The empirical evidence also indicates that the role played by ethnic capital in intergenerational mobility partly explains the slow rates of economic progress experienced by blacks.

II. Theory

I assume that the link between the skills of parents and children arises because parents invest in the human capital of their children. Obviously, there are many alternative ways of motivating the link in skills across generations. Though it abstracts from many of these considerations, the approach followed here leads to an empirically useful understanding of the role played by ethnicity in intergenerational mobility.

To focus the analysis, I consider a one-person household in generation t. This person has a human capital stock k_t which can be sold to the marketplace at constant price R, or which can be used in the production of the human capital of his children. I assume that workers do not invest in their own human capital, so that the human capital stock of workers in generation t+1 is completely determined by the actions of generation t.

I also assume that the household has only one child. A more general model would allow the household to choose both the quality and quantity of children [Becker and Lewis, 1973]. Although this assumption can be easily relaxed, the substantive implications of the model are unaffected (and, because of data constraints, the interaction between child quality, child quantity and intergenerational mobility cannot be fully explored in the empirical analysis presented below).

The parent has a CES utility function defined over the child's quality, which is given by the human capital stock of the child, k_{t+1}, and own consumption C_t.

$$(1) \qquad U = U(k_{t+1}, C_t) = [\delta_1 k_{t+1}^{\rho} + \delta_2 C_t^{\rho}]^{1/\rho} ,$$

where $\rho < 1$, and $\sigma = 1/(1-\rho)$ is the elasticity of substitution between consumption and child quality.[4]

As noted above, the parent can either sell his human capital to the marketplace or devote a fraction s_t of his time to the production of the child's human capital. Setting the price of C_t as the numeraire implies that

$$R(1-s_t)k_t = C_t. \tag{2}$$

Up to this point, I have not addressed the role played by ethnicity in the maximization problem. I assume that the average human capital stock of the ethnic group, $\bar{k}_t$, which I call ethnic capital, acts as an externality in the production of the human capital of children. The production function for child quality is then given by

$$k_{t+1} = \beta_0 \ (s_t k_t)^{\beta_1} \ \bar{k}_t^{\beta_2}. \tag{3}$$

Both β_1 and β_2 are assumed to be less than one. It will be seen below that the value of the sum $\beta_1+\beta_2$ determines if skill differentials across ethnic groups converge over time.

The production function has three important properties. First, the specification uses the neutrality assumption introduced by Ben-Porath (1967) in his analysis of human capital accumulation over the life cycle. In equation (3), $s_t k_t$ is the effective amount of the parent's human capital stock that is devoted to children.

Second, and more important, the production function incorporates the

assumption that the average human capital of the ethnic group has an external effect on the production process. As a result, the child's quality depends not only on parental inputs, but also on the average quality of the ethnic environment in which the child is raised (which I assume to be exogenous). Persons who grow up in high-quality ethnic environments will, on average, be exposed to social, cultural, and economic factors that increase their productivity when they grow up, and the larger or more frequent the amount of this exposure the higher the resulting quality of the worker (for a given level of parental inputs). There are precedents for introducing ethnic capital into the production process in both the economics and sociology literatures.

The literature on the "new" economic growth is motivated by the hypothesis that human capital has external effects on production. The important work of Lucas [1988] uses an aggregate production function similar to (3), and reveals that these externalities provide substantive insights into the process of economic development. A key implication of this approach, which will reappear in a different guise below, is that some countries may remain poor, while others grow richer.[5]

Equation (3) also has strong antecedents in sociology. For instance, Coleman (1988) stresses the concept of "social capital." In Coleman's view, the culture in which the individual is raised, which can be thought of as a form of human capital common to all members of that group, alters his opportunity set, and has significant effects on behavior, human capital formation, and labor market outcomes.[6]

Finally, note that equation (3) implies that parental time and ethnic capital are complements in the production of child quality. A given level

of parental inputs is more productive in environments with higher-quality ethnic capital. This complementarity in production underlies many of the results discussed below.

The maximization of (1) subject to the budget constraint and the technology generates the household's supply function for time allocated to investing in the human capital of children:

$$s_t = s(k_t, \bar{k}_t). \tag{4}$$

It is easy to show that the elasticities of s_t with respect to k_t and $\bar{k}_t$ are

$$\frac{\partial \log s_t}{\partial \log k_t} = \frac{\rho(\beta_1 - 1)(1-s_t)}{(1-s_t)(1-\rho\beta_1) + s_t(1-\rho)}, \tag{5a}$$

$$\frac{\partial \log s_t}{\partial \log \bar{k}_t} = \frac{\rho\beta_2(1-s_t)}{(1-s_t)(1-\rho\beta_1) + s_t(1-\rho)}. \tag{5b}$$

In general, utility maximization does not lead to unambiguous predictions about how the fraction of time devoted to investments in children varies with either the parental human capital stock or ethnic capital. The first ambiguity arises because increases in k_t generate both income and substitution effects, and these effects work in opposite directions. In particular, an increase in k_t increases the demand for child quality (because of the income effect), but also makes child quality more expensive. It is evident from (5a) that parental time decreases with k_t when the

elasticity of substitution between consumption and child quality is greater than one ($\rho > 0$), and increases otherwise. The easier it is to substitute between child quality and own consumption, the more likely that the substitution effect of an increase in k_t dominates and parental time declines. In the special case of a Cobb-Douglas utility function ($\rho = 0$), the fraction of time allocated to the production of human capital is independent of the human capital stock of parents.

The variable s_t also varies with respect to the amount of ethnic capital. Changes in $\bar{k}_t$ only alter the shape of the utility function (because ethnic capital does not enter the budget constraint). Equation (5b) indicates that s_t and ethnic capital are positively correlated as long as the elasticity of substitution between consumption and child quality is greater than unity. Intuitively, as long as C_t and k_{t+1} are easily substitutable, the household takes advantage of the complementarity in production between the parent's human capital and ethnic capital by devoting more time to their children in advantageous ethnic environments.

Despite the fact that the time devoted by parents to human capital investments in their children depends ambiguously on both parental human capital and on ethnic capital, the relationship between child quality and these variables is unambiguous. In particular, the reduced-form equation determining the human capital stock of children is

$$(6) \qquad k_{t+1} = \beta_0 \, s(k_t, \bar{k}_t)^{\beta_1} \, k_t^{\beta_1} \, \bar{k}_t^{\beta_2} \, .$$

In effect, (6) describes the process of intergenerational income mobility (in the absence of stochastic shocks). It is easy to show that

$$\text{(7a)} \qquad \frac{\partial \log k_{t+1}}{\partial \log k_t} = \frac{\beta_1(1-\rho)}{(1-s_t)(1-\rho\beta_1) + s_t(1-\rho)} ,$$

$$\text{(7b)} \qquad \frac{\partial \log k_{t+1}}{\partial \log \bar{k}_t} = \frac{\beta_2(1-\rho s_t)}{(1-s_t)(1-\rho\beta_1) + s_t(1-\rho)} .$$

There is a positive relationship between child quality and both parental human capital and ethnic capital regardless of the value of the elasticity of substitution between own-consumption and child quality.

To analyze the evolution of the human capital stock across generations for a particular ethnic group, and hence to determine if the dispersion in human capital across ethnic groups narrows over time, it is useful to consider the special case where all parents in the ethnic group have the same human capital, so that $k_t = \bar{k}_t$. An increase in $\bar{k}_t$, therefore, implies that both parental capital and ethnic capital increase by the same amount. The elasticity of (average) child quality with respect to $\bar{k}_t$ is

$$\text{(8)} \qquad \eta = \frac{\partial \log \bar{k}_{t+1}}{\partial \log \bar{k}_t} = \frac{\beta_1(1-\rho) + \beta_2(1-\rho s_t)}{(1-s_t)(1-\rho\beta_1) + s_t(1-\rho)} .$$

The average human capital stock of different ethnic groups will converge or diverge across generations depending on whether η is less than or greater than one. Using (8) it follows that

$$\text{(9)} \qquad \eta \begin{cases} < 1, \text{ if } \beta_1+\beta_2 < 1, \\ = 1, \text{ if } \beta_1+\beta_2 = 1, \\ > 1, \text{ if } \beta_1+\beta_2 > 1. \end{cases}$$

If the externality introduced by ethnic capital leads to constant returns in the production function, the relative dispersion that exists in human capital among ethnic groups in the parent's generation will persist indefinitely. As in the new literature on economic growth, sufficiently strong externalities can generate human capital growth paths where relative differences in skills among ethnic groups do not change over time.[7] If the human capital externality, however, is not sufficiently strong to achieve constant returns to scale, the sum $\beta_1+\beta_2$ is less than unity and ethnic differences in human capital will eventually disappear. Nevertheless, a key insight of the model is that the external effects of ethnic capital may greatly retard the process of convergence. In other words, relatively high values of β_2 slow down the regression towards the mean in skills across generations. In the end, the question of how fast the average skills of ethnic groups converge over time can only be resolved by empirical analysis.

III. Empirical Framework and Data

The econometric model typically used to assess the extent of inter-generational income mobility is given by[8]

$$(10) \qquad y_{ij}(t) = \tau + \delta\, y_{ij}(t\text{-}1) + \epsilon_{ij}(t),$$

where $y_{ij}(t)$ represents the (log) earnings of person i in ethnic group j in generation t; and $y_{ij}(t\text{-}1)$ represents the (log) earnings of his father. The parameter δ is an inverse measure of the extent of regression towards the mean across generations. Many empirical studies have found that δ lies between 0.2 and 0.3, although recent research [Solon, 1990; Zimmerman, 1990]

suggests that measurement error leads to a substantial downward bias on the magnitude of the estimated parameter (and hence the estimation of (10) overstates the extent of regression towards the mean).

To the extent that ethnic capital plays an important role in determining the quality of children, equation (10) misspecifies the intergenerational mobility process. In particular, it ignores the presence of ethnic fixed effects that get partially transmitted across generations. A general specification of the ethnic fixed effects can be written as

$$(11) \qquad y_{ij}(t) = \gamma_1 \, y_{ij}(t\text{-}1) + \sum_j \omega_j(t) \, C_{ij} + \epsilon_{ij}(t),$$

where C_{ij} is a dummy variable indicating if individual i is a member of ethnic group j; and the disturbance $\epsilon_{ij}(t)$ is i.i.d. with mean zero and variance σ_ϵ^2. The theoretical model presented above suggests a particular representation for the fixed effects in the vector ω. In particular, they depend on $\bar{y}_j(t\text{-}1)$, the average (log) earnings of the ethnic group in the parent's generation. This implies

$$(12) \qquad \omega_j(t) = \gamma_0 + \gamma_2 \, \bar{y}_j(t\text{-}1) + v_j(t),$$

where $v_j(t)$ is i.i.d. with mean zero and variance σ_v^2. The reduced-form equation summarizing the impact of parental earnings and ethnic capital on child quality is obtained by substituting equation (12) into (11). Hence

$$(13) \qquad y_{ij}(t) = \gamma_0 + \gamma_1 \, y_{ij}(t\text{-}1) + \gamma_2 \, \bar{y}_j(t\text{-}1) + \xi_{ij}(t),$$

where $\xi_{ij}(t) = \epsilon_{ij}(t) + v_j(t)$. I assume that the random variables ϵ and v are uncorrelated. Note that because $E(\xi_{ij}(t))(\xi_{i'j'}(t))^2 = \sigma_v^2$ for $i \neq i'$, $j=j'$, the disturbance ξ has the stochastic structure of a random effects model, and equation (13) will be estimated using generalized least squares.[9]

An important implication of equation (13) is that the transmission parameter describing how the mean skills of the ethnic group evolve across generations is given by the sum of coefficients $\gamma_1+\gamma_2$. In particular, $(\gamma_1+\gamma_2)\cdot\bar{y}_j(t-1)$ gives the expected earnings of the offspring of the average father in a particular ethnic group (abstracting from the constant term).

It is of interest to note that as long as ethnic capital plays a key role in the intergenerational transmission of skills, the linkage across generations (as measured by $\gamma_1+\gamma_2$) may be substantially underestimated by the coefficient estimated from regressions that ignore the importance of ethnic capital. The expected value of the least-squares estimator of δ in equation (10) is

$$(14) \qquad E(\hat{\delta}) = \gamma_1 + (1-\pi)\gamma_2 < \gamma_1 + \gamma_2,$$

where $\pi = [\sum_j \sum_i (y_{ij}(t-1)-\bar{y}_j(t-1))^2]/\mathrm{Var}(y_{ij}(t-1))$, and is the fraction of the variance of earnings that is explained by variation within ethnic groups (the within-variance). Because most earnings variation in the population is likely to be within groups (rather than across ethnic groups), π is probably large, and the OLS regression of children's earnings on parental earnings may greatly underestimate the intensity of the true linkage in earnings across generations (even in the absence of measurement errors).

The empirical analysis will be conducted on two data sets: The General

Social Surveys (GSS) and the National Longitudinal Surveys of Youth (NLSY). The GSS is a series of cross-sections that have been collected annually since 1972 (except for 1979 and 1981) by the National Opinion Research Center.[10] Each cross-section contains over 1000 observations, and respondents are asked about their demographic background, political attitudes, and labor market outcomes. Beginning in 1977, each cross-section provides information on the respondent's ethnic background, as well as information on whether the respondent, the respondent's parents and the respondent's grandparents were born in the United States. In addition, these waves of the GSS contain information on the respondent's educational attainment and occupation as well as on the educational attainment and occupation of his parents.

The empirical analysis presented below pools persons aged 18-64 from the 1977-1989 waves, and focuses on the study of intergenerational mobility in educational attainment and in occupation, where the occupation measure is the Hodge-Siegel-Rossi prestige score [Siegel, 1971]. This prestige score, which resembles the more commonly used Duncan score, is highly correlated with average income in the occupation: the correlation between the prestige score and average earnings was about 0.6. As a way of assessing the cardinal interpretation of the prestige score, I note that a regression of log earnings on the score indicated that a one-point increase in the index increases earnings by 2.4 percent.[11]

The GSS does not contain specific information on the place of birth of the individual's parents or grandparents (other than whether they were born in the United States), so that it is not possible to ascertain the exact national origin of the person. The person's ethnicity, therefore, is

obtained from the individual's response to a question that asks "from what countries or part of the world did your ancestors come?" Although most persons in the sample gave only one response to the question, some gave multiple responses. In these cases, I use the main ethnic background (as identified by the respondent).[12] Persons who have missing data on the ethnicity question or on the other variables used in the analysis are omitted from the study.

The more widely used NLSY contains information similar to that available in the GSS. The main difference between the data sets is that respondents in the NLSY are aged 14-24 at the time of the initial survey (in 1979). The data contain information about the father's (and mother's) educational attainment and the father's occupation.

Using the NLSY data, I will analyze intergenerational mobility in two variables: education and wages. I use the 1987 wave of the NLSY to measure the respondent's education and hourly wage rate (by that time the respondents are 22-32 and only 8 percent of the sample is still enrolled in school). The father's wage is obtained by matching the father's occupation code with average earnings for the occupation obtained from the 1970 Census.[13] I experimented with alternative specifications (such as using an occupational prestige score), with little change in the results.

The NLSY asks respondents "What is your origin or descent?" Hence the self-reported ethnic background variable greatly resembles that available in the GSS, except that the NLSY reports many fewer ethnic groups because more aggregation takes place in the coding.[14] The NLSY, however, permits a separate identification of ethnicity because it reports the specific birthplace of both the father and the mother. For second-generation

Americans, there is a high degree of consistency between parental birthplace and self-reported ethnicity. In particular, the NLSY data indicate that if both of the respondent's parents are foreign-born, both parents were born in the same country of origin over 90 percent of the time, and the self-reported ethnicity almost always coincides with the parent's birthplace. Among respondents who only have one foreign-born parent, respondents tended to report the national origin of the foreign-born parent as their ethnic background. As with the GSS, persons who did not report an ethnic origin or who have missing data for the other variables used in the study are omitted from the study.

Throughout the analysis, therefore, I categorize individuals into ethnic groups according to their self-reported ethnic identification. To the extent possible (i.e., for the children of immigrants in the NLSY), I conducted a parallel empirical analysis based on the national origin of the parents, and obtained results similar to those presented below. Further, in both data sets I focus on the link between the respondent's skills (as measured by education, wage rates, or occupation) and those of the father's.[15] The empirical definition of ethnic capital is then given by the mean of the specific skill variable evaluated within the ethnic group in the father's generation.[16] Third, to focus on intergenerational mobility that is not contaminated by comparisons of U.S. residents with parents who resided permanently in the source countries, the empirical study is restricted to persons born in the United States. Finally, to focus on the transmission of ethnicity across generations, I exclude blacks and native Americans (i.e., American Indians) from the study.[17] I will discuss the empirical relevance of the ethnic capital hypothesis to the study of black

intergenerational mobility below.

Tables I and II report summary characteristics for the variables under analysis for both fathers and children in the GSS and the NLSY data, by ethnic group.[18] A number of findings are immediately apparent. First, the GSS reveals substantial improvement in educational attainment across generations, but little change in the occupational prestige score. The parents of GSS respondents have about 2.5 years fewer schooling than their children, but only about 1 point less in the occupational score (which would translate to about a 2.4 percent increase in earnings). The NLSY also indicates a substantial increase in schooling across generations (of about 1.5 years). Unfortunately, because the father's log wage is obtained by matching the father's occupation to the average earnings in the occupation, and because of the skewed age distribution in the NLSY, it is difficult to ascertain the change in the log wage across generations.

A second finding evident in both the GSS and the NLSY is the huge dispersion in educational attainment, occupational prestige scores, and wages across ethnic groups.[19] In the GSS, for instance, some ethnic groups (such as persons whose ancestors originated in Denmark, Japan, Russia, and Switzerland) have over 14 years of schooling, while others (such as those who originated in Mexico) have 11 years, those from Puerto Rico have 12.1 years, and those who originated in the Netherlands have 12.4 years. The occupational prestige scores show equally wide dispersion, with scores ranging from 36 to about 50 among national origin groups, which imply wage differentials of well over 25 percent across the groups. The NLSY shows equally strong dispersion in both educational attainment and log earnings across national origin groups. The educational attainment of Puerto Ricans

or Portuguese workers is about 12 years, while the educational attainment of Germans is 13.3 and that of Russians is 14.7.

In sum, the raw data indicate a substantial improvement in educational attainment across generations, but they also reveal sizable dispersion in skills among ethnic groups for both parents and children. It is evident that the ethnic skill differentials found in the parent's generation do not disappear in one generation. The central question that remains, therefore, is to determine the extent to which the intergenerational transmission of skills preserves the ethnic differences or leads to a convergence in the skills of ethnic groups over time.

IV. Empirical Results

Table III presents the coefficients estimated from regressions of children's characteristics on the characteristics of the parents.[20] Consider initially the results using educational attainment in the GSS. Column (1) indicates that when the educational attainment of the children is regressed on the educational attainment of the parents, the transmission coefficient is 0.27, which is quite similar to those usually reported in the literature. Note further that controlling for ethnic fixed effects in column (2) has little impact on the estimated coefficient: the transmission parameter declines from 0.27 to 0.25. Nevertheless, the change in the explanatory power of the regression model associated with including the vector of fixed effects is highly significant at conventional levels (R^2 increases from 0.18 to 0.20 and the associated F-statistic is 6.0; the critical value is only 1.4).

In column (3), I include the ethnic capital variable in the regression.

Several findings are worth noting. First, ethnic capital has a positive and significant impact on the educational attainment of respondents in the GSS, holding constant the father's educational attainment. A one-year increase in the average schooling level of an ethnic group increases the average schooling of the next generation by about 0.2 years.

Second, the coefficients of the ethnic capital and the parental education variables have roughly similar magnitudes (and the difference is not statistically significant). In a sense, ethnic capital plays as important a role as the father's human capital in determining the skills of the next generation.

Note also that the intergenerational transmission parameter describing how the mean educational attainment of the ethnic group changes over time is the sum of the coefficients of parental and ethnic capital, which in the education regression for the GSS is 0.48. This number is substantially larger than the 0.27 estimated in column (1) from a regression that ignores ethnic capital. As shown in equation (14), as long as most of the variance in earnings in the population is attributable to within-group differences, studies of intergenerational mobility that ignore ethnic capital greatly overstate the extent of regression towards the mean.

Finally, the fact that the transmission parameter is less than one implies that the external effects of ethnic capital are not sufficiently strong to generate constant or increasing returns in the production of human capital.[21] Nevertheless, the significant role played by ethnic capital in the intergenerational transmission process delays the economic convergence of ethnic groups across generations.

Although the GSS does not contain information on parental income, it

does report the occupation of parents and of GSS respondents, as measured by the Hodge-Siegel-Rossi prestige score. The regression coefficients reported in Table III indicate a strong link in occupational attainment between parents and children. The transmission coefficient in the prestige score is 0.2 when ethnic capital is ignored, and about 0.6 when ethnic capital is introduced. In fact, Table III suggests that ethnic capital may play an even greater role in the transmission of labor market success (as measured by occupational prestige) than parental capital.[22]

The bottom panel of Table III reports the regressions estimated in the NLSY. As with the GSS, there is an important link between the educational attainment and wages of parents and children, as well as a link between the skills of NLSY respondents and ethnic capital, though the ethnic capital coefficient is sometimes insignificant. Nevertheless, the comparison of the results obtained using the GSS and the NLSY is remarkable because, despite the difference in the age composition of the samples, the estimated transmission coefficients are similar. Once ethnic capital is taken into account, the NLSY data yield a transmission coefficient of 0.37 for educational attainment and 0.61 for log wages. The respective statistics in the GSS are 0.48 and 0.63. Both data sets, therefore, suggest that ethnic capital is a key determinant of labor market success among ethnic children.[23] As a result, there is substantial linkage in skills across generations.

It is important to note that these findings are not driven by "outlying" ethnic groups. The raw data reported in Tables I and II indicate that two Hispanic groups, Mexicans and Puerto Ricans, have much less human capital than other ethnic groups. Because a relatively small number of ethnic

groups underlies the empirical analysis, it could be argued that the results are greatly influenced by these outliers. This hypothesis, however, is incorrect. Table IV reports the parental and ethnic capital coefficients estimated in both the GSS and the NLSY after omitting Mexicans and Puerto Ricans from the sample. The ethnic capital coefficient remains positive and (usually) significant when these outlying groups are excluded. In the GSS, the intergenerational transmission coefficient (i.e., the sum of the parental and ethnic capital coefficients) is 0.52 for education and 0.62 for occupation. In the NLSY, it is 0.50 for education and 0.53 for wages.

In view of the social and policy implications of the findings, it is important to consider if the results reported in Tables III and IV could be attributed to a spurious correlation between ethnic capital and the skills of children. Such a correlation arises if parental skills are measured with error. To illustrate, suppose that the intergenerational mobility process is correctly described by the regression model

$$(15) \qquad y = \delta x + \epsilon,$$

where y gives the skill level of children; x gives the skill level of parents (and has variance σ_x^2); all variables are measured in deviations from the mean; and subscripts for individuals and ethnic groups are suppressed. The disturbance ϵ is i.i.d. and independent of x. Note that ethnic capital does not enter the "true" model.

Observed parental skills, x_1, are an imperfect measure of x. In particular, $x_1 = x + v_1$, where the random variable v_1 is i.i.d., with mean zero and variance σ_1^2. In addition, v_1 is independent of x and ϵ. It is

well known that the least-squares regression of y on x_1 provides an inconsistent estimate of the parameter δ and that

$$(16) \qquad \text{plim } \hat{\delta} = [\sigma_x^2/(\sigma_x^2 + \sigma_1^2)]\ \delta.$$

Suppose that a different measure of parental skills, x_2, is available, where x_2 gives the average skill level of parents in the ethnic group, or ethnic capital. By construction, $x_2 = x + v_2$, where v_2 is i.i.d., with mean zero, variance σ_2^2, and is independent of x, ϵ, and v_1.[24] In this notation, the regression model estimated in Table III is given by

$$(17) \qquad y = \theta_1 x_1 + \theta_2 x_2 + \epsilon'.$$

The least-squares estimators of the parameters in (17) have the following properties:

$$(18a) \qquad \text{plim } \hat{\theta}_1 = (\sigma_x^2\sigma_2^2/\Delta)\ \delta,$$

$$(18b) \qquad \text{plim } \hat{\theta}_2 = (\sigma_x^2\sigma_1^2/\Delta)\ \delta,$$

where $\Delta = \sigma_x^2\sigma_1^2 + \sigma_x^2\sigma_2^2 + \sigma_1^2\sigma_2^2$. Equations (18a) and (18b) indicate that the coefficients of both parental capital and ethnic capital are inconsistent estimates of the transmission parameter δ. Note also that the estimated

impact of ethnic capital will be larger the greater the errors in measuring parental skills (and is zero if parental capital is perfectly measured).

By combining equations (16) and (18), it is easy to show that

$$\text{(19a)} \qquad \text{plim } \hat{\theta}_1 = (1-\lambda) \text{ plim } \hat{\delta},$$

$$\text{(19b)} \qquad \text{plim } \hat{\theta}_2 = \lambda\delta,$$

where $\lambda = \sigma_x^2\sigma_1^2/\Delta$, and is a measure of the relative importance of the errors in measuring parental skills.

Equations (19a) and (19b) can be used to assess the practical importance of the spurious correlation introduced by measurement error in generating the results presented in Table III. In particular, equation (19a) shows how the coefficient of parental capital changes asymptotically when ethnic capital is introduced into the regression, as long as ethnic capital does not play a direct role in the intergenerational transmission process. It is evident that the larger the change in the coefficient of parental capital, the greater the errors in measuring parental skills (as measured by the parameter λ). As can be seen in columns (1) and (3) of Table III, the coefficient of parental capital is barely affected by the introduction of ethnic capital. Using equation (19a), the GSS education regression implies that $\lambda = 0.06$, while the GSS occupation regression implies $\lambda = 0.10$. In the NLSY regressions, the estimates of λ are even smaller.[25]

Given this measure of λ, equation (19b) provides an estimate of the coefficient of ethnic capital if this variable is only proxying for imperfectly-measured parental capital. Suppose that the true δ is 0.5, which

is much higher than the usual estimates reported in the literature. The coefficient of ethnic capital should then be 0.03 in the GSS education regression, and 0.05 in the GSS occupation regression. The evidence reported in Table III clearly indicates that the effect of ethnic capital is much larger, so that the spurious correlation introduced by measurement errors accounts for no more than 20 percent of the estimated impact of the ethnic capital variable.[26]

V. Ethnic Capital and Parental Birthplace

It is likely that ethnic capital plays a more important role in the intergenerational transmission process in households whose ancestors are recent arrivals to the United States. As social, cultural, and economic assimilation occurs across generations, the importance of the ethnic enclave diminishes, exposure to ethnic "role models" decreases, and the importance of ethnic capital in intergenerational transmission may decline.

To ascertain the importance of this hypothesis, I reestimated the regressions separately on the sample of second-generation Americans (i.e., children of immigrants), and on the remaining sample of natives whose parents were born in the United States. For brevity, this latter sample will be referred to as third-generation Americans, even though it contains workers in the third- and higher-order generations.

Table V summarizes the estimated coefficients by generation. In general, ethnic capital plays a significant role in intergenerational mobility for both second- and third-generation Americans. The point estimates of the ethnic capital coefficient, however, tend to be greater for the second generation than for the third, particularly in the regressions

that link labor market outcomes (i.e., occupation or log wages) across generations.

For instance, the GSS data indicate that the coefficient of ethnic capital on occupational prestige for second-generation workers is over 0.6, while the same coefficient is 0.3 (and has a very large standard error) for third-generation workers. In the NLSY, the coefficient of ethnic capital on log wages is 0.7 for the second generation and 0.2 for the third. In sum, the evidence suggests that the impact of ethnic capital on intergenerational mobility is lower for persons who have resided in the United States for longer periods. Nevertheless, it is important to note that ethnic capital tends to slow down the process of convergence across ethnic groups even in the third generation.

It is also likely that ethnic capital plays a more influential role when both parents are members of the ethnic group than when only one parent is a member. Both the GSS and the NLSY allow a test of this hypothesis. In particular, both data sets provide information on which of the parents (if any) were born outside the United States. In addition, the NLSY reports the specific country of birth for both parents. As noted above, the NLSY indicates that the conditional probability that both parents are born in the same source country (given that both are born outside the United States) is over 0.9.

Table VI reports the relevant coefficients from regressions estimated separately for second-generation households where only one-parent is foreign-born and for households where both parents are foreign-born. The evidence is mixed. The GSS education regressions, for example, indicate that ethnic capital has a bigger impact in households where both parents are

foreign-born. The NLSY results, however, are inconclusive: many of the ethnic capital coefficients are not significantly different from zero. The ambiguous results probably arise because I am using a random effects estimator on relatively small samples.[27]

Despite the mixed picture portrayed by Table VI, the preponderance of the evidence summarized in this paper indicates that ethnic capital plays an essential role in the intergenerational transmission of skills. Although I have stressed the interpretation of the findings in terms of the human capital externality introduced by ethnic environment, this interpretation is not the only one consistent with the data. Such factors as discrimination or lack of access to schools, credit markets, or other institutions can also generate a correlation between the skills of children and the average skills of fathers in the ethnic group (after holding constant the own father's skills).

I should note, however, that some of these factors may not necessarily generate a positive correlation between mean skills in the ethnic group in generation t-1 and the skills of children in generation t. Suppose, for instance, that statistical discrimination leads to a positive relationship between a worker's wage and the mean skills of his ethnic group (holding constant the individual's skills). Because of the income effect, workers in ethnic groups with high average skills will invest more in their children, while the substitution effect indicates that these workers will invest less in their children. The correlation between what I call ethnic capital and children's skills would then be determined by the parametric specification of the utility function.

In the end, the usefulness of the ethnic capital approach will depend on

whether interpreting ethnicity as a human capital externality increases our understanding of the many ethnic differentials observed in the U.S. economy, not just those that have been the focus of this paper.

VI. Ethnic Capital and Black Intergenerational Mobility

The empirical analysis presented in the previous sections was based on a sample of ethnic Americans that did not include blacks. The relatively slow economic progress of blacks across generations has been the focus of extensive study [Smith and Welch, 1989]. It is fair to conclude that this literature has been unable to explain why the economic progress of blacks lags behind that of many other ethnic or racial groups. It is of substantial interest, therefore, to determine if the ethnic capital hypothesis can partly explain the relatively slow intergenerational mobility of blacks.

As long as ethnic capital plays an important role in human capital accumulation, the slow progress of blacks arises partly because, as a group, blacks have relatively low levels of human capital. To assess the importance of ethnic capital in retarding black economic growth, I use the regressions estimated among third-generation workers (and reported in Table V) to predict the change in black skills and earnings across generations. The simulation uses the regressions estimated in the sample of third-generation ethnic whites because blacks have been in the United States for several generations.[28] I calculate two alternative predictions: the first uses the regression model that ignores ethnic capital (equation (10)), while the second uses the model that includes ethnic capital (equation (13)).

Table VII presents the out-of-sample predictions for black inter-

generational mobility using both the GSS and the NLSY. Consider, for example, educational attainment among black respondents in the GSS. The typical black GSS respondent has 12.3 years of schooling, while his father has 8.7 years. The regression model that ignores the importance of ethnic capital predicts that, given his father's educational attainment, the typical black respondent should have had 12.7 years of schooling, or about half a year more than was actually observed. In contrast, the model that includes ethnic capital predicts that the educational attainment of black respondents should be 12.4, which is closer to the value actually observed.

Similarly, the typical black GSS respondent has an occupational prestige score of 35.1, while his father has 33.0. The intergenerational mobility model that ignores ethnic capital predicts that GSS respondents should have a prestige score of about 40.3, about 5 points more than was observed, while the ethnic capital model predicts that respondents should have a score of 37.1, an overprediction of only 2 points. It should be noted, however, that the standard error associated with the predictions that use the ethnic capital model is quite large.

The results using the NLSY data are less suggestive. The prediction of educational attainment is barely affected by the inclusion of ethnic capital. Black respondents in the NLSY have 12.6 years of schooling, while their fathers have 10.1 years. Both regression models predict that NLSY black respondents should have about 12.4 years of schooling. In contrast, the log wage predictions indicate that, given their father's wage, NLSY respondents should have about 3 percent lower wage rates if one uses the model that incorporates ethnic capital.

Overall, the results suggest that the omission of ethnic capital from

TABLE VI

INTERGENERATIONAL MOBILITY FOR SECOND GENERATION AMERICANS, BY BIRTHPLACE OF PARENTS

	Both parents born abroad			Only one parent born abroad		
Data set/ variable	Parental capital	Ethnic capital	Controls for X	Parental capital	Ethnic capital	Controls for X
GSS: Education	0.1355 (0.0360)	0.4995[a] (0.1419)	No	0.2007 (0.0296)	0.0446 (0.1787)	No
GSS: Education	0.1123 (0.0399)	0.6369[a] (0.1279)	Yes	0.2004 (0.0324)	0.1632 (0.0390)	Yes
GSS: Occupation	0.1232 (0.0529)	0.6290[a] (0.2306)	No	0.2047 (0.0470)	0.6373 (0.3183)	No
GSS: Occupation	0.1167 (0.0542)	0.3142 (0.1608)	Yes	0.2122 (0.0483)	0.6261 (0.3258)	Yes
NLSY: Education	0.1397 (0.0315)	-0.0154 (0.1841)	No	0.0901 (0.0307)	0.0346 (0.2120)	No
NLSY: Education	0.1326 (0.0316)	-0.0591 (0.1811)	Yes	0.1119 (0.0310)	0.0995 (0.0665)	Yes
NLSY: Log Wage	0.5735 (0.5480)	0.7482 (0.4576)	No	0.1203 (0.1142)	0.2995 (0.4570)	No
NLSY: Log Wage	0.2539 (0.1240)	0.2965 (0.5073)	Yes	0.2806 (0.1075)	0.6988 (0.2588)	Yes

Notes. Standard errors are reported in parentheses. The regressions use a generalized least-squares random effects estimator. See the notes to Table III for additional details and for descriptions of variables. The samples sizes are as follows. For both parents born abroad: GSS Education, N=350; GSS Occupation, N=440; NLSY Education, N=199; NLSY Log Wage, N=147. For the sample where only one parent is born abroad: GSS Education, N=446; GSS Occupation, N=507; NLSY Education, N=309; NLSY Log Wage, N=199.

[a]The coefficients of parental and ethnic capital are significantly different from each other at the 10 percent level of significance.

experiences of their parents, but also on the average skills and labor market experiences of the ethnic group in the parent's generation. Second, the introduction of ethnic capital into the analysis provides a very different portrait of intergenerational mobility than that available in the existing literature. In particular, there is much more persistence of skills and earnings capacity across generations than is generally believed. As a result, ethnic differences in skills and labor market outcomes may persist for several generations.

It is apparent that the empirical evidence has an important policy implication. Government interventions designed to increase the average skill level of a racial or ethnic group in one generation significantly improve the economic well-being of all future generations. In addition, these interventions lead to a much faster convergence of average skill levels among the various groups. As a result, models of intergenerational mobility that ignore the significant impact of the policy shocks on the level of ethnic capital may greatly underestimate the economic benefits of these government policies.

Although these results are provocative, this study only represents an initial attempt at analyzing the role played by ethnic capital in the labor market. There are many questions raised by the concept of ethnic capital that I have ignored in both the theoretical and empirical study. Future research, for instance, should consider the link between residential location and ethnic capital. This link leads to a number of interesting issues regarding the migration decisions of ethnic groups, and raises the possibility that parents "choose" particular levels of ethnic capital by migrating to areas that offer the social characteristics they wish to expose

to their children.

In addition, the human capital externalities associated with ethnicity in this paper probably arise in many other contexts. After all, "neighborhood effects" work through a myriad of social, cultural, and economic institutions. In view of the significance of questions relating to social mobility and the economic progress of minorities, it is evident that the further study of these human capital externalities is a promising area for future research.

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REFERENCES

Azariadis, Costas, and Allan Drazen, "Threshold Externalities in Economic Development," Quarterly Journal of Economics, CV (May 1990), 501-26.

Barro, Robert J., "Economic Growth in a Cross-Section of Countries," Quarterly Journal of Economics, CVI (May 1991), 407-43.

Becker, Gary S., A Treatise on the Family (Cambridge, MA: Harvard University Press, 1981).

_____, and Robert J. Barro, "A Reformulation of the Economic Theory of Fertility," Quarterly Journal of Economics, CIII (February 1988), 1-25.

_____, and H. Gregg Lewis, "On the Interaction Between the Quantity and Quality of Children," Journal of Political Economy, LXXXI (March/April 1973 Supplement), S279-88.

_____, Kevin M. Murphy, and Robert Tamura, "Human Capital, Fertility, and Economic Growth," Journal of Political Economy, XCVIII (October 1990 Supplement), S12-37.

_____, and Nigel Tomes, "Human Capital and the Rise and Fall of Families," Journal of Labor Economics, IV (July 1986), S1-39.

Behrman, Jere, and Paul Taubman, "Intergenerational Earnings and Mobility in the United States: Some Estimates and a Test of Becker's Intergenerational Endowments Model," Review of Economics and Statistics, LXVII (February 1985), 144-51.

Ben-Porath, Yoram, "The Production of Human Capital and the Life Cycle of Earnings," Journal of Political Economy, LXXV (August 1967), 352-65.

Borjas, George J., "The Intergenerational Mobility of Immigrants," manuscript, University of California, San Diego, February 1991.

Coleman, James S., "Social Capital in the Creation of Human Capital," American Journal of Sociology, XCIV (1988 Supplement), S95-120.

Conlisk, John, "Can Equalization of Opportunity Reduce Social Mobility?" American Economic Review, LXIV (March 1974). 80-90.

_____, "An Exploratory Model of the Size Distribution of Income," Economic Inquiry, XV (July 1977), 345-66.

Davis, James Allan, and Tom W. Smith, General Social Surveys, 1972-1989, Cumulative Codebook, (Chicago, IL: National Opinion Research Center, 1989).

Farley, Reynolds, "Blacks, Hispanics, and White Ethnic Groups: Are Blacks Uniquely Disadvantaged?" American Economic Review Papers and Proceedings, LXXX (May 1990), 237-41.

Glazer, Nathan, and Daniel P. Moynihan, Beyond the Melting Pot: The Negroes, Puerto Ricans, Jews, Italians, and Irish of New York City, (Cambridge, MA: M.I.T. Press, 1963).

Goldberger, Arthur, "Economic and Mechanical Models of Intergenerational Transmission," American Economic Review, LXXIX (June 1989), 504-13.

Gordon, Milton, Assimilation and American Life, (New York: Oxford University Press, 1964).

Hauser, Robert M., William H. Sewell, and Kenneth G. Lutterman, "Socioeconomic Background, Ability, and Achievement," in W.H. Sewell and R.M. Hauser, eds., Education, Occupation, and Earnings, (New York: Academic Press, 1975).

Lieberson, Stanley, and Mary C. Waters, From Many Strands: Ethnic and Racial Groups in Contemporary America, (New York: Russell Sage, 1988).

Lucas, Robert E., "On the Mechanics of Economic Development," Journal of Monetary Economics, XXII (July 1988), 3-42.

Park, Robert, Race and Culture, (Glencoe, IL: Free Press, 1950).

Perlmann, Joel, Ethnic Differences: Schooling and Social Structure Among the Irish, Italians, Jews, and Blacks in an American City, 1880-1935, (New York: Cambridge University Press, 1988).

Romer, Paul M., "Increasing Returns and Long-Run Growth," Journal of Political Economy, XCIV (December 1986), 1002-37.

Siegel, Paul S., "Prestige in the American Occupational Structure," unpublished Ph.D. Thesis, (Chicago, IL: University of Chicago, 1971).

Smith, James P. and Finis R. Welch, "Black Economic Progress After Myrdal," Journal of Economic Literature, XXVII (June 1989), 519-64.

Solon, Gary, "Intergenerational Income Mobility in the United States," manuscript, University of Michigan, 1990.

Sowell, Thomas, Ethnic America, (New York: Basic Books, 1981).

Steinberg, Stephen, The Ethnic Myth: Race, Ethnicity, and Class in America, (Boston, MA: Beacon Press, 1989).

Wilson, William Julius, The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy, (Chicago, IL: University of Chicago Press, 1987).

Zimmerman, David J., "Intergenerational Mobility and the Transmission of Inequality: An Empirical Study Using Longitudinal Data," manuscript, Princeton University, 1990.

FOOTNOTES

1. Classic expositions of the assimilation hypothesis are contained in Park [1950] and Gordon [1964]. A more recent study of ethnic differentials within this paradigm is given by Sowell [1981].

2. See Lieberson and Waters [1988] for a systematic documentation of the evidence on the social and economic differences among ethnic groups in the 1980 Census.

3. Theoretical discussions of the process of intergenerational income mobility are given by Becker [1981], Becker and Tomes [1986], Conlisk [1974], and Goldberger [1989]. Empirical evidence is reported in Behrman and Taubman [1985], Borjas [1991], Hauser, Sewell, and Lutterman [1975], Solon [1990], and Zimmerman [1990].

4. The specification of the utility function in (1) ignores the dynastic approach suggested by the work of Becker and Barro (1988]. Although the introduction of dynastic households provides a much richer description of the long-run relationship between human capital and fertility [Becker, Murphy, and Tamura, 1990], the simpler model presented here captures the key insights that are useful for the empirical study of intergenerational skill transmissions.

5. Conlisk [1977] provides an early application of this technology to the study of income distributions. See also Azariadis and Drazen [1990], Barro [1991], Becker, Murphy, and Tamura [1990], and Romer [1986].

6. Wilson's [1987] influential study of the underclass also hinges on human capital externalities. He argues that the economic situation of young blacks in poor neighborhoods is worsened because they are not exposed to "mainstream role models that help keep alive the perception that education

is meaningful, that steady employment is a viable alternative to welfare, and that family stability is the norm" [Wilson, 1987, p. 56].

7. Even though the model focuses on the comparison of skill levels across two generations, it should be evident that its implications can be easily extended to models with longer time horizons. Also note that although equation (9) describes the evolution of relative skill differentials among ethnic groups, there are a large number of growth paths for the level of the human capital stock that are possible outcomes of the maximization process.

8. See Becker and Tomes [1986] for a survey of the empirical evidence on intergenerational mobility.

9. The relationship between the regression coefficients in equation (13) and the parameters of the model is easily ascertained. Suppose that the supply function for time allocated to children (equation (4)) can be approximated by $s_t = \alpha_0 k_t^{\alpha_1} \bar{k}_t^{\alpha_2}$. Substituting this expression into the reduced-form equation giving the human capital of children (equation (6)) yields

$$\log k_{t+1} = \psi + \beta_1(1+\alpha_1) \log k_t + (\beta_2+\alpha_2\beta_1) \log \bar{k}_t .$$

Note that the coefficients γ_1 and γ_2 in equation (13) do not identify the parameters β_1 and β_2 unless the utility function is Cobb-Douglas. As noted in Section II, this functional form implies that the fraction of time devoted by parents to human capital investments in their children is constant across households ($\alpha_1=\alpha_2=0$). In general, the regression coefficients estimate the elasticities in equations (7a) and (7b), which

allow for the impact of parental and ethnic capital on the time devoted to investments in children.

10. The content and sampling frame of the General Social Surveys is described in Davis and Smith [1989].

11. This estimate is obtained from a regression of the income data available in the GSS on the occupational prestige score. I should note, however, that the GSS income data is of much lower quality than the income data usually used by economists. The intervals used by the GSS to report income are relatively wide, and all incomes above $50,000 in the earlier waves are truncated at that point (the truncation point for the more recent waves is $60,000). It is not possible to use the occupational background of the father to get an alternative measure of parental income, because even though the prestige score is based on a three-digit occupation code, the publicly-released GSS only reports a one-digit occupation code.

12. To determine the sensitivity of the results reported below to the use of the self-reported ethnicity variable, I estimated a number of alternative specifications of the basic model. For instance, the empirical analysis was conducted on the subsample of workers who only named one ethnic group in their response (and whose ethnicity can presumably be exactly determined). The substance of the results was not affected by this sample selection. I think it would be worthwhile, however, to conduct additional research to help determine how the definition of ethnic capital should be altered in order to accommodate the fact that some workers are exposed to the social, cultural, and economic characteristics of more than one ethnic group.

13. I used the 1970 Census because the NLSY reports the 1970 Census

code for the father's occupation, and the occupation codes changed substantially between the 1970 and 1980 Censuses.

14. Persons who give multiple answers to the ethnicity question are asked to report the ethnic background they most identify with. It is this single response that is used in the empirical analysis below.

15. I also estimated specifications of the regression models that linked the respondent's skills to those of the mother (or to an average of the skills of both parents), with little change in the substance of the results.

16. Obviously, there are many alternative approaches to operationally defining the concept of ethnic capital. In this paper, I chose the simplest specification. It would be of interest to determine if other dimensions of the ethnic environment (such as the labor force participation rate of the ethnic group) provide additional information about the intergenerational mobility process.

17. These restrictions alter the samples available for analysis as follows. There are 14,102 persons aged 18-64 interviewed in the GSS since 1977. Of these persons, 872 are either immigrants or do not report birthplace; 2,346 are blacks or American Indians; 35 do not report parental birthplace; and 2,478 do not report ethnicity. From this base, I then delete either 1,615 observations in the education analysis (due to missing own or father's education), or 1,305 observations in the occupation analysis. The 1987 wave of the NLSY contains 10,485 respondents. Of these persons, 279 are deleted because they do not report either their own or their parent's birthplace; 3,019 are blacks or American Indians; 410 do not report their ethnic background; and 607 are immigrants. I then delete

either 551 observations in the education analysis or 2,436 in the wage analysis. As a result of these sample selection rules, the data used below tend to contain fewer persons in the less-skilled ethnic groups. For instance, about 2.5 percent of the sample used in the GSS education analysis is of Mexican origin, but 4.8 percent of persons who do not report education (or their father's education) are Mexicans. Similarly, 11.3 percent of the observations in the NLSY education sample are Mexican, but 21.8 percent of those who do not report the education data are Mexican. I show below that my main conclusions are unaffected when the sample is further altered to exclude less-skilled ethnic groups (such as Mexicans and Puerto Ricans).

18. The NLSY data contain a relatively large group of persons who classify their ethnic background as "American." Presumably this group contains well-assimilated persons who no longer identify with any national origin. Although the empirical analysis below treats these persons as an additional ethnic group, deleting this subsample has little effect on the results.

19. Borjas [1991] presents a detailed analysis of the factors underlying these ethnic differentials. The study suggests that the differentials partially arise because of the huge dispersion in skills that characterized the original immigrant flows.

20. The regressions use a minimal set of controls. All regressions include gender, a dummy indicating if either parent was an immigrant (to isolate the possibility that second-generation Americans experience a different type of intergenerational mobility), a dummy indicating if the respondent is enrolled in school (in the NLSY), and dummies indicating the year of the survey (in the GSS). The regressions in column (4) also include

age and region. The exclusion of any of these controls does not alter the results of the analysis.

21. Although I do not report these test statistics, the data generally rejected the hypothesis that the sum of the parental and ethnic capital coefficients was equal to one.

22. The aggregation of equation (13) within ethnic groups implies that the parameter $\gamma_1+\gamma_2$ can also be estimated by regressing the average skills of children in the ethnic group on the average skills of their parents. In earlier work [Borjas, 1991], I used the 1940 Census to calculate the average earnings of immigrant groups (by national origin group), and the 1970 Census to calculate the average earnings of second-generation workers (by birthplace of the parents). This intercensal comparison approximates the relationship between the earnings of fathers and children. Interestingly, the Census estimate of $\gamma_1+\gamma_2$ was 0.45, which is quite close to the intergenerational transmission parameters reported in Table III.

23. Note that the wage regressions reported for the NLSY data mix individual data (i.e., the respondent's wage rate) with aggregate data (i.e., the mean wage in the occupation for the father). An alternative specification would also assign the NLSY respondent the mean wage in his occupation. The estimated coefficients (and standard errors) are 0.121 (0.05) for parental capital, and 0.214 (0.19) for ethnic capital (using the model that does not include the vector of socioeconomic characteristics). It is apparent that this type of aggregation, perhaps because the NLSY samples young men and women at a time when they are "shopping" for an occupation, leads to an imprecise estimate of the ethnic capital effect.

24. I am assuming that measurement errors in parental capital are

independent of ethnicity and that there are sufficiently large numbers of observations for each ethnic group so that measurement errors are "washed out" by averaging parental skills within the group. The random variable v_2 then measures only how the skills of an individual parent deviate from the true group-specific mean.

25. The calculation of λ uses coefficients from Table III that are estimated using OLS (the regression that ignores ethnic capital) and GLS (the regression that includes ethnic capital). The derivation of equations (19a) and (19b) ignores this complication.

26. An alternative way of assessing the importance of measurement error is to use an instrument, such as mother's education, for father's education. This exercise reinforces the conclusion that measurement error is not generating a spurious correlation between children's education and ethnic capital. For instance, in the GSS education regression (which does not control for X), the instrumental variables estimate for the coefficient of father's education is 0.368 (0.011), and for the coefficient of ethnic capital is 0.224 (0.027), where the standard errors have not been corrected for the random effects stochastic structure.

27. Given the stochastic nature of the disturbance in equation (13), it is not surprising to find that the random effects estimator leads to much larger standard errors for the coefficient of ethnic capital than the corresponding OLS estimator. The standard errors estimated by the random effects model behaved more erratically the smaller the sample size.

28. I also conducted the simulations using the regressions presented in Table III, with qualitatively similar results.

TABLE I

SUMMARY CHARACTERISTICS IN GSS, BY ETHNIC GROUP

Country of origin	Education		Occupation		Sample size
	Self	Father	Self	Father	
Arabic	15.200	9.600	54.600	52.600	5
Austria	13.378	9.733	43.000	42.367	45
Belgium	12.333	9.250	37.133	40.067	12
Canada (French)	12.788	10.125	38.496	39.748	104
Canada (Other)	12.911	11.107	40.484	39.813	56
China	14.857	10.429	49.000	34.444	7
Czechoslovakia	12.976	9.368	41.326	38.609	125
Denmark	14.500	10.530	47.912	42.632	66
England & Wales	13.925	11.577	43.920	43.932	1233
Finland	12.708	9.771	38.438	38.229	48
France	13.407	11.429	42.434	42.357	189
Germany	13.175	10.728	41.618	41.224	1653
Greece	13.833	11.458	44.172	44.207	24
Hungary	13.554	10.357	41.702	40.193	56
Ireland	13.151	10.853	41.020	41.328	1043
Italy	13.156	10.294	40.807	38.788	469
Japan	14.579	9.737	49.421	39.474	19
Lithuania	14.130	10.870	44.280	42.040	23
Mexico	11.076	5.890	36.350	31.062	172
Netherlands	12.390	9.968	39.675	40.268	154
Norway	13.288	11.183	41.943	42.383	191
Poland	13.453	10.202	41.725	37.725	258
Portugal	12.800	8.000	34.000	35.583	10
Puerto Rico	12.120	9.760	36.077	36.269	25
Romania	15.125	13.750	46.000	47.000	8
Russia	14.962	11.333	48.009	44.035	105
Scotland	13.969	11.674	43.537	43.549	261
Spain	12.902	9.689	37.683	38.267	61
Sweden	13.843	11.916	44.029	43.372	166
Switzerland	14.053	11.868	45.474	40.053	38
Yugoslavia	12.927	9.146	40.875	37.075	41
Other Hispanic	14.900	11.100	44.818	42.364	10
American	11.452	8.532	40.194	39.224	62
All	13.331	10.726	41.923	41.174	6756

Notes. The sample sizes refer to the education data. There are 7066 observations for which the occupation data are available.

TABLE II

SUMMARY CHARACTERISTICS IN NLSY, BY ETHNIC GROUP

Country of origin	Education		Log wage		Sample size
	Self	Father	Self	Father	
China	14.000	14.571	1.831	2.664	7
Cuba	13.444	11.778	2.268	2.452	27
England	12.985	11.977	1.974	2.529	1239
France	12.789	11.813	1.925	2.519	246
Germany	13.288	12.113	2.001	2.503	1168
Greece	14.400	12.550	2.288	2.603	20
Ireland	13.284	12.590	2.041	2.568	714
Italy	13.200	12.297	2.120	2.542	360
Japan	12.667	11.917	2.195	2.144	12
Mexico	12.304	8.079	1.861	2.326	635
Pacific Islander	12.500	8.875	1.662	2.418	8
Phillipines	14.071	13.000	2.049	2.628	14
Poland	13.223	11.787	2.018	2.544	188
Portugal	12.043	9.978	2.094	2.532	46
Puerto Rico	11.623	8.084	1.933	2.316	191
Russia	14.698	13.651	2.103	2.650	43
Scotland	14.061	13.520	2.026	2.616	98
Wales	14.571	14.643	2.036	2.692	28
Other Hispanic	12.632	11.059	1.971	2.387	68
American	12.189	10.853	1.914	2.455	502
All	12.941	11.444	1.984	2.496	5619

Notes. The log wages are reported in 1987 dollars. The sample sizes refer to the education data. There are 3734 observations for which the log wage data are available.

TABLE III

INTERGENERATIONAL TRANSMISSION COEFFICIENTS IN GSS AND NLSY

I. General Social Surveys

	Education (N = 6756)				Occupation (N = 7066)			
Variable	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Parental capital	0.2664 (0.0074)	0.2490 (0.0076)	0.2501 (0.0076)	0.2586 (0.0080)	0.1997 (0.0127)	0.1829 (0.0128)	0.1829 (0.0128)	0.1985 (0.0127)
Ethnic capital	---	---	0.2265[a] (0.0466)	0.1455[a] (0.0882)	---	---	0.4589 (0.2244)	0.3714[a] (0.2177)
Fixed effects	No	Yes	No	No	No	Yes	No	No
Controls for X	No	No	No	Yes	No	No	No	Yes
R^2	0.177	0.198	0.184	0.210	0.041	0.058	0.046	0.080

II. National Longitudinal Surveys of Youth

	Education (N = 5619)				Log wage (N = 3734)			
Variable	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Parental capital	0.2665 (0.0072)	0.2566 (0.0077)	0.2570 (0.0075)	0.2556 (0.0073)	0.3465 (0.0283)	0.3257 (0.0205)	0.3257 (0.0291)	0.2983 (0.0284)
Ethnic capital	---	---	0.1165 (0.0630)	0.0990 (0.0714)	---	---	0.2843 (0.0955)	0.2983 (0.0967)
Fixed effects	No	Yes	No	No	No	Yes	No	No
Controls for X	No	No	No	Yes	No	No	No	Yes
R^2	0.247	0.261	0.248	0.267	0.091	0.104	0.092	0.146

Notes. Standard errors are reported in parentheses. Regressions (3) and (4) use a generalized least-squares random effects estimator. Parental capital gives the value of the characteristic observed in the respondent's father, while ethnic capital gives the mean of the characteristic in the ethnic group (evaluated in the father's generation). All GSS regressions control for gender, whether the parents were immigrants, and a vector of dummies indicating the cross-section from which the observation was drawn, while all NLSY regressions control for gender, whether the parents were immigrants, and a dummy variable indicating if the respondent is enrolled in school. In addition, the vector X includes age (and age squared), and a vector of dummies indicating region of residence.

[a]The coefficients of parental and ethnic capital are significantly different from each other at the 10 percent level of significance.

TABLE IV

INTERGENERATIONAL MOBILITY IN NON-HISPANIC SAMPLE

I. General Social Surveys

	Education (N = 6559)		Occupation (N = 6863)	
Variable	(1)	(2)	(1)	(2)
Parental capital	0.2496	0.2602	0.1865	0.2028
	(0.0076)	(0.0081)	(0.0130)	(0.0129)
Ethnic capital	0.2722	0.2429	0.4325	0.3276
	(0.1194)	(0.1018)	(0.2634)	(0.2563)
Controls for X	No	Yes	No	Yes
R^2	0.156	0.195	0.043	0.077

II. National Longitudinal Surveys of Youth

	Education (N = 4793)		Log Wage (N = 3216)	
Variable	(1)	(2)	(1)	(2)
Parental capital	0.3015	0.2980	0.3372	0.3030
	(0.0087)	(0.0086)	(0.0318)	(0.0310)
Ethnic capital	0.1896[a]	0.2271[a]	0.1980	0.0447[a]
	(0.0581)	(0.0406)	(0.3364)	(0.1930)
Controls for X	No	Yes	No	Yes
R^2	0.265	0.291	0.090	0.144

Notes. Standard errors are reported in parentheses. The regressions use a generalized least-squares random effects estimator. See the notes to Table III for additional details and for descriptions of variables.

[a]The coefficients of parental and ethnic capital are significantly different from each other at the 10 percent level of significance.

TABLE V

INTERGENERATIONAL MOBILITY FOR SECOND- AND THIRD-GENERATION AMERICANS

	Second generation			Third generation		
Data set/ variable	Parental capital	Ethnic capital	Controls for X	Parental capital	Ethnic capital	Controls for X
GSS: Education	0.1741 (0.0225)	0.2267 (0.1079)	No	0.2620 (0.0080)	0.2071 (0.1099)	No
GSS: Education	0.1538 (0.0248)	0.2568 (0.1209)	Yes	0.2744 (0.0085)	0.1983 (0.0859)	Yes
GSS: Occupation	0.1637 (0.0346)	0.7807[a] (0.0559)	No	0.1843 (0.0137)	0.3008 (0.4049)	No
GSS: Occupation	0.1679 (0.0357)	0.6441[a] (0.1492)	Yes	0.2005 (0.0136)	0.2244 (0.3731)	Yes
NLSY: Education	0.1020 (0.0223)	0.0681 (0.0970)	No	0.2836 (0.0080)	0.1340[a] (0.0589)	No
NLSY: Education	0.1072 (0.0222)	0.0317 (0.0982)	Yes	0.2816 (0.0078)	0.1196[a] (0.0786)	Yes
NLSY: Log Wage	0.2162 (0.0844)	0.7017 (0.2255)	No	0.3385 (0.0310)	0.2078 (0.1054)	No
NLSY: Log Wage	0.2675 (0.0816)	0.4188 (0.2461)	Yes	0.3048 (0.0303)	0.1152 (0.2780)	Yes

Notes. Standard errors are reported in parentheses. The regressions use a generalized least-squares random effects estimator. See the notes to Table III for additional details and for descriptions of variables. The sample sizes are as follows. For the second generation: GSS Education, N=796; GSS Occupation, N=947; NLSY Education, N=508; NLSY Log Wage, N=346. For the third generation: GSS Education, N=5960; GSS Occupation, N=6119; NLSY Education, N=5111; NLSY Log Wage, N=3388.

[a]The coefficients of parental and ethnic capital are significantly different from each other at the 10 percent level of significance.

TABLE VI

INTERGENERATIONAL MOBILITY FOR SECOND GENERATION AMERICANS, BY BIRTHPLACE OF PARENTS

	Both parents born abroad			Only one parent born abroad		
Data set/ variable	Parental capital	Ethnic capital	Controls for X	Parental capital	Ethnic capital	Controls for X
GSS: Education	0.1355 (0.0360)	0.4995[a] (0.1419)	No	0.2007 (0.0296)	0.0446 (0.1787)	No
GSS: Education	0.1123 (0.0399)	0.6369[a] (0.1279)	Yes	0.2004 (0.0324)	0.1632 (0.0390)	Yes
GSS: Occupation	0.1232 (0.0529)	0.6290[a] (0.2306)	No	0.2047 (0.0470)	0.6373 (0.3183)	No
GSS: Occupation	0.1167 (0.0542)	0.3142 (0.1608)	Yes	0.2122 (0.0483)	0.6261 (0.3258)	Yes
NLSY: Education	0.1397 (0.0315)	-0.0154 (0.1841)	No	0.0901 (0.0307)	0.0346 (0.2120)	No
NLSY: Education	0.1326 (0.0316)	-0.0591 (0.1811)	Yes	0.1119 (0.0310)	0.0995 (0.0665)	Yes
NLSY: Log Wage	0.5735 (0.5480)	0.7482 (0.4576)	No	0.1203 (0.1142)	0.2995 (0.4570)	No
NLSY: Log Wage	0.2539 (0.1240)	0.2965 (0.5073)	Yes	0.2806 (0.1075)	0.6988 (0.2588)	Yes

Notes. Standard errors are reported in parentheses. The regressions use a generalized least-squares random effects estimator. See the notes to Table III for additional details and for descriptions of variables. The samples sizes are as follows. For both parents born abroad: GSS Education, N=350; GSS Occupation, N=440; NLSY Education, N=199; NLSY Log Wage, N=147. For the sample where only one parent is born abroad: GSS Education, N=446; GSS Occupation, N=507; NLSY Education, N=309; NLSY Log Wage, N=199.

[a]The coefficients of parental and ethnic capital are significantly different from each other at the 10 percent level of significance.

TABLE VII

PREDICTED INTERGENERATIONAL MOBILITY OF BLACKS

Data set/ variable	Mean of black fathers	Mean of black children	Prediction ignoring ethnic capital	Prediction including ethnic capital	Controls for X
GSS: Education (N=1001)	8.666	12.278	12.726 (0.040)	12.438 (0.240)	No
GSS: Education	8.666	12.278	12.629 (0.041)	12.353 (0.188)	Yes
GSS: Occupation (N=1164)	33.000	35.075	40.310 (0.234)	37.153 (1.833)	No
GSS: Occupation	33.000	35.075	40.179 (0.246)	37.935 (1.782)	Yes
NLSY: Education (N=1926)	10.106	12.641	12.453 (0.030)	12.368 (0.073)	No
NLSY: Education	10.106	12.641	12.445 (0.033)	12.389 (0.040)	Yes
NLSY: Log wage (N=1066)	1.215	1.843	1.936 (0.010)	1.906 (0.018)	No
NLSY: Log wage	1.215	1.843	1.924 (0.012)	1.905 (0.052)	Yes

Notes. Standard errors are reported in parentheses. The sample sizes report the number of blacks over which the relevant characteristics are evaluated. See the notes to Table III for additional details and for descriptions of variables.