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ABSTRACT

Ethnic Capital and Intergenerational Transmission of Educational Attainment*

This paper studies the role of ethnicity in the intergenerational transmission of educational attainment. Relying on heteroskedasticity to identify parameters in the presence of endogenous regressors, I revisit Borjas ethnic capital hypothesis. I find evidence that the OLS estimates of the effect of ethnic capital on intergenerational transmission of education are biased upwards due to the transfer of unobserved ability. I find that while the role of parental capital has declined over time, ethnic capital has a relatively constant effect on intergenerational transmission of educational attainment. I also find that only women benefit from the quality of the ethnic environment and that the intergenerational transfer of ethnic capital is most prevalent in communities with strong ties measured with endogamy rates.

JEL Classification: J15, J62, D1, Z1

Keywords: ethnic capital, human capital formation, intergenerational transmission

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1 Introduction

Inter-generational transmission of human capital has attracted much attention in the literature with the primary focus on the link between parents and children schooling. Since inter-generational linkage of skills can have long term effects on the socioeconomic status as well as on welfare distribution the transmission of human capital among ethnic group is of particular interest given the increasing share of migrants in the developed countries. Mejía and St-Pierre (2008) show that, just like differences in credit constraints, differences in endowment of the factors that complement schooling process generate differences in human capital accumulation. More inequality in the complementing factors leads to a lower overall educational attainment. As a result, inequality might increase over time as both improvement among the disadvantaged groups and dissemination of skills among more advantaged groups are slowed down. A growing body of literature in psychology recognizes that ethnic minority face different, often hostile, developmental environment to majority youth and the growing role of parents in facilitating the ethnic socialization.[1] In light of these findings as well as in presence of the recent evidence documenting the lack of inter-generational mobility with respect to movement in the income distribution (Chetty et al., 2014) it is essential to recognize the role of ethnicity in the complementing factors in human capital process accumulation.

Borjas (1992) first pointed to this distinct feature of inter-generational transmission among immigrants which he referred to as the transfer of *ethnic capital*. The overall human capital gained by the group as a hole is expected to have an effect on members of a group. The skills of the next generation depend on parental human capital and on the quality of ethnic environment in which parents make their investment decisions. It is expected that the social environment matters for educational choices and that social interactions play an important role in determining labor market outcomes. Borjas finds a strong and significant effect of the ethnic capital on intergenerational transmission of education. Children educational attainment, occupational standing and earnings are affected not only by parent's education, occupational prestige or earnings but also by the average education or earnings of their corresponding ethnic group. However, Bauer and Riphahn (2007) found no evidence supporting Borjas's hypothesis using 2000 Swiss census data. Similarly, Aydemir et al. (2013) did not confirm the importance of ethnic capital in Canada and Nielsen et al. (2003) does not find a convincing evidence in Denmark. Moreover, more recent papers found that much of the ethnic capital is attributed to neighborhood effects (Borjas, 1995, Ioannides, 2002, 2003).

This study contributes to the literature in three ways. (i) I re-estimate Borjas's model (Borjas, 1992) on a larger and more recent data set which allows for the analysis of the changes in the role of the ethnic capital transfer over time. (ii) I improve on the estimation strategy employed in Borjas (1992) by accounting for endogeneity of both parental and ethnic capital. Transfer of unobservables play a significant role in determining educational choices (Farré et al., 2013) which suggests that in Borjas (1992) analysis both the effect of parental and ethnic capital are likely to be overestimated. To account for the role of unobservables, I apply Klein and Vella (2010) constant correlation estimation procedure, which allows for estimation of the effect of parental and ethnic capital on educational attainment in absence of exclusion restrictions. Identification in the model relies on heteroskedasticity (see Klein and Vella (2010) for details)[2].(iii) I extend the empirical

[1] For a exhaustive summary of research see Hughes et al. (2006).

[2] This method has been successfully applied to estimate the inter-generational transmission of educa-

model to gain insight into the channels through which the transfer of ethnic capital affects schooling outcomes in the children's generation.

I find evidence of a large upward bias on both parental and ethnic capital of the OLS estimates. I also find evidence that while the effect of ethnic capital is relatively stable over time, the effect of parental capital has slightly declined over time. The results also show that the transfer of ethnic capital is more likely to affect women and groups characterized by strong ties. Among others, this might reflect different socialization patterns and the effect of environment on educational outcomes of the youth.

The paper is organized as follows. The following section explains in detail the estimation method and identification. Section 3 describes the data and section 4 follows with empirical results and discussion. Section 5 concludes.

2 Model and Identification

In this section I follow Farré et al. (2013, 2012) to describe the identification strategy and its interpretation in this framework. In absence of exclusion restrictions, identification of the parameters relies on assumptions about the structure of the error term and heteroskedasticity in the model (see Klein and Vella (2010) for details). Let *edu* denote the individual's education, *eduf* the father's education and $e\bar{d}u$ the average education of the ethnic group measured as the average education in the parents generation[3]. The model consist of three equations (time identifier is omitted for the sake of brevity):

$$\begin{aligned} edu_{ij} &= \gamma_1 eduf_{ij} + \gamma_2 e\bar{d}u_{ij} + \delta_0 X_{ij} + u_{ij} \\ eduf_{ij} &= \delta_2 X_{ij} + v^f_{ij} \\ e\bar{d}u_{ij} &= \delta_3 X_{ij} + v^{av}_{ij} \end{aligned} \tag{1}$$

I assume that all variables in X are exogenous and that there are no instruments available for the two endogenous regressors. Exogeneity of X implies:

$$E(u_{ij}|X_{ij}) = E(v^f_{ij}|X_{ij}) = E(v^{av}_{ij}|X_{ij}) = 0$$

Since there are no variables that provide exogenous variation to identify the $\gamma's$, assume for simplicity that the same $X's$ appear in all three equations. In principle, they do not need to be the same. However, there is no source of exogenous variation to identify $\gamma's$ in equation 1. The variables that enter the parental or ethnic capital equations but do not appear in the primary equation do not grant identification.

Furthermore, assume that the errors are heteroskedastic and can be defined as:

$$\begin{aligned} u_{ij} &= H_u(X_{ij})u^*_{ij} \\ v^f_{ij} &= H^f_v(X_{ij})v^{f*}_{ij} \\ v^{av}_{ij} &= H^{av}_v(X_{ij})v^{av*}_{ij} \end{aligned} \tag{2}$$

tion in the US (Farré et al., 2013), to estimate returns to schooling in the US (Farré et al., 2012) and in Germany (Saniter et al., 2012), and also to estimate the occupational mobility in China (Holmlund et al., 2011, Emran and Sun, 1988).

[3]Average education in parents generation is computed as average education among the fathers within a cohort.

u^*_{ij}, v^{f*}_{ij}, v^{av*}_{ij} are correlated homoskedastic error terms and $H^2_u(X_{ij})$, $H^2_{v^f}(X_{ij})$ and $H^2_{v^{av}}(X_{ij})$ denote the conditional variance functions for u_{ij}, v^f_{ij} and v^{av}_{ij}, respectively. The homoskedastic part reflects the transfer of unobserved ability, u^*_{ij}, v^{f*}_{ij}, v^{av*}_{ij} which is independent of the father's, and child's environment as implied by equation 2. However, the heteroskedasticity implies that once we condition on the vector of exogenous variables X, the transfer of ability contributes differently to human capital accumulation depending on respective socioeconomic backgrounds[4]. Identification in the model is achieved through this variation. Without this variation the mapping from u^*'s and v^{f*}'s or v^{av*}'s is identical to the mapping between u's and v^f's or v^{av}'s and therefore we cannot estimate the relationship between the u^*'s and v^{f*}'s or v^{av*}'s. In addition to the assumption of heteroskedastcity, the following constant correlation conditions are necessary for identification:

$$\begin{aligned} E[u^*_{ij}v^{f*}_{ij}|X_{ij}] &= E[u^*_{ij}v^{f*}_{ij}] = \rho^f \\ E[u^*_{ij}v^{av*}_{ij}|X_{ij}] &= E[u^*_{ij}v^{av*}_{ij}] = \rho^{av} \end{aligned} \tag{3}$$

This error structure implies that the correlation between the unobservables correlated with educational attainment are positively correlated with both parental and ethnic capital. This is consistent with the ability being responsible for the confounding effect of parental education and average educational attainment within the ethnic group. However, there is also a possibility that this correlation is negative. It would be the case if there were other unobserved factors that are not captured by ability. Examples of such factors are motivation, norms and beliefs. It is possible to extend the error structure to accommodate this case without compromising any of the identification in the model (Klein and Vella, 2010, Farré et al., 2012). However, since in this application I find a positive correlation, I will refer to the simple structure as defined in 3. Notice however, that the identification fails if there are factors that are related to the exogenous variables in the model and to the correlations between the unobserved factors that are not controlled for. In the context of this paper, the conditional constant correlation assumption implies that after controlling for all the exogenous variables in the model, the correlation between the unobserved factors affecting individual's educational attainment and parental educational attainment or average educational attainment in the ethnic group, remains constant. Therefore, the identification would fail if the correlation between the transfer of unobservables was affected by individual's behavior of environment. The heteroskedasticity implies that the contribution of ability to the formation of educational attainment differ depending on characteristics.

To summarize, both heteroskedasticity and constant correlation between the homoskedastic error term in the child's educational attainment equation and the father's schooling equation or the ethnic capital equation are necessary for identification. Consider the latter condition first. If unobserved ability is transferred genetically, than this assumption is clearly satisfied. In case of parental capital, this approach was successfully applied in Farré et al. (2012) and Farré et al. (2013). In case of ethnic capital, the literature delivers evidence justifying this error structure. First of all, there is a plethora of research focusing on selection of immigrants. Borjas (2006) points to the fact that not much can be inferred from a cross section about social mobility of immigrants due to a confounding effect of cohort quality. As migration decision is driven by a number of push

[4]This is one of the possible error structure Klein and Vella (2010) show that other structures are consistent with the constant correlation coefficient assumption.

and pull factors, the individuals that end up migrating from one country to another at a certain point in time are likely to be similar. This implies that unobserved individual ability correlates with unobserved characteristics of the ethnic group within the cohort.

Moreover, ethnic features are passed on genetically from the parents to the children. Bourdieu (2011) distinguishes between social and cultural ethnic capital. While the latter relies on group membership and networks, the former is enacted regardless of whether individuals are isolated or form a part of a community (Portes, 2000). This transfer goes beyond the transfer of unobserved cohort quality and includes norms and beliefs that originate in culture that is shared by an ethnic group. Cultural capital includes attitudes, norms, and skills that give an individual higher status in society (Portes, 2000) and its effect goes beyond peers effects.

Since parents can shape their children contacts with other ethnic group members, this ensures presence of heteroskedasticity in the error term of the primary equation - second condition required for identification. Borjas (1995) showed that neighborhood effects cannot account for the entire impact of ethnicity on inter-generational transmission of education, especially among less skilled individuals. Provided that individuals interact with other individuals from the same country of birth, ethnic capital effect goes beyond neighborhood effects. Borjas (1995) uses the following example to illustrate this point. Consider two immigrants identical in all respect, except from the fact that one comes from Korea and the other from Mexico. Even if both grow up in the same neighborhood, the Mexican child is more likely to interact with children of less educated parents, whereas the Korean is more likely to have friends with highly educated parents. The choice of the neighborhood in which a child grows up introduces heterogeneity to this effect but cannot erase it completely. The latter finding further supports the assumption that the transfer is constant regardless of environment or behavior. The previous confirms that the effect of the transfer can be modified by either behavior or environment.

In addition to peer effects, heteroskedacticty is granted by the fact that parents will invest less effort in child's education in favorable ethnic environment and more in less favorable (Bisin and Verdier, 2001). Therefore, negative (positive) effect of ethnic ability can be alleviated (reinforced) by shaping the child's interaction with peers of the same ethnicity. Parents actions will, in turn, vary by their socioeconomic status as well as by their children characteristics. In contrary to Bisin and Verdier (2001), Patacchini and Zenou (2011) find evidence of cultural complementarity of parental effort and quality of neighborhood. While among more educated parents, parental effort seem to be more influential than neighborhood effects, among low educated parents, neighborhood seem to play a significant role. Another source of heteroskedasticity comes from the finding that parents apply different ethnic socialization models to sons and daughters (Suárez-Orozco and Qin, 2006, Dion and Dion, 2001). Especially parents born outside of the US tend to have higher expectations for their daughters to embody home country cultural traits (Gupta, 1997). Moreover, as discussed in Farré et al. (2012), heteroskedasticity also arises due to regional differences in access to educational institutions as well as ethnic diversity. Also, the fact whether parents were born outside of the US introduces additional variation as they do not have as good information about US educational system as parents born in the US.

Furthermore, selection into migration may lead to heteroskedasticity in the parental and ethnic capital equation. Depending on when and which country are the parents migrating from, they will be either positively or negatively selected and therefore the $H^2_{v^f}(X_{ij})$ and $H^2_{v^{av}}(X_{ij})$ will not be the same across individuals.

To summarize and provide some more intuition consider two individuals coming from the same ethnic background and having identical parents, so that they receive identical transfers of ability, $v_i^{f*} = v_j^{f*}$ and $v_i^{af*} = v_j^{af*}$ but different observed characteristics X. The differences in $X's$ guarantee that the mapping between the v^{f*}, v^{af*} and u is not constant across individuals and thus identify the effect of parental and ethnic capital in educational attainment. In other words, the effect of this identical transfers on educational attainment of an individual varies with individual's characteristics. That means that the effect of coming from a disadvantaged background or having parents of low ability can be influenced by parental investments such as choice of neighborhood or school. Similarly, the effect of high ability parents or high average ability ethnic group can be attenuated or magnified by similar parental investments. The differential educational attainment resulting from these differences in behaviors and environments across otherwise "identical" individuals grant us variation necessary to identify the relationship between the v^{f*}, v^{af*} and u.

This error structure allows construction of control functions which inclusion in the main equation makes estimation of the unknown parameters $\gamma = \{\gamma_1, \gamma_2\}$ feasible. This is done by inclusion of consistent estimates of v_{ij}^{av} and v_{ij}^{f} in the child's education equation. Let $\lambda_1 = \frac{Cov(u_{ij}, v_{ij}^f)}{Var(v_{ij}^f)}$ and $\lambda_2 = \frac{Cov(u_{ij}, v_{ij}^{av})}{Var(av_{ij}^f)}$. Then we can rewrite the error term u as:

$$u_{ij} = \epsilon_{ij} + \lambda_1 v_{ij}^f + \lambda_2 v_{ij}^{av} \tag{4}$$

Equation 4 explicitly shows why heteroskedasticity is necessary for identification. If all errors are homoskedastic the control function has the same impact across all individuals, i.e. λ_1 and λ_2 are constant. Let $A_1(x_{ij}) = \rho_1 \frac{H_u(x_{ij})}{H_v^f(x_{ij})}$ and $A_2(x_{ij}) = \rho_2 \frac{H_u(x_{ij})}{H_v^{av}(x_{ij})}$. Then, under the conditional correlation assumption in equation 3, we can rewrite the above error term as:

$$u_{ij} = \epsilon_{ij} + A_1(x_{ij}) v_{ij}^f + A_2(x_{ij}) v_{ij}^{av}$$

Given equation 3, both $A_1(x_{ij})$ and $A_2(x_{ij})$ are non linear in $x_{ij}'s$ and that grants us identification of the parameters of the child's education equation by estimating the following model:

$$edu_{ij} = \delta_0 X_{ij} + \gamma_1 eduf_{ij} + \gamma_2 \bar{edu}_{ij} + \rho_1 \frac{H_u(x_{ij})}{H_v^f(x_{ij})} v_{ij}^f + \rho_2 \frac{H_u(x_{ij})}{H_v^{av}(x_{ij})} v_{ij}^{av} + \epsilon_{ij}$$

3 Data and summary statistics

I use the 1977-2014 General Social Survey data. The sample consist of 15390 individuals aged 18-64 born in the United States. I exclude individuals born abroad as well as native Americans and African Americans. Also, only individuals who grew up with both parents are included. Individuals for whom information about their own or their parents education attainment is not available are omitted from the sample. Individuals in the sample were born between 1913 and 1992 and they are divided into 5 cohorts[5]. Also, only individuals for whom there is at least 30 other individuals in the same cohort of the

[5]Data on parents age is not available so I use year of birth to categorize into cohorts. Finer division is not possible due to small cell sizes.

same ethnic origin are included[6]. Since data on father's education is available for more individuals in the sample I measure parental human capital with father's education and ethnic capital as the average education in the father's generation[7].

The final sample contains individuals coming from 26 different origins. First column of Table 1 presents the breakdown by country or region of origin in the whole sample. Descendants of German, English, Welsh and Irish immigrants are most represented in the sample, while other origins individually constitute a small share of the total sample. Table 2 presents the summary statistics for all variables used in this analysis. The first three columns show the summary statistics for the whole sample, the fourth column for the 1977-1989 sample[8] and the last column considers the post 1990 sample. Consider the full sample first. 54 percent of the sample are women. The average individual is about 46 years old, has about 3 siblings and has completed 14 years of schooling, which is surprisingly high. The average parental and ethnic capital are approximately the same at 11 years of schooling. 41 percent of all individuals lived in urban setting at the age of 16 and 25 percent lived in the South at the age of 16. Only 10 percent of individuals have at least one parent born abroad. The differences between men and women are very small, however the difference in years of self and average schooling within ethnic group is statistically significant at 1 percent significance level. Not surprisingly, in the sub sample until 1989, average educational attainment, among children, parents and ethnic groups is lower than in the whole sample. In the pre 1990 sample, an average individual and parent completed 13.3 and 10.6 years of schooling respectively. These numbers were 14.1 and 11.7 in the post 1990 sample. Also, individuals in the post 1990 sample are on average 6 years older and have less siblings.

Table 3 and Table 4 present the key variables, self, parental and average ethnic educational attainment by region of origin for the whole sample and by cohort, respectively. There is significant variation in father's education and ethnic capital across different origins. Individuals of Russian decent and their fathers have the highest educational attainment throughout the years. In more recent years they are closely followed by individuals of Chinese origin. Also, individuals of Indian decent born between 1950 and 1969 show exceptionally high self, parental and ethnic capital. Children of Mexican origin have the lowest educational attainment, although the gap has decreased over years. Nevertheless, their fathers are still ranked last and so is the overall ethnic capital. It is worth noticing though that the gap in the average education attainment decreased from about 8 years for individuals born between 1910-1929 to less than 3 years among individuals born between 1970 and 1999. This decrease is partially driven by the large increase (about 6 years) in average schooling among individuals of Mexican origin. Also the gap in the average schooling among ethnic groups has shrunk.

Table 5 presents the fraction of individuals obtaining at most high school and above high school education conditional on father's education or average education. I use 12 years of education as a dividing point[9]. While having a father who completed more than

[6]This is an arbitrary chosen threshold and a higher threshold would be more desired. However, higher thresholds resulted in significant sample size loss and more importantly fewer ethnic groups.

[7]Due to the high correlation between father's and mother's education and since data on father's education was available for more observations, I only include father's education in the estimation. Moreover, Farre, Klein and Vella Farré et al. (2012) find that the high correlation between parents education makes it difficult to disentangle the effects of mother's and father's schooling.

[8]This sample corresponds to the sample used in Borjas (1992).

[9]This is equivalent with high school completion in the US schooling system. Since only 10 percent of all individuals have fathers born abroad it appears to be a reasonable assumption.

12 years of schooling significantly increases chances that an individual will stay at school for more than 12 years, having a father who completed at most 12 years of schooling does not predict schooling in the children generation well. Out of individuals whose fathers have completed 13 or more years of education, only 16 percent completed 12 or less years of schooling. The remaining 84 percent followed their fathers and obtained at least 13 years of schooling. The probability of staying at school for more than 12 years is almost the same as finishing at at most 12 years of schooling if a father completed at most 12 years of schooling. A similar yet slightly less striking picture emerges from the lower panel. 68 percent of individuals coming from ethnic groups with relatively high average years of schooling stayed at school for over 12 years, while 54 percent of individuals coming from relatively low educated ethnic group obtained more education then their counterparts in fathers generation. This difference could be driven by the general trend in the US population to continue education past high school.

4 Empirical strategy

The summary statistics confirm the results in Borjas (1992) that educational attainment of an individual is not only related to parental education but also to the average level of education among countryman in the father's generation. Now, let us turn to a more rigorous examination of the effect of parental and ethnic human capital. The details of the estimation are presented in Appendix A. First, consider the OLS estimates of intergenerational transmission, which are presented in the first column of table 8. In line with existing literature, I find that each additional year of average and parental schooling increases child's education by 0.138 years and 0.237 respectively. Both coefficients are significant at 1 percent level.

In order to account for endogeneity, one could argue that averages of exogenous variables can be used as instruments for the endogenous regressors. Even though it might be convincing in the ethnic capital case, it is hard to justify these instruments as valid exclusion restrictions for parental education. Another approach could be to use a mix of the classic control function and the conditional correlation coefficient methods. Both of these approaches resulted in counter intuitive results leading to a conclusion that in this case the conditional correlation coefficient estimator is the most appropriate.

I follow closely Farré et al. (2012) in the estimation strategy[10]. Since there are two endogenous regressors, father's education and ethnic capital, I first estimate these two equations using OLS. Next, the conditional variance in both equations is estimated using non linear least squares. I use exponential function to model the conditional variance in all equations. The last step involves simultaneous estimation of the heteroskedastic index and the coefficients of the main equation. This is obtained by standard iterative procedure. I start with a guess of coefficients for the main equation (OLS estimates). Then, given these coefficients I compute the residuals and estimate the heteroskedastic index of the main equation. Given these estimates, I improve the guess of coefficients by including this correction term into the equation and estimating it by OLS to get new set of coefficients. This process continues until the coefficients values converge.

[10]Details of estimation are explained in Appendix A.

4.1 Parental and ethnic capital equations

All results are presented separately for the whole sample, as well as for the same sample as used in Borjas (1992) (the pre-1989 sample) and the post-1989 sample. This allows for comparison with the results in Borjas (1992) as well as reveals trends over time. The sets of variables included in the parental and ethnic capital equations are almost the same, so I discuss them together. Since I do not have information about the age of the parents, I include the age of the children (and age squared) in both of the equations. This, together with the dummy variable indicating the cross section, controls for the age of the fathers. Dummy variables for regions control for geographic differences in educational attainment that might result from labor market specific needs of given region or different access to educational institutions. I also include a dummy variable indicating whether the child was living in the south or in the city at the age of 16. Unfortunately, this information is not available for the parents so I use the information for the children as proxies. In the ethnic capital equation I also include a dummy indicating whether at least one of the parents is foreign born and in the father's schooling equation a dummy variable indicating whether the father is foreign born.

Consider the results for the whole sample first. The OLS results presented in the first two columns of table 6 are in line with the literature. All the year dummies (with the exception of 1978) are significant and indicate an increasing trend in educational attainment among parents. Younger individuals and those with fewer siblings have not only better educated father's but also more favorable ethnic environment. Individuals living in the city at 16 have, on average, better educated parents than their counterparts residing outside of the cities. The correlation with the ethnic capital is also positive but it's of much smaller magnitude and appear to be insignificant. However, the coefficient is insignificant. Residence in southern states lowers the average educational attainment of the fathers as well as the average ethnic capital individuals are exposed to by almost one year. Fathers born outside of the US have on average 2.7 years less of schooling than US born fathers. Also, average ethnic capital decreases for individuals with at least one parent born abroad by 1.4 years on average. This might reflect the fact that more recent immigrant groups are on average less educated than members of established groups within the US. There is also some evidence of regional differences for both parental and ethnic capital.

Lower panel of table 6 presents the test statistics for White and Breush-Pagan tests for heteroskedasticity in both equations. The null hypothesis of homoskedastic errors is strongly rejected in both equations confirming presence of heteroskedasticity in parental and ethnic capital equations necessary for identification.

Having established the presence of heteroskedasticity we can continue with estimation of its form and further construct the two control variables[11]. Results of the non linear least squares estimation of the conditional variance are presented in first two columns of table 7. Given the assumed exponential form of heteroskedasticity, I can directly interpret the coefficients. Older individuals are exposed to a smaller variation in average education among immigrants from the same origin as well as their fathers have smaller residual variance. This could result from increasing heterogeneity of immigrants coming form the same origin as well as easier access to education. Moreover, I find higher dispersion

[11]In the paper results using the preferred specification are discussed. Corresponding results with all variables entering the heteroskedastcity index can be obtained per request. The results are qualitatively unaffected by the choice of the form of heterskedasticity. However, some small quantitative differences are present.

in fathers' education for individuals who lived in the city or in the south at the age of 16. Similarly, fathers born abroad and with more children have a higher variance in educational attainment. I also find bigger dispersion in ethnic capital for individuals with at least one parent born abroad.

4.2 Education transmission equation

Having estimated the heteroskedasticity indexes for the two endogenous equations, I can now turn to estimation of the main equation. To construct the correction terms I still need the estimates of the heteroskesdticity index in the primary equation. These are estimated simultaneously with the coefficients of the main equation. The results are presented in the third column of table 7. I find that women, younger individuals and individuals with more siblings have a smaller residual variance.

Now, turn to the results of the main equation relating child's human capital to parental and ethnic capital. First two columns of Table 8 presents the OLS and control function (CF) estimates of the primary equation. I find that accounting for endogeneity reduces the coefficient on father's education from 0.24 to 0.18 and from 0.14 to 0.07 on ethnic capital. This confirms the fact that OLS coefficients are confounded by the endogeneity of parental and ethnic capital. The coefficients on control functions are both statistically significant at 1 percent significance level confirming the importance of unobserved ability and implying that the strategy employed in this paper is successful at capturing the endogeneity of parental and ethnic capital. Moreover, coefficients on both control functions are positive which confirms the conjecture that the unobservables are positively correlated across generations and justifies the interpretation of the assumed error structure. The magnitude of the effect of unobserved ability is similar to the one found by Farré et al. (2012).

However, I still find an important effect of father's education as well as I find evidence that ethnic capital plays a role in inter-generational transmission beyond the transfer of unobserved ability, even though not controlling for endogeneity results in a non trivial upward bias on both parental and ethnic capital coefficients. The effect of the unobserved ability is much stronger in case of the father's education. This can reflect the fact that unobserved ability transmitted through ethnic capital is more diluted as it reflects the average of the whole group.

I also find that women and individuals with more siblings have, on average, lower educational attainment. Similarly, individuals who lived in the south at the age 16 have acquired less years of education. Interestingly, individuals with at least one parent born outside of the US have higher educational attainment. This could be a result of the importance that immigrant parents often place on schooling of their children (Portes and Zhou, 1993). Notice also, that the OLS coefficient on at least one parent born abroad is almost three times as large as the coefficient in the CF approach. This confirms the argument of positive selection of immigrants and confounding effect of ability on parental migration dummy. Living in the city at the age of 16 increases educational attainment. Surprisingly, I find that age has a positive effect indicating that older individuals obtain higher educational credentials.

4.3 Pre and post 1990 results

It is possible that the effect of ethnic capital on inter-generational transmission of education has decreased in magnitude over time and this is why we observe a much smaller effect of ethnic capital than was obtained in Borjas (1992). Therefore, in order to contrast the results above with the results obtained in Borjas (1992), I estimate the model using the same sample (1977-1989) as well as on the newer sample (1990-2014). OLS estimates for parental and ethnic capital and estimates for heteroskedastic indexes for parental, ethnic and child education are presented in table 6 and table 7. There are few difference in the estimates of the conditional means for parental and ethnic capital (table 6). Only the effect of age differs significantly between the two samples. It is much smaller in case the post 1990 sample. Similarly, in the estimation of the heteroskedastic indexes in the children capital equation the role of age has decreased significantly. It also appears that females in the post 1990 sample are exposed to lower residual variance in the children capital equation. Furthermore the effect of residence in the city and having a father born abroad is larger in the post 1990 sample. Interestingly, the effect of having a parent who was born abroad changes sign (from positive to negative) between the two samples.

Consider the results of the main equation. Even though the OLS estimates in table 8 suggests that the role of ethnicity in inter-generational transmission of education has declined over the years, the CF estimates indicate that it remained relatively constant. The effect of parental capital decreased from 0.22 to 0.17. At the same time the role of unobserved ability in the transfer of parental capital increased while its role in the transfer of ethnic capital decreased significantly. Also gender differences disappear in the newer sample.

4.4 Ethnic capital, gender and social interactions

The literature delivers evidence that ethnicity can have different impact on men and women through different socialization patterns. Ethnic socialization, a concept that describes maturing to ethnic identity, has been recognized to vary significantly between boys and girls. Since, in general, girls are more susceptible to social influences, they might be more likely to be isolated due to parental fear of the "bad" influence of the majority. Therefore, girls are prone to a much stricter control over their brothers (Sung, 1987, Olsen, 1997). This finding is consistent over time and across almost all ethnic groups (Dasgupta, 1998, Gupta, 1997, Williams et al., 2002, Yung, 1999, Sung, 1987). As a result, girls might be more likely to have contacts with peers of the same ethnicity than their brothers. Moreover, such an increased supervision has proved to have a positive effect on schooling among Vietnamese girls (Zhou and Bankston III, 2001). Also, this could lead to a stronger importance of gender roles within ones ethnic group. High correlation between parental education implies that high average education within ethnic group is directly related to a high average education among women within this ethnic group. This could explain why average quality of ethnic group affects girls educational attainment but has no significant effect on boys. Even though girls are also more likely to rebel against the traditions and values, they have been found to be more flexible in choosing ethnic identity and building more complex ethnic identity by bridging home and host country identities (Rumbaut, 1997, Olsen, 1997). Girls have also higher educational and career aspirations, while boys tend to express more concern about social mobility (Suárez-Orozco and Qin, 2006). Also, boys are more pressured to take on their ethnic identity and are more likely to see the host country as hostile and unwelcoming (Suárez-

Orozco and Qin, 2006). This might result in low self esteem and low aspirations and, therefore, boys might perceive a more limited set of opportunities in comparison to girls (Qin-Hilliard, 2003) regardless of the socioeconomic position of their ethnic group. To verify the extent to which the transfer of ethnic capital vary by gender, I interact gender with the measure of ethnic capital.

While the OLS show that the effect of ethnic capital is still significant, albeit of smaller magnitude, the CF estimates reveal that once the unobservables are controlled for, the transfer of ethnic capital matters only for females confirming the direction of the effects suggested above. Also, such differential role of ethnic capital in inter-generational transmission could be a result of the transmission of gender roles. Realizing this differential effect is of importance to policy makers as it suggests that policies addressing girls and boys of ethnic minorities should be structured differently to alleviate the disadvantaged ethnic background among girls or help benefits boys take advantaged of the available ethnic capital within their group.

Consistently with the theory indicating that girls should be more affected by the transfer of ethnic capital, it appears that intensity of contact among group members play a key role in this framework. Individuals of origins characterized by strong ties among group members are likely to be more affected by the transfer. To verify the extent to which the social environment matters I use the share of women who marry within own ethnic group (*endogamy rates*) as a measure of closeness of ties. The endogamy rates are obtained from the US Census microdata (Steven Ruggles et al., 2010) and are computed separately for each region and cohort to allow for changes over time.

The results of the main equation for the extended model are presented in table 9. Both OLS and CF estimates shows a decreased coefficient on the ethnic capital measure, however, even the CF estimates remain significant, although relatively small in magnitude. This implies that a large part of the transfer depends on the group dynamics. The results suggest that higher endogamy rates amplify the effect of the transfer of ethnic capital. Individuals living in communities with stronger ties are more likely to benefit (hinder) from advantageous (disadvantageous) ethnic environment. For example, the effect of ethnic environment for individuals of Peurto Rican ancestry exceeds the effect for individuals of Filipino ancestry, on average, by 0.43. This means that increase in average schooling of Peurto Rican immigrants by one year increases the average years of schooling completed in the children generation by almost half a year more than it would among individuals of Filipino ancestry. Among Europeans decedents, Individuals of German origin exhibit one of the highest endogamy rates of 0.34. Compared to Italian decedents, schooling of individuals of German origin would increase by 0.08 year more if average schooling in the ethnic group would increase by one year.

5 Conclusions

This paper focuses on the role of ethnic capital in the inter-generational transmission of human capital. It's focus is on consistent estimates of the effects as well identifying potential channels through which the transfer appears. I find evidence that the OLS estimates of the effect of ethnic capital on inter-generational transmission of education are biased upwards. Unobserved ability has an important effect on educational choices and not accounting for its confounding effect biases the estimates of parental and ethnic capital. I deliver new evidence on how ethnic capital contributes to the inter-generational

transmission of educational attainment. I find that the transfer of ethnic capital benefits mostly women and that the effect of ethnicity vary with group dynamics.

In this paper I have established a link between ethnic capital and education of individuals, however I cannot say much about the mechanisms of transmission that go beyond the transfer of ability. Therefore, further research in this area should focus further on possible channels of transmission. Moreover, this paper suffers from two significant limitation. First one was mentioned before and concerns the lack of detail geographic information. Second issue is related to the sample composition. The sample is biased towards individuals of European decent and 90 percent of individuals have parents who were already born in the US. Intuitively the contribution of ethnic capital to the inter-generational transmission of education should be stronger among individuals whose parents were born outside of the US. Also, given the changing scene of the immigration in the US, the sample composition arising from the GSS data is somewhat restricted. A consequence of this sample composition is a relatively high average schooling of ethnic groups which is not representative for the current US population.

Given these empirical issues, the policy implication of the results are limited. However, this paper delivers convincing evidence that ethnic environment is an important complementing factor in the transmission of human capital and its differential effect should be considered when drafting policies concerning assimilation of immigrants.

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Appendix A

This section outlines the two step procedure employed to estimate the model. First, regress $eduf_{ij}$ on X_{ij} and $ed\bar{u}_{ij}$ on X_{ij} and obtain α^f and α^{av}. Then define the residuals from these two regressions as follows:

$$\begin{aligned} \hat{v^f}_{ij} &= eduf_{ij} - X_{ij}\hat{\alpha^f} \\ \hat{v^{av}}_{ij} &= ed\bar{u}_{ij} - X_{ij}\hat{\alpha^{av}} \end{aligned} \tag{5}$$

The conditional variances of the father's education and average education errors can be estimated using both parametric and non-parametric methods. In this paper I employ

parametric approach and assume the following functional form of the heteroskedasticity:

$$\begin{aligned} H_{ij}^{v^f} &= \exp(Z_{ij}\theta^f) \\ H_{ij}^{v^{av}} &= \exp(Z_{ij}\theta^{av}) \end{aligned} \tag{6}$$

where Z_{ij} is a vector of variables responsible for the heteroskedasticty of the errors. Note that there are no restrictions imposed over the relationship between Z_{ij} and X_ij, i.e. model is identified even if $Z_{ij} = X_{ij}$. If, however, there are variables that appear in Z_{ij} but not in X_{ij}, they do not help identify the model in a standard way. Since it is the movement in the variances that grants identification in the model, variables in Z_{ij} aid identification only if they can explain the differences in the variance across observations.

The conditional variances are estimated using non linear least squares using $\ln(\hat{v}_{ij}^f)$ and $\ln(\hat{v}_{ij}^{av})$ as dependent variables. Then we can compute the standard deviation of the error terms associated with the two reduced forms: $\hat{H}_{v^f ij} = \sqrt{\exp(Z_{v^f ij}\hat{\theta^f})}$ and $\hat{H}_{v^{av} ij} = \sqrt{\exp(Z_{v^{av} ij}\hat{\theta^{av}})}$.

Last element needed to estimate the parameters of the main equation is the standard deviation of the child's education error (so the error term of the main equation). Since consistent residuals are nor readily available, it is estimated simultaneously with the parameters of the main equation in an iterative procedure. Let $\beta = \{\gamma_1, \gamma_2, \delta_0, \theta_u\}$. The parameters are found using a non linear least squares:

$$\min_{\beta,\rho_1,\rho_2} \sum_{i=1}^{n} \left(edu_{ij} - \gamma_1 eduf_{ij} - \gamma_2 e\bar{du}_{ij} - \delta_0 X_{ij} - \rho_1 \frac{H_{uij}}{\hat{H}_{v^f ij}} \hat{v}_{ij}^f - \rho_2 \frac{H_{uij}}{\hat{H}_{v^{av} ij}} \hat{v}_{ij}^{av} \right)^2$$

where H_{uij} denotes the conditional variance of the child's education equation. In a fully parametric specification, assume $H_{uij}^2 = exp(z_{uij}\theta_u)$.

To simplify the computations, Klein and Vella (2010) suggest a two step procedure. First, for a given value of $\beta = \tilde{\beta}$, define the residuals $u_{ij}(\tilde{beta})$ and compute the standard deviation of the child's education error in the same way as $\hat{H}_{v^f ij}$ and $\hat{H}_{v^{av} ij}$, so $\hat{H}_{u_{ij}} = \sqrt{\exp(Z_{uij}\tilde{\theta}_u)}$. Second, estimate ρ_1 and ρ_2 by minimizing the sum of the squared residuals of the child's education equation:

$$\min_{\rho_1,\rho_2} \sum_{i=1}^{n} \left(u_{ij}(\tilde{\beta}) - \rho_1 \frac{\hat{H}_u(\tilde{\beta})}{\hat{H}_{v^f}} \hat{v}_{ij}^f - \rho_2 \frac{\hat{H}_u(\tilde{\beta})}{\hat{H}_{v^{av}}} \hat{v}_{ij}^{av} \right)^2 \tag{7}$$

Repeat the last two steps until the minimum of (7) is found.

Appendix B

Table 1: Sample composition

Country of ancestry	1977-2010	1977-1989	1990-2014
Africa	0.08		0.12
Austria	0.10	0.17	0.06
French Canada	1.19	1.22	1.04
Other Canada	0.04	0.06	1.22
China	0.01		0.02
Czechoslovakia	0.90	1.16	0.76
Denmark	0.89	0.06	0.12
England and Wales	22.33	18.63	19.88
Finland	0.14	0.34	0.04
France	1.73	1.99	1.59
Germany	27.65	27.85	27.54
Hungary	0.38	0.43	0.36
Ireland	19.49	18.50	20.01
Italy	7.64	7.09	7.93
Japan	0.11	0.09	0.12
Mexico	3.35	2.81	4.17
Netherlands	1.30	1.46	1.21
Norway	2.34	2.81	2.09
Poland	3.36	4.20	3.32
Puerto Rico	0.51	0.26	0.64
Russia	0.90	0.79	0.96
Scotland	4.32	3.62	4.69
Spain	0.38	0.43	0.35
Sweden	1.68	1.99	2.18
Portugal	0.09	0.04	0.12
Arabic	0.03	0.02	0.08

Table 2: Summary statistics

	1977-2014	1977-1989	1990-2010
Female	0.54	0.54	0.53
	(0.49)	(0.50)	(0.50)
Age	45.89	42.06	47.94
	(16.62)	(16.14)	(16.51)
Number of siblings	3.15	3.37	3.02
	(2.30)	(2.41)	(2.24)
Years of schooling	13.86	13.26	14.13
	(2.73)	(2.70)	(2.70)
Parental capital	11.28	10.57	11.66
	(4.01)	(4.03)	(3.96)
Ethnic capital	11.14	10.57	11.44
	(1.98)	(2.00)	(1.91)
Living in a city	0.41	0.39	0.42
at the age of 16	(0.49)	(0.49)	(0.50)
Living in a Southern	0.25	0.24	0.25
state at the age of 16	(0.43)	(0.43)	(0.43)
At least one parent	0.10	0.11	0.10
born abroad	(0.30)	(0.31)	(0.29)
Endogamy rates	0.06	0.06	0.05
	(0.23)	(0.23)	(0.23)
Concentration rates	0.10	0.10	0.10
	(0.06)	(0.06)	(0.06)
Number of observations	15390	5329	10061

Notes: Standard deviations in brackets.

Table 3: Self, parental and ethnic capital by ancestry

Country of ancestry	Self	Father	Ethnic capital
Africa	13.17	12.5	11.8
Austria	13.33	6.67	6.5
French Canada	13.11	9.98	9.98
Other Canada	13.17	8	9.07
China	15	13.01	12.77
Czechoslovakia	13.47	9.85	9.84
Denmark	13.93	12.07	11.79
England & Wales	14.28	11.85	11.71
Finland	12	8.05	7.86
France	13.83	11.75	11.62
Germany	13.65	11.3	11.21
Hungary	14.31	11.69	11.28
Ireland	13.8	11.52	11.35
Italy	14.02	11	10.86
Japan	15.18	13.06	12.71
Mexico	12.57	8	7.51
Netherlands	13.16	10.6	10.55
Norway	13.54	11.08	11.05
Poland	13.78	10.84	10.65
Puerto Rico	12.83	9.83	9.36
Russia	15.57	12.27	12.22
Scotland	14.42	12.06	11.95
Spain	13.31	10.62	10.89
Sweden	14.24	11.81	11.66
Portugal	14.5	12.21	11.91
Arabic	15.56	14.5	13.83

Table 4: Self, parental and ethnic capital by origin and cohort

	Cohort 1			Cohort 2			Cohort 3			Cohort 4			Cohort 5		
Country of ancestry	Self edu	Father edu	Ethnic capital	Self edu	Father edu	Ethnic capital	Self edu	Father edu	Ethnic capital	Self edu	Father edu	Ethnic capital	Self edu	Father edu	Ethnic capital
Africa										13.57	11.71	11.06	12.6	13.6	12.84
Austria				13.33	6.67	6.5									
French Canada				10.7	6.7	6.82	13.07	9.84	9.79	13.78	10.97	10.95			
Other Canada				13.17	8	9.07									
China													18	15	12.6
Czechoslovakia				11.21	6.76	6.39	14.08	9.69	9.9	14.32	12.39	12.34			
Denmark										13.93	12.07	11.79			
England & Wales	12.6	9.15	9.2	13.2	9.75	9.58	14.55	11.34	11.18	14.62	13.18	13.07	14.68	14.38	14.08
Finland				10.22	4.89	5.08	13.23	10.23	9.78						
France							13.55	10.33	10.29	13.97	12.49	12.31			
Germany	10.82	7.84	7.87	12.16	8.32	8.21	13.62	10.19	10.11	14	12.32	12.23	14.31	13.59	13.49
Hungary							13.69	9.69	9.58	14.48	12.26	11.76			
Ireland	11	7.41	7.85	12.54	8.75	8.52	13.75	10.38	10.26	14.15	12.59	12.38	14.38	13.95	13.8
Italy	10.6	2.6	1.55	11.65	6.42	5.62	14.2	9.77	9.73	14.33	12.1	12.06	14.49	13.3	13.17
Japan										15.18	13.06	12.71			
Mexico				7.2	1.4	1.88	10.82	5.21	4.9	12.61	7.92	7.17	13.44	9.49	9.16
Netherlands				11.14	8.08	8.35	13.65	10.04	9.88	13.57	11.2	11.04	13.7	13.52	13.52
Norway	11	6.14	6.06	12.24	7.78	7.91	13.67	10.5	10.5	13.88	12.42	12.32	14.57	14.3	14.21
Poland				11.72	6.83	6.57	13.79	9.64	9.51	14.22	12.13	11.9	14.25	13.94	13.85
Puerto Rico							9.3	7.7	6.73	13.26	9.66	9.08	13.61	11.5	11.62
Russia				15.11	8.53	8.51	15.76	11.57	11.62	15.55	13.81	13.69			
Scotland				13.5	10.15	9.82	14.6	11.37	11.3	14.56	13.13	13.06	15.2	14.33	14.48
Spain							15	15	9.56	13.25	10.46	10.94			
Sweden				12.69	9	8.48	14.77	11.02	11.05	14.29	12.86	12.7			
Portugal										14.5	12.21	11.91			
Arabic										17	14.5	13.83			

Cohort 1,2,3,4 and 5 include individuals born between 1889-1909, 1910-1929, 1930-1949, 1950-1969 and 1970-1999 respectively

Table 5: Conditional probabilities of obtaining at most high school or above high school education

	Father's education					
	1977-2010		1977-1989		1990-2010	
	Above HS	HS or less	Above HS	HS or less	Above HS	HS or less
Self education						
Above HS	0.84	0.48	0.80	0.39	0.86	0.53
HS or less	0.16	0.52	0.20	0.61	0.14	0.47
	Average education of ethnic group					
	1977-2010		1977-1989		1990-2010	
	Above HS	HS or less	Above HS	HS or less	Above HS	HS or less
Self education						
Above HS	0.68	0.52	0.58	0.45	0.72	0.57
HS or less	0.32	0.48	0.42	0.55	0.28	0.43

Table 6: Parental and ethnic capital - conditional means

	1977-2010		1977-1989		1990-2010	
	Parental capital	Ethnic capital	Parental capital	Ethnic capital	Parental capital	Ethnic capital
Age	-0.089	-0.061	-0.194	-0.139	-0.04	-0.020
	(0.009)	(0.004)	(0.017)	(0.006)	(0.012)	(-.005)
Female	0.011	-0.031	-0.017	-0.025	-0.012	-0.037
	(0.057)	(0.021)	(0.096)	(0.035)	(0.070)	(0.026)
Living in a city	1.171	0.009	1.117	-0.003	1.117	0.006
at the age of 16	(0.059)	(0.022)	(0.101)	(0.040)	(0.073)	(0.027)
Living in a Southern	-0.828	-0.703	-0.918	-0.848	-0.776	-0.619
state at the age of 16	(0.099)	(0.037)	(0.180)	(0.066)	(0.119)	(0.0.45)
Number of siblings	-0.303	-0.084	-0.301	-0.092	-0.310	-0.084
	(0.0125)	(0.005)	(0.00)	(0.007)	(0.016)	(0.006)
Father born abroad	-2.706		-2.302		-2.862	
	(0.108)		(0.180)		(0.137)	
At least one parent		-1.406		-1.19		-1.453
born abroad		(0.036)		(0.059)		(0.046)
Constant	12.199	13.979	14.500	15.524	12.229	13.912
	(0.316)	(0.112)	(0.559)	(0.179)	(0.379)	(0.138)
Breush-Pagan test	544.42	5030.34	138.11	1540.66	469.63	3437.97
White test	1095.95	3126.06	403.03	1242.04	760.10	2028.23
Number of observations	15390		5329		10061	

Notes: Robust standard errors in brackets. All regressions also include age squared, dummy variables for region of residence and year dummies for cross section.

Table 7: Heteroskedastic indexes for parental, ethnic and children capital

	All			1977-1989			1990-2010		
	Parental capital	Ethnic capital	Children capital	Parental capital	Ethnic capital	Children capital	Parental capital	Ethnic capital	Children capital
Age	-0.001	-0.399	0.115	-0.002	-0.322	0.307	0.000	-0.435	0.129
	(0.006)	(0.021)	(0.018)	(0.010)	(0.015)	(0.064)	(0.007)	(0.016)	(0.019)
Female			-0.448			-1.146			-0.294
			(0.073)			(0.475)			(0.081)
Living in a	0.245			0.075			0.348		
city at 16	(0.034)			(0.047)			(0.036)		
Living in the	0.271			0.280			0.207		
south at 16	(0.030)			(0.044)			(0.037)		
# siblings	0.036		-0.054	0.022		-0.075	0.032		-0.040
	(0.006)		(0.023)	(0.011)		(0.075)	(0.007)		(0.016)
One parent		0.471			0.498			-0.437	
born abroad		(0.111)			(0.176)			(0.176)	
Father born	0.414			0.245			0.491		
abroad	(0.048)			(0.090)			(0.049)		
Year d.	Yes	Yes	No	No	Yes	No	Yes	Yes	No
Regional d.	No	Yes	No	No	Yes	No	No	Yes	No
Constant	0.600	7.466	-3.541	0.444	6.665	-3.903	0.597	9.174	-3.949
	(0.172)	(0.350)	(0.753)	(0.245)	(0.274)	(1.574)	(0.184)	(0.240)	(0.504)

Notes: Standard errors bootstrapped

Table 8: Relationship between parental and ethnic capital and children education

	1977-2010		1977-1989		1990-2010	
	OLS	CF	OLS	CF	OLS	CF
Parental capital	0.237	0.177	0.245	0.215	0.234	0.170
	(0.006)	(0.006)	(0.009)	(0.011)	(0.007)	(0.007)
Ethnic capital	0.138	0.070	0.182	0.068	0.122	0.075
	(0.015)	(0.017)	(0.026)	(0.028)	(0.019)	(0.019)
Female	-0.152	-0.163	-0.352	-0.400	-0.043	-0.049
	(0.039)	(0.039)	(0.063)	(0.053)	(0.048)	(0.046)
Age	0.128	0.150	0.191	0.222	0.119	0.142
	(0.007)	(0.007)	(0.012)	(0.011)	(0.008)	(0.008)
Living in a city at the age of 16	0.275	0.387	0.269	0.377	0.269	0.372
	(0.041)	(0.042)	(0.067)	(0.072)	(0.051)	(0.049)
Living in a Southern	-0.167	-0.245	-0.183	-0.289	-0.163	-0.222
state at the age of 16	(0.068)	(0.068)	(0.120)	(0.110)	(0.083)	(0.082)
Number of siblings	-0.172	-0.191	-0.171	-0.182	-0.165	-0.184
	(0.009)	(0.008)	(0.014)	(0.016)	(0.011)	(0.010)
At least one parent born abroad	0.430	0.151	0.421	0.168	0.515	0.268
	(0.069)	(0.075)	(0.111)	(0.115)	(0.088)	(0.086)
ρ_1		0.099		0.068		0.099
		(0.009)		(0.020)		(0.010)
ρ_2		0.031		0.085		0.015
		(0.006)		(0.014)		(0.004)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	7.011	7.611	5.444	5.999	7.352	7.8959
	(0.321)	(0.288)	(0.491)	(0.376)	(0.360)	(0.410)

Notes: Standard errors bootstrapped

Table 9: Model extensions: role of gender and endogamy rates. Relationship between parental and ethnic capital and children education(1977-2014)

	Gender		Endogamy rates	
	OLS	CF	OLS	CF
Parental capital	0.237	0.173	0.236	0.172
	(0.006)	(0.005)	(0.006)	(0.005)
Ethnic capital	0.088	-0.003	0.103	0.037
	(0.018)	(0.025)	(0.017)	(0.019)
Age	0.127	0.151	0.126	0.148
	(0.007)	(0.006)	(0.007)	(0.007)
Female	-1.201	-1.413	-0.157	-0.167
	(0.221)	(0.252)	(0.039)	(0.036)
Female X Ethnic capital	0.094	0.112		
	(0.019)	(0.021)		
Endogamy rates			-1.859	-1.850
			(0.361)	(0.520)
Endogamy X Ethnic capital			0.196	0.192
			(0.038)	(0.054)
Living in a city	0.279	0.403	0.266	0.383
at the age of 16	(0.041)	(0.047)	(0.041)	(0.036)
Living in a Southern	-0.167	-0.254	-0.172	-0.253
state at the age of 16	(0.068)	(0.081)	(0.070)	(0.075)
Number of siblings	-0.172	-0.192	-0.169	-0.189
	(0.009)	(0.009)	(0.009)	(0.008)
At least one parent	0.429	0.117	0.407	0.121
born abroad	(0.69)	(0.064)	(0.70)	(0.076)
ρ_1		0.108		0.107
		(0.010)		(0.007)
ρ_2		0.037		0.029
		(0.004)		(0.004)
Year dummies	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes
Constant	7.595	7.611	7.497	8.111
	(0.313)	(0.288)	(0.309)	(0.303)

Notes: Standard errors bootstrapped