Intergenerational Transmission of Education: An Alert to Empirical Implementation

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ABSTRACT

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The intergenerational transmission of education is certainly a problem that continues to challenge most countries. The level of education that an individual rises to is linked to the education level(s) of her/his parents. This note serves as an alert to researchers undertaking empirical investigation into how the parents' education should be considered with regard to the child's. Using Portuguese data we conclude that the parents should be viewed as a unit (i.e. as a couple), and we should examine all of the different education combinations, avoiding the temptation to aggregate them in larger categories.

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Introduction

There is an extensive literature relating child's educational achievement to the education or income of their parents (Becker, 1988, Becker & Tomes, 1986, Haveman & Wolfe, 1995, Oosterbeek, 1995, Heineck & Riphahn, 2009, Pascual, 2009, Rumberger, 2009, just to cite a few). The model behind these studies is one where parents decide the allocation of resources to consumption and investment either on assets or human capital of their children. More education implies higher income and therefore a larger choice set allowing the choice of more human capital for their children. In this sense there is an intergenerational transmission of education meaning that children from parents with high education tend to attain high education while children from parents with low education tend to attain low education.

This conclusion has been tested and found to be valid in several empirical works. The issue I address in this note is the way that the education of the parents has been treated in some of these works. Some authors have considered the education of the parents as the highest level attained between the parents (e. g., Heineck & Riphahn, 2009), the highest level attained by both parents (e. g., Rumberger, 2009), or consider them separately (e. g., Pascual, 2009).

Using Portuguese data we test the following hypothesis:

1) Gender blindness – the gender of the parent having the higher education is unimportant.

2) What counts is the highest level attained by at least one of the parents.

3) What counts is the highest level that both parents achieved.

4) The effect of both parents having education is equal to adding the separate effects.

Data and methods

We use IEFA[1] (Adult education and training survey – 2007) data. Our data comprises 11,289 interviews (5,350 males, 5,939 females) in which the respondents were asked the educational level of the parents and their situation in the labor market while they were growing up (age 12 to 16).

In the dataset there are three educational levels for the parents from which the respondents could choose:

BAS – corresponding to less than or equal to 9 years of education;

SEC – corresponding to 11 or 12 years of education;

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[1] This survey was carried out by Statistics Portugal and took place in all European Member States, following methodological guidelines issued by Eurostat.

HIG – Higher education degree,

We consider only those cases where we have information about both parents (10,436 observations). M stands for mother and F stands for father, so, as an example, MBAS_FBAS represents a couple in which both partners have BAS education.

In Table I we see the distribution of education among parents.

Table I. Parents' educational achievement

	N.	%
MBAS_FBAS	9,538	91.42
MBAS_FSEC	182	1.74
MBAS_FHIG	104	1.00
MSEC_FBAS	105	1.01
MSEC_FSEC	134	1.28
MSEC_FHIG	86	0.82
MHIG_FBAS	77	0.74
MHIG_FSEC	43	0.41
MHIG_FHIG	164	1.57
Total	10,433	100.00

We see that more than 90% of the individuals have both parents with at most a degree corresponding to 9 years of education.

In the dataset the education of the individual (child) appears in four categories, one more than those of the parents. The extra category is of individuals who attained no formal education. The categories and the distribution of education appear below.

NONE – no formal education;

BAS – corresponding to less than or equal to 9 years of education;

SEC – corresponding to 11 or 12 years of education;

HIG – Higher education degree;

Table II – Individual's education

	N.	%
NONE	514	4.93
BAS	7,098	68.03
SEC	1,675	16.05
HIG	1,146	10.98
Total	10,433	100.00

We perform an ordered probit (four education levels). We use as explanatory variables parents education. We performed independent regressions depending on the gender of the individual.

Findings and conclusions

We use as reference group an individual whose parents both have basic education.

For the sample of females we have the following results:

Ordered probit regression
Number of obs = 5478
LR chi2(8) = 760.21
Prob > chi2 = 0.0000
Log likelihood = -5135.1261
Pseudo R2 = 0.0689

Table III – Females' education

Educational level	Coef.	Std. Err.	z	P>|z|
MBAS_FSEC	1.296761	.1227121	10.57	0.000
MBAS_FHIG	1.437740	.1614672	8.90	0.000
MSEC_FBAS	1.195232	.1446895	8.26	0.000
MSEC_FSEC	1.646253	.1451327	11.34	0.000
MSEC_FHIG	1.888777	.1911292	9.88	0.000
MHIG_FBAS	1.133614	.1866223	6.07	0.000
MHIG_FSEC	1.864989	.2755164	6.77	0.000
MHIG_FHIG	2.015568	.1390118	14.50	0.000
cut1	-1.522843	.0274417		
cut2	.6939479	.0192910		
cut3	1.3518650	.0242860		

And for males we have the following results:

Ordered probit regression
Number of obs = 4958
LR chi2(8) = 786.53
Prob > chi2 = 0.0000
Log likelihood = -3928.0614
Pseudo R2 = 0.0910

Table IV – Males' education

	Coef.	Std. Err.	z	P>|z|
MBAS_FSEC	**1.252195**	**.1143128**	**10.95**	**0.000**
MBAS_FHIG	**1.459748**	**.1539760**	**9.48**	**0.000**
MSEC_FBAS	**1.539607**	**.1629626**	**9.45**	**0.000**
MSEC_FSEC	**1.513769**	**.1365484**	**11.09**	**0.000**
MSEC_FHIG	**1.73789**	**.1759110**	**9.88**	**0.000**
MHIG_FBAS	**1.544943**	**.1730826**	**8.93**	**0.000**
MHIG_FSEC	**2.044571**	**.2470063**	**8.28**	**0.000**
MHIG_FHIG	**1.943243**	**.1353325**	**14.36**	**0.000**
cut1	**-1.728752**	**.0332022**		
cut2	**.8654607**	**.0214239**		
cut3	**1.66038**	**.0298699**		

Hypothesis 3) is rejected as having at least one parent with higher education has a positive effect that is significantly different from zero.

The testing of the other hypothese appears in the table below.

Table V – Testing of hypothese

	For the female sample		For the male sample	
	Test	Conclusion	Test	Conclusion
Gender blindness	MBAS_FSEC= MSEC_FBAS chi2(1) = 0.29 Prob > chi2 = 0.5885	Do not reject hypothesis 1)	MBAS_FSEC= MSEC_FBAS chi2(1) = 2.14 Prob > chi2 = 0.1434	Do not reject hypothesis 1)
	MBAS_FHIG= MSUP_FBAS chi2(1) = 1.54 Prob > chi2 = 0.2148	Do not reject hypothesis 1)	MBAS_FHIG= MSUP_FBAS chi2(1) = 0.14 Prob > chi2 = 0.7103	Do not reject hypothesis 1)
	MHIG_FSEC=MSEC_FHIG chi2(1) = 0.01 Prob > chi2 = 0.9432	Do not reject hypothesis 1)	MHIG_FSEC=MSEC_FHIG chi2(1) = 0.01 Prob > chi2 = 0.9432	Do not reject hypothesis 1)
Both parents = at least one parent	MBAS_FSEC=MSEC_FSEC chi2(1) = 3.46 Prob > chi2 = 0.0629	Reject hypothesis 2)	MBAS_FSEC=MSEC_FSEC chi2(1) = 2.23 Prob > chi2 = 0.1353	Reject hypothesis 2)
	MSEC_FBAS= MSEC_FSEC chi2(1) = 4.94 Prob > chi2 = 0.0263	Reject hypothesis 2)	MSEC_FBAS= MSEC_FSEC chi2(1) = 0.02 Prob > chi2 = 0.9021	Reject hypothesis 2)
	MHIG_FBAS= MHIG_FHIG chi2(1) = 14.59 Prob > chi2 = 0.0001	Reject hypothesis 2)	MHIG_FBAS=MHIG_FHIG chi2(1) = 3.37 Prob > chi2 = 0.0665	Reject hypothesis 2)
	MBAS_FHIG= MHIG_FHIG chi2(1) = 7.50 Prob > chi2 = 0.0062	Reject hypothesis 2)	MBAS_FHIG=MHIG_FHIG chi2(1) = 5.72 Prob > chi2 = 0.0168	Reject hypothesis 2)
Both parents=parent A+parent B	MSEC_FSEC=MSEC_FBAS+ MBAS_FSEC chi2(1) = 12.73 Prob > chi2 = 0.0004	Reject hypothesis 4)	MSEC_FSEC=MSEC_FBAS+ MBAS_FSEC chi2(1) = 28.57 Prob > chi2 = 0.0000	Reject hypothesis 4)
	MHIG_FHIG=MHIG_FBAS+ MBAS_FHIG chi2(1) = 3.90 Prob > chi2 = 0.0484	Reject hypothesis 4)	MHIG_FHIG=MHIG_FBAS+ MBAS_FHIG chi2(1) = 15.93 Prob > chi2 = 0.0001	Reject hypothesis 4)

Given the above findings[2] we conclude that in the empirical work we should consider the different pairs of possibilities of education of the parents and test if we can join some of them in larger categories. In the Portuguese case we cannot.

Gender blindness seems to be the exception, as we could not statistically reject the hypothesis.

Finally, the effect of the parents' education is not the same as the effect of the education of each parent added together. As a result, we should not treat them independently.

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[2] Similar results were obtained in a regression where we considered as explanatory variables not only the education of the parents but also their situation in the labour market and the age of the individual.

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