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## Higher education attainment: the case of intergenerational transmission of education in Portugal

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The Case of Intergenerational Transmission of  
Education in Portugal**

Pedro Telhado Pereira

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# Higher Education Attainment: The Case of Intergenerational Transmission of Education in Portugal

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## **ABSTRACT**

### **Higher Education Attainment: The Case of Intergenerational Transmission of Education in Portugal**

The lack of formal education and competences of the Portuguese workers is one of the biggest problems of the country. This lack is disappearing as quickly as desired and the young generations still lag far behind those in other OECD countries. This paper studies the intergenerational transmission of education achievement, in particular higher education completion, seeking to determine the influence on future attainment of parents' education and labor market conditions while the child was growing up. We conclude that the education of the parents is very important, even if it is only one of them that has it. This influence seems not to be independent of the gender of the parent who has it. The fact that the parents face unemployment has a negative effect on the educational achievement of the child. Females generally perform better than males, but there are exceptions. For instance, it is significantly lower if the father has low education and the mother has secondary or higher education.

JEL Classification: I21, I28, J11

Keywords: demand for schooling, human capital, parent's education

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## Introduction

Portugal is one of the OECD's countries that shows lower educational attainment even among its younger population, as can be seen in the table I.

**Table I. Population with at least upper secondary education<sup>1</sup> (2007)**

		<i>Percentage, by age group</i>				
		Age group				
		25-64	25-34	35-44	45-54	55-64
		(1)	(2)	(3)	(4)	(5)
<b>OECD countries</b>	Australia	68	81	70	64	54
	Austria	80	87	84	78	70
	Belgium	68	82	75	63	50
	Canada	87	91	90	86	78
	Czech Republic	91	94	94	89	85
	Denmark	75	85	80	71	66
	Finland	81	90	87	81	65
	France	69	83	74	63	53
	Germany	84	85	86	85	81
	Greece	60	75	67	53	37
	Hungary	79	85	83	79	68
	Iceland	65	69	70	62	54
	Ireland	68	83	72	60	42
	Italy	52	68	56	48	34
	Korea	78	97	92	65	39
	Luxembourg	66	77	67	62	53
	Mexico	33	39	37	29	18
	Netherlands	73	83	77	71	61
	New Zealand	72	80	74	70	60
	Norway	79	83	80	77	76
	Poland	86	92	90	86	74
	Portugal	27	44	27	20	13
	Slovak Republic	87	94	92	86	71
	Spain	51	65	56	44	28
	Sweden	85	91	90	83	74
	Switzerland	86	90	87	85	81
	Turkey	29	38	26	22	16
	United Kingdom	68	75	69	66	61
	United States	88	87	88	89	87
	<b>OECD average</b>	<b>70</b>	<b>79</b>	<b>74</b>	<b>67</b>	<b>57</b>
	<b>EU19 average</b>	<b>71</b>	<b>81</b>	<b>75</b>	<b>68</b>	<b>57</b>
<b>Partner countries</b>	Brazil	37	47	37	31	22
	Chile	2 50	64	52	44	32
	Estonia	89	86	94	93	82
	Israel	80	85	83	77	71
	Russian Federation	3 88	91	94	89	71
	Slovenia	82	92	84	78	71

1. Excluding ISCED 3C short programs.

2. Year of reference 2004.

3. Year of reference 2002.

Source: OECD. ([www.oecd.org/edu/eag2009](http://www.oecd.org/edu/eag2009)).

There is an extensive literature relating children's educational achievement to the education or income of their parents (Becker 1988, Becker and Tomes 1986, Haveman and

Wolfe 1995, Oosterbeek 1995, Heineck and 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 in assets or human capital of their children. More education of the parents implies higher income and therefore a larger choice set, allowing the choice of more human capital for their children.

Portugal is a country where returns to education have been very high (see, for instance, Martins and Pereira 2004) and we would therefore expect to find a strong intergenerational transmission of educational achievement and, at the same time, the transmission of the problem of low skills that the country's population faces.

The labor market situation of the parents, unemployment in particular, can also decrease the choice set and therefore decrease the investment in the human capital of the children.

The questions we address in this study are the following:

1. What is the relationship between parents' education and the individual's higher education completion?
2. Is this relationship independent of who has the education (mother or father)?
3. What is the relationship between parents' labor market situation and the individual's higher education completion?
4. Do these relationships vary with gender?

## **1 Methods**

We use IEFA<sup>1</sup> (Adult education and training survey – 2007) data. It contains 11,289 interviews (5,350 males, 5,939 females) where the respondents were asked about 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 and three labor market situations for the parents:

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

SEC – degree corresponding to 11 or 12 years of education

HIG – Higher education degree

UNE - Unemployed

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

EMP - Employed

NOT - Not in the labor market

We consider only cases where we have information about both parents (10,433 observations). M stands for mother and F stands for father, e. g. M\_BAS/F\_BAS is a couple in which both partners have BAS education. M\_UNE/F\_EMP is a couple where the mother is unemployed and the father is employed.

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

**Table II. Parents' educational achievement**

	N.	%
M_BAS/F_BAS	9,538	91.42
M_BAS/F_SEC	182	1.74
M_BAS/F_HIG	104	1.00
M_SEC/F_BAS	105	1.01
M_SEC/F_SEC	134	1.28
M_SEC/F_HIG	86	0.82
M_HIG/F_BAS	77	0.74
M_HIG/F_SEC	43	0.41
M_HIG/F_HIG	164	1.57
Total	10,433	100.00

We see that more than 90% of the individuals have both parents with at most 9 years of education. Less than 2% have both parents with a Higher Education Degree.

The distribution of the parents' labor market situation appears in Table III.

**Table III. Parents' labor market situation**

	N.	%
M_NOT/F_NOT	116	1.11
M_NOT/F_UNE	29	0.28
M_NOT/F_EMP	5,172	49.57
M_UNE/F_NOT	3	0.03
M_UNE/F_UNE	6	0.06
M_UNE/F_EMP	29	0.28
M_EMP/F_NOT	93	0.89
M_EMP/F_UNE	12	0.12
M_EMP/F_EMP	4,973	47.67
Total	10,433	100.00

More than 97% of the individuals had an employed father and for the majority of these the mother was not in the labor market while they were growing up. The cases of unemployment were rare when the individuals were growing up.

In the dataset the education of the individual (child) appears in four categories, one more than those of the parents. The extra category is for individuals who did not attain any education. The categories and the distribution of education appear in table IV.

NONE – no formal education

BAS –less than or equal to 9 years of education

SEC –11 or 12 years of education

HIG – Higher education degree

**Table IV. 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

More than 70% of the individuals have up to 9 years of education, meaning that less than 30% of the individuals have at least an upper secondary degree (as already seen in Table I). Educational attainment is not gender blind, as can be seen in Table V.

**Table V. Individual's education by gender**

Individual's Education	Female (FEM)	%	Male	%
NONE	324	5.92	190	3.83
BAS	3,557	64.96	3,541	71.43
SEC	884	16.14	791	15.96
HIG	711	12.98	435	8.78
Total	5,476	100.00	4,957	100.00

As in other countries, females (see, for the US, Goldin, Katz, & Kuziemko, 2006) are more prone to achieve a higher education degree than males.

Finally the dataset gives information about the individual's age in five age groups.



AGEI – 18 to 24 years old

AGEII – 25 to 34 years old

AGEIII – 35 to 44 years old

AGEIV – 45 to 54 years old

AGEV – 55 to 64 years old

The educational attainment by age group follows:

**Table VI. Individual's education by age group**

Individual's Education	AGEI	%	AGEII	%	AGEIII	%	AGEIV	%	AGEV	%
NONE	13	0.95	38	2.22	73	3.20	129	5.04	261	10.37
BAS	700	51.28	916	53.54	1,622	71.11	1,931	75.46	1,929	76.64
SEC	556	40.73	398	23.26	316	13.85	251	9.81	154	6.12
HIG	96	7.03	359	20.98	270	11.84	248	9.69	173	6.87
Total	1,365	100	1,711	100	2,281	100	2,559	100	2,517	100

We see that completion of higher education decreases with age except in the first age group. In this youngest group there are still people who did not finish their studies.

We perform an ordered probit (four education levels), using as explanatory variables parents' education, parents' labor market situation, age of individual, and gender. We allow the influence of the explanatory variables to be different depending on the gender of the individual (creating variables VAR\*FEM).

We considered as reference group a young male with both parents with a degree of less than or equal to nine years of education, both not in the labor market.

Due to the small number of individuals whose parents were both unemployed (six individuals) or whose mother was unemployed and father not in the labor market (three individuals) we decided to drop them from our sample.

## 2 Results

The marginal effects on higher education completion appear in Table VI.

**Table VII. Marginal effects on higher education completion**

variable	dy/dx	Std. Err.	z	P> z
<i>M_BAS_F_SEC</i>	.2997595	.04272	7.02	0.000
<i>M_BAS_F_HIG</i>	.4164844	.06094	6.83	0.000
<i>M_SEC_F_BAS</i>	.4031556	.06458	6.24	0.000
<i>M_SEC_F_SEC</i>	.4032619	.05392	7.48	0.000
<i>M_SEC_F_HIG</i>	.4861511	.06872	7.07	0.000
<i>M_HIG_F_BAS</i>	.4122408	.06973	5.91	0.000
<i>M_HIG_F_SEC</i>	.5987253	.08863	6.76	0.000
<i>M_HIG_F_HIG</i>	.5595771	.05066	11.05	0.000
<i>M_NOT/F_UNE</i>	-.0748998	.00366	-20.47	0.000
<i>M_NOT/F_EMP</i>	.0283184	.02671	1.06	0.289
<i>M_UNE/F_EMP</i>	.2178198	.13513	1.61	0.107
<i>M_EMP/F_NOT</i>	.0031802	.04033	0.08	0.937
<i>M_EMP/F_UNE</i>	-.052403	.02757	-1.90	0.057
<i>M_EMP/F_EMP</i>	.0255261	.02694	0.95	0.343
<i>AGEII</i>	.0242619	.00995	2.44	0.015
<i>AGEIII</i>	-.0235694	.00737	-3.20	0.001
<i>AGEIV</i>	-.0296682	.00712	-4.17	0.000
<i>AGEV</i>	-.040434	.00674	-6.00	0.000
<i>M_BAS_F_SEC*FEM</i>	.0231177	.02928	0.79	0.430
<i>M_BAS_F_HIG*FEM</i>	.0014126	.0323	0.04	0.965
<i>M_SEC_F_BAS*FEM</i>	-.0426145	.01677	-2.54	0.011
<i>M_SEC_F_SEC*FEM</i>	.0232	.0349	0.66	0.506
<i>M_SEC_F_HIG*FEM</i>	.0257958	.04591	0.56	0.574
<i>M_HIG_F_BAS*FEM</i>	-.0387563	.02139	-1.81	0.070
<i>M_HIG_F_SEC*FEM</i>	-.0032356	.05095	-0.06	0.949
<i>M_HIG_F_HIG*FEM</i>	.0326183	.03624	0.90	0.368
<i>M_NOT/F_UNE*FEM</i>	-.0678814	.01254	-5.41	0.000
<i>M_NOT/F_EMP*FEM</i>	-.0207577	.03016	-0.69	0.491
<i>M_UNE/F_EMP*FEM</i>	-.0708181	.00875	-8.09	0.000
<i>M_EMP/F_NOT*FEM</i>	-.0447669	.02508	-1.78	0.074
<i>M_EMP/F_UNE*FEM</i>	.0405425	.14939	0.27	0.786
<i>M_EMP/F_EMP*FEM</i>	-.0443322	.02638	-1.68	0.093
<i>AGEII*FEM</i>	.0052481	.01266	0.41	0.679
<i>AGEIII*FEM</i>	-.0195432	.01003	-1.95	0.051
<i>AGEIV*FEM</i>	-.0418633	.00798	-5.25	0.000
<i>AGEV*FEM</i>	-.0726491	.00541	-13.43	0.000
<i>FEM</i>	.0927274	.03446	2.69	0.007
Predicted probability for the reference group (young male with both parents with BAS education and not in the labor market) = .07644406				

Looking at the results of females' variables, we see that there is a significant difference between females and males pointing to a female positive effect that decreases when the father has low education. Based on these results we perform independent regressions for the male and female samples (results in the appendix). From the results of these regressions we calculate the probabilities of achieving a Higher education degree, which appear in table VII.

**Table VIII. Total effects on higher education completion (in percentage)**

	F_BAS			F_SEC			F_HIG		
	Female	Male	Difference	Female	Male	Difference	Female	Male	Difference
M_BAS	9,15%	6,10%	3,04%	45,59%	46,73%	-1,14%	51,94%	46,73%	5,21%
M_SEC	35,37%	45,31%	-9,95%	56,07%	45,32%	10,76%	64,56%	53,78%	10,78%
M_HIG	37,80%	46,18%	-8,37%	68,44%	65,49%	2,94%	72,44%	61,34%	11,10%

We see that education of the parents increases significantly the higher education attainment of their children; at least a 25% increase, going as high as 60%. This answers question 1 above.

Given the education of the parents, females seem to perform better than males with the exception of those whose father has low education and the mother has a secondary or tertiary education, and those whose mother has low education and the father has secondary education. Therefore the positive female effect is not observed in all types of families. This answers question 4.

In the female case, having a father with low education and a mother with secondary or higher education is worse than having a mother with low education and father with secondary or higher education. In the male case we do not see that difference.

In the case of one of the parents having secondary education and the other higher education, it is better that the female has the higher education. The difference is much higher in the case of the males. Therefore the effect of the parents' education on the attainment of the child is not independent of the gender of the parent who has the education (answers question 2), and not independent of the gender of the individual.

From the results in the annex, we see that having a father unemployed decreases significantly the probability of higher education attainment (in the case of the mother being employed the negative effect is not significant for the female sample). This answers question 3.

The young age effect seems to be greater among females meaning that younger female cohorts are improving their performance better than are male cohorts are doing, meaning in turn that the time trend is steeper for females than for males.

### 3 Conclusions

The transmission of education between generations can explain different situations that perpetuate the lag of education of certain groups and the need for policy measures to overcome the unfavorable starting conditions. In Portugal there is a great influence of parents' education on the child's higher education attainment. The probability of achieving a higher education degree is more than eight times higher for an individual both of whose parents have a higher education degree than for one whose parents both have at most 9 years of education. Therefore low level of education is going to perpetuate from generation to generation, creating a lasting problem.

Portuguese data show that the effect of parents' education is not independent of the gender of the parent that has it, and from the education of the partner. As a result we recommend not using the highest education level of one of the members of the couple as an indicator of the couple's education.

Unemployment of the father decreases the probability of attaining a higher education degree, showing that financial reasons can be the explanation for the low educational attainment.

Females have an advantage in terms of educational attainment – an average increase of around 10% in the probability of attaining a higher education degree. The average disguises situations that are unfavorable for females, such as the case of having the mother with more education than the low educated father.

The time trend seems to be steeper for females than for males.

Given the findings, it is very important to intervene in the educational process to see if the children of parents with low levels of education obtain, in order that do not leave their studies early. This should also be done with children whose parents are unemployed, especially the father. Female children whose father has low education should also have extra support.

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# Appendix

**Table AI. Marginal effects on higher education completion**

	Females					Males			
	variable	dy/dx	Std. Err.	z	P> z	dy/dx	Std. Err.	z	P> z
Parents' Education	<i>M_BAS_F_SEC</i>	<i>.3644079</i>	<i>.04845</i>	<i>7.52</i>	<i>0.000</i>	<i>.2872214</i>	<i>.04168</i>	<i>6.89</i>	<i>0.000</i>
	<i>M_BAS_F_HIG</i>	<i>.4279069</i>	<i>.0637</i>	<i>6.72</i>	<i>0.000</i>	<i>.4062774</i>	<i>.06058</i>	<i>6.71</i>	<i>0.000</i>
	<i>M_SEC_F_BAS</i>	<i>.2621965</i>	<i>.05444</i>	<i>4.82</i>	<i>0.000</i>	<i>.3921008</i>	<i>.06434</i>	<i>6.09</i>	<i>0.000</i>
	<i>M_SEC_F_SEC</i>	<i>.4692882</i>	<i>.05732</i>	<i>8.19</i>	<i>0.000</i>	<i>.392137</i>	<i>.05368</i>	<i>7.30</i>	<i>0.000</i>
	<i>M_SEC_F_HIG</i>	<i>.5541432</i>	<i>.07036</i>	<i>7.88</i>	<i>0.000</i>	<i>.4767576</i>	<i>.06926</i>	<i>6.88</i>	<i>0.000</i>
	<i>M_HIG_F_BAS</i>	<i>.2865847</i>	<i>.07179</i>	<i>3.99</i>	<i>0.000</i>	<i>.4007239</i>	<i>.06947</i>	<i>5.77</i>	<i>0.000</i>
	<i>M_HIG_F_SEC</i>	<i>.5928922</i>	<i>.09663</i>	<i>6.14</i>	<i>0.000</i>	<i>.5938867</i>	<i>.09068</i>	<i>6.55</i>	<i>0.000</i>
	<i>M_HIG_F_HIG</i>	<i>.6329232</i>	<i>.04677</i>	<i>13.53</i>	<i>0.000</i>	<i>.5523683</i>	<i>.05163</i>	<i>10.70</i>	<i>0.000</i>
Parents' Labor Market	<i>M_NOT/F_UNE</i>	<i>-.0923406</i>	<i>.00403</i>	<i>-22.90</i>	<i>0.000</i>	<i>-.0604248</i>	<i>.00368</i>	<i>-16.42</i>	<i>0.000</i>
	<i>M_NOT/F_EMP</i>	.006795	.02338	0.29	0.771	.0251655	.0227	1.11	0.268
	<i>M_UNE/F_EMP</i>	-.027817	.03806	-0.73	0.465	.2079095	.1301	1.60	0.110
	<i>M_EMP/F_NOT</i>	<i>-.048463</i>	<i>.01992</i>	<i>-2.43</i>	<i>0.015</i>	.0027343	.03457	0.08	0.937
	<i>M_EMP/F_UNE</i>	-.0395095	.06189	-0.64	0.523	-.0444237	.02068	-2.15	0.032
	<i>M_EMP/F_EMP</i>	-.0266651	.02324	-1.15	0.251	.0227805	.02321	0.98	0.326
Age	<i>AGEII</i>	<i>.0337868</i>	<i>.01158</i>	<i>2.92</i>	<i>0.004</i>	<i>.0214165</i>	<i>.00859</i>	<i>2.49</i>	<i>0.013</i>
	<i>AGEIII</i>	<i>-.0452848</i>	<i>.00752</i>	<i>-6.02</i>	<i>0.000</i>	<i>-.0209386</i>	<i>.00615</i>	<i>-3.40</i>	<i>0.001</i>
	<i>AGEIV</i>	<i>-.0753454</i>	<i>.0068</i>	<i>-11.08</i>	<i>0.000</i>	<i>-.0262587</i>	<i>.00595</i>	<i>-4.41</i>	<i>0.000</i>
	<i>AGEV</i>	<i>-.1211064</i>	<i>.00624</i>	<i>-19.41</i>	<i>0.000</i>	<i>-.0356393</i>	<i>.00564</i>	<i>-6.32</i>	<i>0.000</i>
		Predicted probability for the reference group (young female with both parents with BAS education and not in the labor market) = .07644406					Predicted probability for the reference group (young male with both parents with BAS education and not in the labor market) = .06103418		