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## **Does School Improve Equity? Some Key Findings from Portuguese Data**

Chagas Lopes, Margarida and Medeiros, João and PINTO, AQUILES

ISEG (SCHOOL OF ECONOMICS AND MANAGEMENT,  
TECHNICAL UNIVERSITY OF LISBON, ISEG - UTL, ESCOLA  
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- Margarida Chagas Lopes, Assistant Professor with Aggregation,  
ISEG, Technical University of Lisbon  
([mchagaslopes@mail.telepac.pt](mailto:mchagaslopes@mail.telepac.pt))
- João Cavaco Medeiros, MSc., ISEG, Technical University of Lisbon  
([cavacomedeiros@sapo.pt](mailto:cavacomedeiros@sapo.pt))
- Aquiles Sequeira Pinto, José Gomes Ferreira Secondary School  
([asp@netcabo.pt](mailto:asp@netcabo.pt))

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# *Does School Improve Equity? Some Key Findings from Portuguese Data*

## Abstract

Most school inequality research usually emphasize the role played by pupils' family social, cultural and economic condition, their parents' educational achievement, previous own school story and gender, among other factors. Despite also considering these same determinants, our main purpose in this paper had to do with assessing the specific role played both directly and indirectly by the "school effect" upon pupils' scholar trajectories; and thereby trying to investigate how far does school alleviate or reinforce the other factors inequality outcomes. Therefore, we began by identifying the statistically meaningful variables on the basis of contingency analysis, then went on to investigate the joint influence exerted by those variables upon two different success/failure school outcomes. Finally, we applied discriminant with control analysis in order to assess the magnitude of "school effect" throughout its diverse intervention forms along school course. We concluded that Portuguese secondary school actually amplifies both the vicious and the virtuous cycles generated by the other inequality variables, depending mostly on school characteristics themselves and possibly with their interaction with surrounding area characteristics.

**Key Words:** social and economic deprivation; parents' school achievement; gender; own school trajectory; school effect; school outcomes inequity; data; Portugal.

**JEL:** I 21

# **“Does School Improve Equity? Some Key Findings from Portuguese Data”**

## **0. Introduction**

The severe financial and competitiveness crisis which the Portuguese society is facing nowadays is convoking more than ever the role that human resources development should play in overcoming this situation. Actually, politicians do not innovate in this light: most Economy and Sociology researchers have been emphasizing this weakness for long and, most of all, stressing the point that reforms in education take time to exhibit their offsprings, specially when forecasting and diagnosis procedures are not adequately routinized.

Raising high skilled unemployment, altogether with the lack of quality in most of the newly created employment, reinforcement in the share of the low paid workers at the bottom, increasing income inequality ...are all of them issues well related with Portuguese savings weakness, family raising insolvency, lack of civic consciousness and participation. Equality of opportunities is becoming, once again, a strong concern, and therefore education, mostly in which concerns its equity and quality features.

Some of the most recent approaches in this light are actually trying to save education from the burden of equalising opportunities... School for itself wouldn't be powerful enough to overcome inequalities arising all over nowadays societies. But some authors wonder if it isn't the case that inequality will become more tolerable once legitimised by education (e.g. Meuret 2000)? We don't agree with such a viewpoint – this kind of legitimisation only helps to hide inequality and in some way to excuse decision makers to set in motion policies fostering equity; besides, it sometimes happens that the above legitimisation strategy completely bursts and its effective outcomes are opposite to the initial purposes. The rising unemployment rates which most graduates are facing in societies like the Portuguese one can be pointed as a striking evidence of the failure of such a strategy.

School, the way it contributes to foster equity or, conversely, the drawbacks throughout which stronger inequality will arrive, have been studied for long. More recently, (OECD 2000) presented other factors despite families' socio-economic condition as being responsible for the strong educational failure most Portuguese children face nowadays: among them, school organisation, curricula design and teachers training, deserved a special mention. In what concerns educational status transmission, PISA emphasized the intervention of possible endogeneity bias arising from the fact that most factors directly associated with parents' school achievement – like family income – also intervene affecting children's educational success. All those results emphasize the relevance of studying school inequality in Portugal and led us to develop research on some of those issues, on the basis of the data we had got access to and which we will describe in point 3.

For us own, we have been developing research on the intergenerational transmission of the “human capital” and its impact upon school failure in the Portuguese society (Chagas Lopes & Medeiros, 2004). We then concluded that an important inertia determinant was still imparting in that transmission from parents (fathers and mothers) to children. But we also got evidence on a much wider diversity of factors underneath school failure, most of them possibly responsible for inequality associated to schooling. The analysis of some of those features was set by us as the main purpose of this paper.

Being aware of the interplaying effects exerted by gender, social, economic and educational status of the pupils' family, each individual school trajectory and school itself, upon individual scholar success or failure, we therefore had to control for all those factors when trying to isolate as much as possible the impact exerted by each one of them. This has been particularly the case with “school effect” – concerning both the synchronic effect exerted by the school establishment where upper secondary certificate was obtained and the dynamic cumulative process generated by school trajectory, in which both previous average scores and eventual moving between schools could also be depicted from our data.

## 1. Theoretical Approach

In this point we are briefly referring to the main theoretical guidelines which have been emphasized by research on the school inequality features which concern us by now.

Since Marx's theory on social reproduction, approaches on social inequality were being developed; a considerable amount of the corresponding research relied upon the grounds of Education Sociology: Althusser, to begin with, who encompassed "May '68" with its approach on school segmentation Althusser and Balibar (1968), Baudelot and Establet (1971), thereafter, for whom quite heterogeneous school networks were resulting from social inequalities and would go on deepening their outcomes divergence after the entry into the labour markets; or even Bowles and Gintis (1974), who clearly set how education would replicate the hierarchical division of labour.

More recently, research came to reveal the very strong links also existing between *socio-economic disadvantage*, school non-attendance and truancy, early school leaving, high school expectations and attendance and further unemployment; those outcomes contribute to illustrate the cumulative dynamics of inequality, a result much empirical evidence can show (Kiely 2000).

*Gender* and school outcomes has been the subject of a great deal of research on school inequality, as well. A deeper insight on education and gender inequalities would need to combine multiple disciplinary approaches, as Development Psychology and Sociology of Education, along with our own field, Economics of Education. Notwithstanding, despite our aim of getting to work further on in team with researchers in those disciplines, a good deal of research has yet to be done in Economics of Education and Gender, mostly in which has to do with longitudinal data.

It has to be stressed that our present concern deals but with regular pupils. Working children, considered as boys and girls who regularly perform domestic work, wage work or both, before completing compulsory school, have not been enquired by our surveys. Therefore, our present concern has essentially to do with gendered

strategies which mark the trade-off between going on studying after that education level or alternatively leaving school to join labour market at an earlier stage.

As gender strongly affects wages and earnings which men and women respectively obtain, opportunity costs could quite well influence the way boys and girls should solve that trade-off. Despite opportunity costs, also the quite different probabilities between men and women of getting a first job could affect further studying decisions as well (Smith, 1994). Therefore, research on search for an earlier job experience, eventually foreseen as more valuable than a further school grade achievement, appears to us as being worthwhile.

*Own previous school trajectory* and success or failure events need to be taken into account as well. Actually, the already mentioned inequality dynamics and its cumulative nature along individual life cycles play here a major role. Deprivation and poor scholar trajectories since the early years do indeed cumulate their effects throughout adolescence, coming to strongly condition social and economic status when in the adulthood. And this because of an interplay among multiple factors: school failure – which is in itself the result of deprivation inside pupils' families, most of times - leads pupils to assume very often alternative and deviating identification strategies (e.g. indiscipline, truancy, adolescent maternity...) in order to obtain their pairs 'respect' and 'consideration', thereby severely affecting their later life opportunities.

But childhood and adolescence are also the times when most cognitive development takes place, along with physical, psychosocial and emotional development. Some recent research has been shedding light on the influence exerted both by cognitive development and the corresponding scholar performances upon further labour market insertion and labour market conditions; and this because of the self-confidence and self-esteem degrees and the kind of expectations those development and performances give room to (Graham & Power 2004).

By *school effect* we mean the influence exerted upon each pupil's achievement by the characteristics of the institution or institutions where he or she has been studying. For that purpose we have firstly to control for any school transitions either before or during the attendance of upper secondary education. Actually, moving between school

establishments usually brings with it the need to change from one culture to another, to impose both individual and social identity, to face a new sometimes frightening environment, both emotionally and even physically. Therefore, accepting or contesting a new set of norms will be at stake for the newcomers, as well as the affirmation strategies towards the new pairs and the need to face the sometimes strange arrangements, as to class constitution for instance. But this also means acquainting with new teachers whose judgement about those affirmation strategies is most of times biased in the light of the latter own values and perceptions (Noyes 2003).

In the framework of Economics of Education, the cumulative effect exerted by features like the above ones can be resumed as the probability of going on studying or, conversely, leaving school earlier in order to get (or try to) a paid occupation. Taking J. Mincer standard equation, that outcome can be generally described as follows:

$$\ln y = \beta_0 + \beta_1 S + \beta_2 X - \beta_3 X^2 + \mu$$

where the individual's decision rule (or opportunity...) equates further schooling, S, labour experience, X, and the corresponding impacts upon (expected) earning capacity ( $\ln y$ )<sup>1</sup>.

## **2. Data and Methodology of Analysis**

### 2.1. Data and Sample Characteristics

The Portuguese statistical system doesn't provide as yet data deriving from any statistically representative longitudinal survey, both concerning scholar trajectories and

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<sup>1</sup> Actually, this model represents a quite simple process of equating expectations toward further labour market conditions, which we have been criticising several times (See, for instance, Chagas Lopes & Leão Fernandes 2004). But our main concern here has to do with the "right side" of the equation, mostly with factors behind S, as it will come clear in the statistical analysis in point 3.



transitions between secondary school and tertiary education or labour market<sup>2</sup>. Therefore, whenever we are addressing such research goals like the ones in this paper, we have to rely upon the results of some specifically designed enquiries, launched within the framework and restrictive conditions of ongoing research projects.

Here, we are dealing with incomplete school trajectories, depicted after each individual's answers to questions on the main nodal points marking institutional scholar stories, average scores by education cycle and transition between schools, as in Hillmert & Jacob (2004). We obtained results for 530 individuals (39.7% men, 60.3% women), who had achieved secondary education in 6 of the secondary schools belonging to Lisbon Metropolitan Area, either in the 1997-98 or in the 2000-01/2002-03 school years.

The former period has to do with data and outcomes from the 2 schools which we analysed in the framework of a research project on the behalf of the Portuguese Agency for Science and Technology (Chagas Lopes et al, 2005). The two latter dates concern data and outcomes obtained by João Medeiros in his MSc. dissertation, (Medeiros 2004).

Controlling for cyclical economic dynamics and inherent labour market opportunities will mean a major concern in future developments using outcomes from those two distinct time periods. And that because secondary school graduates will frequently consider corresponding labour market opportunities against the ones offered to tertiary education certificates, for the time in which they set cost-benefit analysis to decide whether to proceed into university or not.

Actually, with two slight exceptions for men, in 2000, and for women, in 2002, always a larger “investment in human capital”, corresponding to a tertiary degree instead of a secondary education one, seems to have been effective in preventing or at

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<sup>2</sup> Actually, some Observatories were set with those purposes but either are they no longer working or they don't provide systematic statistically representative school trajectories even for the cohorts they have been surveying.

least reducing unemployment probabilities in the Portuguese labour market<sup>3</sup>, as it can be observed from the following OECD indicators:

### Unemployment Rates by School Level - 1998

	Both Sexes	Men	Women
Upper Secondary	4.3	3.3	5.4
Tertiary	2.6	1.9	3.1

### Unemployment Rates by School Level - 2000

	Both Sexes	Men	Women
Upper Secondary	3.3	2.2	4.4
Tertiary	2.8	2.3	3.1

### Unemployment Rates by School Level - 2002

	Both Sexes	Men	Women
Upper Secondary	4.3	3.9	4.8
Tertiary	3.9	2.6	4.8

**FONTE:** OECD, *Employment Outlook*.

That is to say, even during the labour market most critical periods taken here into consideration – 1998 and 2002 – acquiring a tertiary degree appears to have been an advised decision in as much as employment probabilities were then concerned, with

<sup>3</sup> An outcome which, indeed, has been reversed after then, with a strong increase in unemployment rates for tertiary education in most fields.

two irrelevant exceptions. Therefore, not having controlled for the economic cycle effects upon secondary education graduates' opportunities to enter into the labour market seems not to have been too risky, in the strict light of the present paper purpose.

As to the 6 secondary schools we have considered, our main selection criteria had to do with their adequacy to depict most educational, economic and social surrounding environment features in an as much as possible confronted way. And so, in 2 out of the 6 schools (E.S. José Gomes Ferreira - ESJGF and Alfredo da Silva) 20% of either fathers or mothers (or both, in ESJGF) had got at least a tertiary education certificate and in a third one (Sto. André) that share approximated 11% for mothers, a much higher result than the corresponding one for the other schools pupils' mothers. Also, 2 of the schools in which less educated fathers and/or mothers were found – Damaia and Amora – exhibited higher percentages for unemployment or labour market retirement among fathers. In a great majority, mothers are paid working women but many of them are domestic ones; the corresponding higher percentages of this latter status coincide with the areas for which less educated mothers (Amora and Baixa da Banheira, followed by Damaia) and more vulnerable to labour market precariousness fathers (Damaia and Amora) were also found.

Nevertheless, sample distribution of pupils among the 6 schools is quite deviated from the real one. Therefore, all the statistical adjustments we developed took this deviation into consideration, namely by previously setting each school actual frequency into the sample instead of the by default equal number of cases for each variable.

Proceeding with the sample characterisation, we must say that more than an half of the pupils (51.5%) were older than 18 years when enquired, some 5% of which even older than 24. As to pupils fathers' and mothers' education level, in both cases the statistical mode coincided with the lowest level, e.g., lower or equal than the first cycle (4 education years). Only 13.3%, for fathers and 13.8%, for mothers, did achieve at least a tertiary education degree. As to parents' status towards the labour market most of them (81.2%, for fathers and 68.2%, for mothers) were employed workers; nevertheless, being domestic represented the second most important situation for mothers and concerned 18.3% of them, a clear indicator of a still prevailing traditionally gendered social division of labour inside the Portuguese society.

Each student previous school trajectory deserved our attention at the outmost, as we have already said. Considering the attendance of pre-primary education to start with, one will notice that in our sample roughly one half of the pupils (52.0%) had got that opportunity, a feature for which a lot of public effort has yet to be made despite the strong improvement observed along the latter decades. Moving between school establishments, another meaningful school trajectory indicator we have looked for, happened mostly before the transition into the upper secondary education than along this latter cycle; and as far as this last grade is concerned, most moves should have to do with school arrangements and some other organisation features than with each pupil's own story.

Failure strongly affects the Portuguese education system, has we have already shown in previous research<sup>4</sup>. Actually, more than one third (36.5%) of the pupils in our sample faced retention at least once along his/her school trajectory, a figure which quite well approximates the corresponding nation wide average. Statistical mode for the average score obtained before joining upper secondary education lies inside the interval 14/20 - 16/20, with a high standard deviation responding for the enormous differences in scores among the observed schools. As it will become clear later on, retention is also correlated with selection of the track into which upper secondary education will proceed, much more than with the specific field of study inside each track.

## 2.2.- Inequality Indicators and Factors

Let us now get a further insight on most failure and inequality outcomes we expected to find throughout this research.

To begin with, we must clarify what we mean by school inequality. Actually, we are taking two main school outcomes as *success* or *failure indicators*: having or not being retained at least once along school trajectory and having or not proceed into university (or tertiary education, more broadly) after secondary education graduation. With Sparkes (1999), we are full aware of the fact that this methodological option is

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<sup>4</sup> Chagas Lopes & Medeiros, op. cit.

open to criticism: as a matter of fact, school failure or success exceeds by far the learning outcomes displayed by examination results and test scores. Actually, getting the usually called “soft skills” becomes increasingly relevant in which concerns adulthood employment and social and cultural opportunities as well. In the framework of João Medeiros MSc.<sup>5</sup> dissertation, indicators and data on those skills have already been dealt with, namely in what has to do with civic participation and volunteer work along with secondary schooling. It’s just for sake of easiness that we decided here to simplify in this light.

In this paper we had hence to begin with the identification of some of the most striking factors behind success or failure so considered.

Actually, identifying the reasons for school failure is not an easy task. The multivariate nature of these processes compels researchers to check for a diversity of failure reasons Duru-Bellat (2002) presents a large and useful scope of factors underlying school failure. In the light of her approach, which we are following closely, we may summarize four main domains:

- pupils’ family factors, like parents’ educational achievement, occupational status, expectations...
- individual factors, such as gender, age, previous school trajectory...
- environment factors, among which we have selected school area social and economic characteristics;
- school factors, described in our analysis throughout the characteristics of the schools along which pupil trajectories had developed and those of the establishment in which upper secondary degree was completed.

Success and failure factors are not only multiple and diverse but also strongly articulated. It will be enough to consider class arrangements to conclude on the influence exerted by “some” families – throughout parents’ representatives, for example

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<sup>5</sup> Medeiros 2004, op. cit.

– upon certain school’s management procedures; and thereby infer the possible impacts in terms of social inequality reinforcement (Duru-Bellat 2002, op cit).

We shall consider now each one of the four success or failure determinants with more detail.

*Gender* is not by itself an inequality factor. Nevertheless, a very deep and robust literature on education and gender provides us strong evidence on the existing deep differences between girls’ and boys’ school outcomes when attending similar courses and training. As we have previously explained, theoretical approaches attribute such differences mainly to the role played by the opportunity costs of further studying, between boys and girls; but the division of labour inside the family and the way how traditional chores *versus* paid work are allocated between the two sexes still plays a role. Evidence for Portugal does confirm such differences as well, both for regular pupils<sup>6</sup> and for the ones who perform child work<sup>7</sup>. So, in the light of the present data, we have also tried to disentangle gender impacts from the other factors affecting school outcomes, as in Hobcraft (2000), for instance.

As we have referred in point 2, another success or failure factor has to do with pupils’ *social and economic origin*; for that purpose we took each individual father’s and mother’s both present situation towards the labour market and school achievement. Thereby we got for each pupil a proxy of his/her family socio-economic and cultural status, which actually do affect children’ school outcomes; but we were able to thereby separate as well father’s from mother’s school level effect, an issue we have already dealt with and which revealed to exert a quite meaningful impact upon school failure (and success) in Portugal<sup>8</sup>.

Controlling for each pupil *previous school trajectory and outcomes* has to do with the already discussed feature that success or failure, and therefore inequality, is a dynamic and cumulative process throughout which children’ and adolescents’ shortcomings in cognitive development do affect their further outcomes both in

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<sup>6</sup> (Chagas Lopes et al. 2005).

<sup>7</sup> (Goulart 2004).

<sup>8</sup> Chagas Lopes & Medeiros, op. cit.

subsequent schooling and in later labour market insertion (DGES 2005). Most studies are revealing how deeply prior attainment does explain a great deal of school performance, insisting for instance in the role played by pre-primary school attainment in avoiding truancy (Sparkes 1999).

Confronting final scores among different schools for the same levels, tracks and pupils characteristics (e.g., gender, age, previous school outcomes and socio-economic status) allow us to identify meaningful differences among schools. We are full aware that behind such differences there are many features outside the scope of the present research; among them we may list organisation models, teaching methodologies, class arrangements, parents' association lobbying capacity, and so forth. Nevertheless, given the lack of systematic longitudinal enquiries into the Portuguese education system, most of the relevant outcomes have not been considered so far, as to our knowledge, and therefore they deserved to be analysed even when there is only information on some of those features.

Actually, most success and failure factors lie frequently inside *school* itself (good teaching, good management, web-based resources, relationship and culture...) and derive from a relationship structure which has to be assessed<sup>9</sup>. As a matter of fact, in the research developed by João Medeiros in his MSc. thesis, not only pupils' answers to the enquiries but professors', parents' and entrepreneurs' views as well, on most of those schools' main indicators and environment determinants, have also been considered; but we are not approaching those issues in the present paper.

But our main concern had to do with *inequality* towards and/or throughout school, as we have been stressing. Therefore, after having controlled for the main differences in families background, individual's previous school achievement and gender, we would then be able to approximate how far does school overcome in fostering equity among children. As we will develop further, discrimination analysis with controlling procedures – school establishment (12<sup>o</sup>) and school trajectory variables

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<sup>9</sup> See, for instance, Danziger & Waldfogel (2000).

playing the role of controllers – has been the statistical methodology we have applied with that purpose.

Despite the above mentioned, many other factors must also be considered when studying school inequalities. One of the most meaningful has perhaps to do with the structure of economic and employment opportunities in the environment area of each school, a feature which in our research has been assessed mostly throughout the interviews we have already referred to. Actually, adolescents' decisions on whether to go on studying or alternatively leave school and joining the labour market, strongly depend on the employment opportunities in the neighbourhood, be them effective and regular or illegal, as child work, for instance. But an adequate consideration of such “demand side” factors was far behind the scope of this paper.

Another kind of issues a deeper analysis should take into consideration concerns the interaction between social and economic environment characteristics – as the demand side issues like the ones just mentioned, for instance - and school organisation, goals and strategies. How far does each school's kind of leadership, extra-curricular support, excellence and targets policies, strategies of interacting with families, positive expectations fostering, and so many other features, overcome in compensating for a particular underprivileged social and economic background ? There are just some of the issues further research has to take into account.

A major limitation which most times affects school inequality analyses has to do with the lack of consideration of the interactions which inequality factors do exert among themselves, thereby implying a stronger inequality outcome than the merely summing up of the different factors' results taken separately (Sparkes 1999, op. cit). That's why we decided to apply a statistical methodology robust enough to take account of these interactions as deeply as possible.

Therefore, we began by applying Contingency Analysis in order to assess the association degree between each one of the inequality factors and both school outcomes indicators, that is to say eventual retention and potential further progress into tertiary education. After that, and with the support of Discriminant Analysis, we systematically investigated which set of explaining variables taken altogether would contribute the



most to a better “separation” (discrimination) between the “having’s” and the “having not’s” responding to each one of those outcomes indicators.

### **3. Empirical Results**

#### 3.1.- Contingency Analysis

When applying contingency analysis we relied, as usually, upon the  $\chi^2$  significance level for testing independence and only considered to be meaningful the adjustments for which that level was equal or lower than 0.05. Despite this statistic indicator, also contingency coefficient for a given degree of freedom had to be considered.

Generally speaking, we always obtained better results for the Proceeding to tertiary education outcome than to the Retention one. This is the obvious result of the two quite different frequencies with which both features did actually occur in our sample: while going on studying into tertiary education accounts for more than  $\frac{3}{4}$  of the enquired, having been retained marks slightly over one third of the school trajectories, though representing a very bad performance nevertheless.

The contingency coefficients between Retention and each one of the statistically acceptable failure potential determinants were quite small in value, as a rule, as it can be observed in the next table:

**Table 1: Contingency Analysis – Retention**

<b>Success/Failure Factors</b>	<b>Contingency Coefficients</b>
<u>Sex</u>	0.122
<u>Father's School Level</u>	0.189
<u>Mother's School Level</u>	0.240
<u>School Establishment at 12°</u>	0.182
<u>Pre-primary Attendance</u>	0.145
<u>Father's Occupation</u>	0.136
<u>Mother's Occupation</u>	0.122
<u>School Track</u>	0.151
<u>School Track Field</u>	0.145
<u>Same School Establish. during Secondary</u>	0.108
<u>Proceeding to Tertiary</u>	0.243
<u>Average score before 11°</u>	0.317

Obviously, Retention is quite well associated with average scores previously obtained; the same happens with going on studying after completing secondary education. Parents' (mother's much more than father's) school level also seems to deserve some further attention among the school outcomes factors, as our previous results could reveal (Chagas Lopes & Medeiros 2004, op. cit.) and are consistent with most studies outcomes<sup>10</sup>. The school establishment in which secondary education has been completed (School Establishment 12°) also appears to play a non negligible role. Nevertheless, in these adjustments such variables, like sex, whom we would expected to play a more prominent role, seem to be meaningfulness.

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<sup>10</sup> See, for instance, Sparkes (1999, op. cit) and Hobcraft (2000, op. cit).

Contingency Analysis developed with Proceeding to tertiary education exhibited much more robust results, as previously said. Nevertheless, two “explanatory variables” – sex and remaining in the same school establishment during secondary education - loose now any association probability at all. This last variable effect does not surprise, because secondary education organization makes impossible for each school to provide all the existing tracks and likewise moving between schools becomes a normal trajectory for secondary education pupils; but the lack of association between sex and further education trajectories appeared to us as an unexpected result now then girls are increasingly outperforming boys in school scores and more young women than men are joining Portuguese universities. Wouldn't there be some other results advising us to go deeper into the statistical analysis and this single one would be strong enough to compel us that way! Before proceeding, let's consider the other results we obtained in this Contingency Analysis exercise:

**Table 2: Contingency Analysis – Proceeding into tertiary education**

<b>Success/Failure Factors</b>	<b>Contingency Coefficients</b>
<u>Father's School Level</u>	0.543
<u>Mother's School Level</u>	0.536
<u>School Establishment at 12°</u>	0.758
<u>Pre-primary Attendance</u>	0.237
<u>Father's Occupation</u>	0.512
<u>Mother's Occupation</u>	0.466
<u>School Track</u>	0.719
<u>Same School Establish. along Secondary</u>	0.372
<u>Having ever been Retained</u>	0.243
<u>Average score before 11°</u>	0.272

School effect, represented here throughout the school establishment in which secondary education has been completed, presents the higher score. Should it be attributable to the establishment's strategic policies, leadership and commitment; to its staff competences and general training quality; to the pedagogic and organizational methodologies; to the environmental area and social economic background in which the establishment is located ... and most probably to the compound of all these features, the robustness of this outcome is indisputable.

But also the school track along which the pupils' trajectory followed during secondary education appears to be extremely conditioning on whether proceeding further studies or not. It must be stressed that there are two main tracks along secondary education in Portugal – the “general” and the technological-vocational one. Actually, the first one doesn't provide so far any specific vocational skills at the secondary education level and therefore professional competences acquisition absolutely demands attendance of a tertiary education degree. On the contrary, the technological-vocational track provides professional skills as a rule; but it suffers from a strong social undervaluation as most population still associates upward social mobility with obtaining a graduation certificate ... even if the corresponding outcome will be unemployment, as it is much the situation in nowadays labour market.

It should be noticed that parents' “human capital” – now father's a little bit more than mother's – also displays a strong impact upon proceeding into university, an expectable result. Father's and mother's situation respective to the labour market is also noticeable: actually, most students complete tertiary education in private universities and even those who were able to enter the sometimes too selective public ones must pay reasonably high tuition fees; therefore, belonging to a family in which there is one adult pensioner or long term unemployed, for instance, severely restricts the opportunities to go on studying for most youngsters.

The other results these adjustments provided are quite well expectable, being meaningful as well.

But now we need to go a step further and investigate whether the impacts upon these two outcomes get reinforced in a joint variable adjustment and if so how far. Thereafter, analysing the role played by school in compensating for, or reinforcing, inequality will follow, on the basis of discrimination with control statistical analysis.

### 3.2.- Discriminant Analysis

The joint effect displayed by the success or failure factors and inherent inequality outcomes shall now be considered.

For that purpose we took separately each one of the two trajectory outcomes – having ever been retained and Proceeding to tertiary education. As to the “explanatory variables”, a control effect methodology has been applied: any discriminant function was adjusted twice, without (a) and with (b) the inclusion of the particular inequality factor which effect we were assessing. Afterwards, and for each function, the discrimination capacity each factor contributes with to the global adjustment could therefore be computed.

As it becomes clear (see Table I in Appendix) from the percentage of cases correctly classified (% Cases), two possible inequality factors mostly contribute to enlarge the separation (discrimination) between the “having ever been retained” and the “having not” pupils: Previous school trajectory (+ 6.3%) and school establishment in which secondary education was completed – School at 12<sup>o</sup>, (+ 3.6%). In this adjustments, Sex seems again to exhibit a modest contribute to the whole discrimination (+ 0.8%) and both father’s and mother’s school level appear not to contribute at all to the separation reinforcement. We must remember that the latter variables – and specially Mother’s education – appeared to be quite well associated with Retention in a one by one Contingency Analysis; in this light, we must conclude that both each pupil’s previous success or failure and also the school in which he/she obtained the secondary degree certificate contribute to offset some of the other variables’ effect in the joint explanation model and specially sex and parents’ educational achievement. **Success or failure dynamics and “school effect”** appear likewise to be non negligible. Besides,

**School at 12°** keeps its influence both in the Contingency and in the Discriminant analyses.

From Table II in Appendix, we can observe that as far as going on studying into tertiary education is concerned, and according to the % of Cases correctly classified as usually, no one inequality effect seems to meaningfully reinforce the whole discriminant capacity. Only previous schooling trajectory and sex do slightly increase the whole discriminant capacity. At the same time, all the adjustments exhibit worse statistical test scores than the corresponding ones for Retention, namely in what has to do with the Qui-square significance level.

Therefore, to go deeper into the Discrimination with Control Analysis and the interpretation of the linear adjustment coefficients we went on considering only the two best adjustments set for Retention and already described.

Previous school trajectory affects Retention general probabilities throughout the following standardized canonical discriminant function coefficients:

$$D_1 = a_0 \text{ Age} + a_1 \text{ Father's Occupation} + a_2 \text{ Mother's Occupation} - a_3 \text{ School Track} + a_4 \text{ School Track Field} - a_5 \text{ Sex} + a_6 \text{ School (12°)} - a_7 \text{ Father's Schooling} - a_8 \text{ Mother's Schooling} + a_9 \text{ Pre-primary Attendance} - a_{10} \text{ Same School before Secondary} + a_{11} \text{ Same School during Secondary} + a_{12} \text{ Average Score until 11°}$$

in which the control process relied on the four latter variables, i.e., the ones representing *previous school trajectory*.

Explicitly:

$$D_1 = \mathbf{0.673} \text{ Age} + 0.108 \text{ Father's Occupation} + 0.003 \text{ Mother's Occupation} - 0.102 \text{ School Track} + 0.013 \text{ School Track Field} - 0.104 \text{ Sex} + \mathbf{0.570} \text{ School (12°)} - 0.076 \text{ Father's Schooling} - 0.066 \text{ Mother's Schooling} + 0.100 \text{ Pre-primary Attendance} - 0.201 \text{ Same School before Secondary} + 0.295 \text{ Same School during Secondary} + \mathbf{0.659} \text{ Average Score until 11°}$$

and, when retrieving the four control variables:

$$D_1^* = \mathbf{0.945} \text{ Age} + 0.104 \text{ Father's Occupation} - 0.020 \text{ Mother's Occupation} - 0.003 \text{ School Track} + 0.110 \text{ School Track Field} - \mathbf{0.306} \text{ Sex} + \mathbf{0.815} \text{ School (12}^\circ) - 0.060 \text{ Father's Schooling} - \mathbf{0.343} \text{ Mother's Schooling}$$

The interpretation of this result follows straightforwardly: **when releasing previous school attainment indicators, both School (12°), Mother's Schooling and Sex, along with Age, reveal their expected influence.** It should also be noticed that both Sex and Mother's Schooling appear to be negatively correlated with Retention, an outcome completely congruent with the reference literature.

Proceeding in the same way, we discriminated Retention by means of a function in which *School (12°)* entered now as the control variable, thus obtaining:

$$D_2 = \mathbf{0.673} \text{ Age} + 0.108 \text{ Father's Occupation} + 0.003 \text{ Mother's Occupation} - 0.100 \text{ Pre-primary Attendance} - 0.102 \text{ School Track} + 0.013 \text{ School Track Field} - 0.104 \text{ Sex} - 0.076 \text{ Father's Schooling} - 0.066 \text{ Mother's Schooling} - \mathbf{0.201} \text{ Same School before Secondary} + \mathbf{0.295} \text{ Same School during Secondary} + \mathbf{0.659} \text{ Average Score until 11}^\circ + \textit{School (12}^\circ) \mathbf{0.570}$$

and when excluding *School (12°)* (the school establishment in which secondary education has been completed):

$$D_2^* = \mathbf{0.404} \text{ Age} + 0.090 \text{ Father's Occupation} + 0.072 \text{ Mother's Occupation} - 0.164 \text{ Pre-primary Attendance} - 0.119 \text{ School Track} + 0.038 \text{ School Track Field} - 0.057 \text{ Sex} - 0.079 \text{ Father's Schooling} - 0.145 \text{ Mother's Schooling} - 0.160 \text{ Same School before Secondary} + \mathbf{0.372} \text{ Same School during Secondary} + \mathbf{0.766} \text{ Average Score until 11}^\circ$$

Therefore, **“School effect” and previous scholar trajectory** **outstand among the discriminating variables.**

Summing up the outcomes we have arrived at, a main result appear to come clear: among the four inequality factors previously proposed to investigation – Gender, Parents’ (Mothers’ and Fathers’) occupation status and “Human Capital”, School at 12° and own previous School Trajectory – two of them excels in the discriminatory capacity, precisely the two latter ones.

Which reveals the strong interaction effect exerted by school - be it indirectly under the form of previous school trajectory or throughout school at 12° - upon the other success or failure determinants, mostly as far as retention is concerned. So, it appears quite evident that the “school effect” not only interplays deeply but also strongly amplify the other determinants influence.

#### **4. Conclusion**

In the light of previous research on school failure in Portugal we purposed ourselves to go a step further and investigate how far would some of the main success or failure determinants be responsible for school inequality. We approached this latter outcome throughout the investigation on which ones of those factors would the most contribute to alleviate or reinforce the separation (discrimination) between two opposite status relative to success and failure trends, once included or retrieved from a joint discriminant model.

As a conclusion, we must say that, actually, the “school effect” seems to display a meaningful influence upon the youngsters’ school trajectories and outcomes. Nevertheless, when taking each variable separately, that influence only appeared to intervene directly in which concerns the association between Proceeding into tertiary education and both School at 12° and School track. For Retention, Contingency Analysis revealed a much weaker direct association with school variables: there, the association seemed to be stronger with the Average score before secondary education, Mother’s and Father’s education level and only then with School at 12°.



It was precisely on account of the well known interaction network these kinds of variables establish among themselves that we decided to apply the Discriminant with Control Analysis, thereby trying to assess the indirect interaction effects as well. Despite not having obtained statistically meaningful results for the Proceeding into tertiary education outcome, research on Retention among Portuguese secondary students went a little step further, we believe.

Actually, in a first stage, regular Discriminant Analysis between the “having ever been retained” pupils and the “having not’s” displayed own Previous scholar trajectory, School at the 12<sup>o</sup> and in a smaller degree parents’ (Mother’s and Father’s) education achievement and Sex as the most discriminating variables, thereby lessening these two latter variables influence relatively to the association results. But Discriminant with Control Analysis brought us even more enlightening outcomes: when controlling for *Previous scholar trajectory*, School at 12<sup>o</sup>, Mother’s education level and Sex appeared then as the most powerful discriminating variables; alternatively, when controlling for *School at 12<sup>o</sup>*, the two opposite outcomes towards Retention revealed to be the best discriminated throughout Previous schooling trajectory, including both average scores and eventual transition between schools.

“Does School Improve Equity?”, did we set since the beginning – it depends, must we answer. As a matter of fact, we needed to dig deeply below “school effect” to arrive at the most common inequality factors - like Mother’s education, Father’s or Sex – and assess their relative discriminating ability. Notwithstanding, this latter factors’ influence imparts indirectly, as well, upon School at 12<sup>o</sup> selection and mostly upon scholar trajectories since its beginning...Which apparently means that trajectories along “good schools” arrive to break the original vicious circle and, alternatively, proceeding along “the other” schools reinforces inequality among the Portuguese scholar population.

Therefore, systematic research on schools heterogeneity and its interaction with the social, cultural and economic surrounding characteristics should mean a further step in this research process.

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## Appendix

**Table I - Discriminant Analysis - Retention**

		% Cases	Canonical Correlation	Wilks' Lambda	Qui-square Signif. Level
SEX	(a)	76.5	0.474	0.775	0.000
	(b)	77.3	0.476	0.774	0.000
SCHOOL AT 12°	(a)	73.7	0.437	0.809	0.000
	(b)	77.3	0.476	0.774	0.000
PARENTS SCHOOLING	(a)	77.3	0.477	0.772	0.000
	(b)	77.3	0.476	0.774	0.000
PREVIOUS TRAJECTORY	(a)	71.0	0.386	0.851	0.000
	(b)	77.3	0.476	0.724	0.000

**Table II - Discriminant Analysis – Proceeding into terciary education**

		% Cases	Canonical Correlation	Wilks' Lambda	Qui-square Signif. Level
SEX	(a)	96.0	0.282	0.920	0.011
	(b)	96.3	0.289	0.917	0.012
SCHOOL AT 12°	(a)	96.3	0.280	0.922	0.013
	(b)	96.3	0.289	0.917	0.012
PARENTS SCHOOLING	(a)	96.4	0.276	0.924	0.009
	(b)	96.3	0.289	0.917	0.012
PREVIOUS TRAJECTORY	(a)	95.8	0.217	0.953	0.046
	(b)	96.3	0.289	0.917	0.012