

# Study of the influence of educational factors on diplomas rate through PISA results

Simon LEBASTARD

Cyrille VESSAIRE

February, 14th, 2016

## 1 Motivation

### 1.1 General approach

The aim of this statistical study is to unveil the influence of some measurable factors on the performances of education in the countries of OECD.

The authors already have a few years of experience in giving classes to secondary level students, and are interested in the influence of the context on learning performances. Quite often have they heard their students complain about an uninteresting mathematics teacher giving class facing a blackboard, turning is back on a crowded and turbulent 35 students classroom. The authors already had the opportunity to try out and evaluate the efficacy of several teaching methods when teaching to one to six students. However they have no experience in high-effective teaching, which is at the same time the most widespread mean of teaching in public and private institutions, and almost the most challenging way to share knowledge.

Some factors are believed to have influence on the learning proficiency. Among others, the following factors were chosen for study:

- The student to teaching staff ratio in a given school
- The number students in a given class
- The teacher's salaries
- The amount of teaching hours
- The amount of homework as measured in preparation hours
- The spending on education
- Teaching methods that will be referred to as *innovative methods* in this paper:

the amount of independent work in class

the valorisation of explanations and ideas over mere results

working in small groups of students

giving the student the choice of the method to chose over the resolution of non-trivial problems

forming classes by abilities in a given field

There are great economic and cultural discrepancies in the world, and it appeared complicated to the authors to study the effects of those factors on a large panel of countries with completely different

situations. What the authors aim at instead is to study their impact for a collection of countries of comparable wealth. Therefore the OECD database was chosen over some other available source of data, and the paper will only deal with the corresponding countries.

## **1.2 Chosen factors**

### **1.2.1 Number of student in a class & student to teaching staff ratio**

One of the arguments to the uneffectiveness of teaching in many secondary institutions is the high amount of students in the same class, causing crowded and noisy classes, which can be highly detrimental for focusing.

The students to teachers ratio does not measure this density, but reflects the way students are framed during their learning hours.

### **1.2.2 Teachers salaries**

This is a key factor, as teaching salaries settle the attractiveness of the job, and thus the competition among teachers. At a given level of demand in teachers, high salaries will lead to better selection among teachers. One could then expect better paid teachers to be more skilled. This study will try to assess whether this is true or not, and if it is. Well, not really, as what is measured is only the results of the students at standard tests, and it is obvious that a skilled mathematician may not be a good teacher. There are two things that will be measured regardless of one another: the skills of the teachers, and the way teachers are selected.

### **1.2.3 Time spent in class & at doing homework**

This study will try to see if there is a relation between the amount of time students spend in time and their academic results. This is interesting namely because even among western european countries, class hours and academic calendars are very different. Here the only factor studied is the number of hours spent in class per week. Holidays are therefore not taken into account.

## **1.3 Measurements of effectiveness**

PISA test Relate PISA to third grade enrollment and diplomas rate