



The quantitative evaluation of the Priority Education Zone Program

September 25th



EVALUATING THE EDUCATION ZONE PROGRAM



WHY DO WE WANT TO QUANTITATIVELY EVALUATE THE PRIORITY EDUCATION PROGRAM?

- The French Education Department publishes every year a large number of statistics on schools' characteristics, pupils' social backgrounds, teachers' features, class size in priority schools and non-priority schools...

- Although these figures improve our understanding of the implementation of the program, they cannot inform us on the efficiency of the program on a number of outcomes, for instance :
 - Does the program really have an impact on the difference in the pupils/teacher ratio between education priority schools and ordinary schools?
 - Does the program really contribute to the improvement of the results of pupils?
 - Do the premiums granted to teachers in education priority schools really reinforce the attractiveness of teacher positions in these schools?

- All these questions deal with the notion of causality. To answer them, we do not only need yearly figures on class sizes, pupils results... but also an analysis which will allow us to measure properly the impacts we are interested in

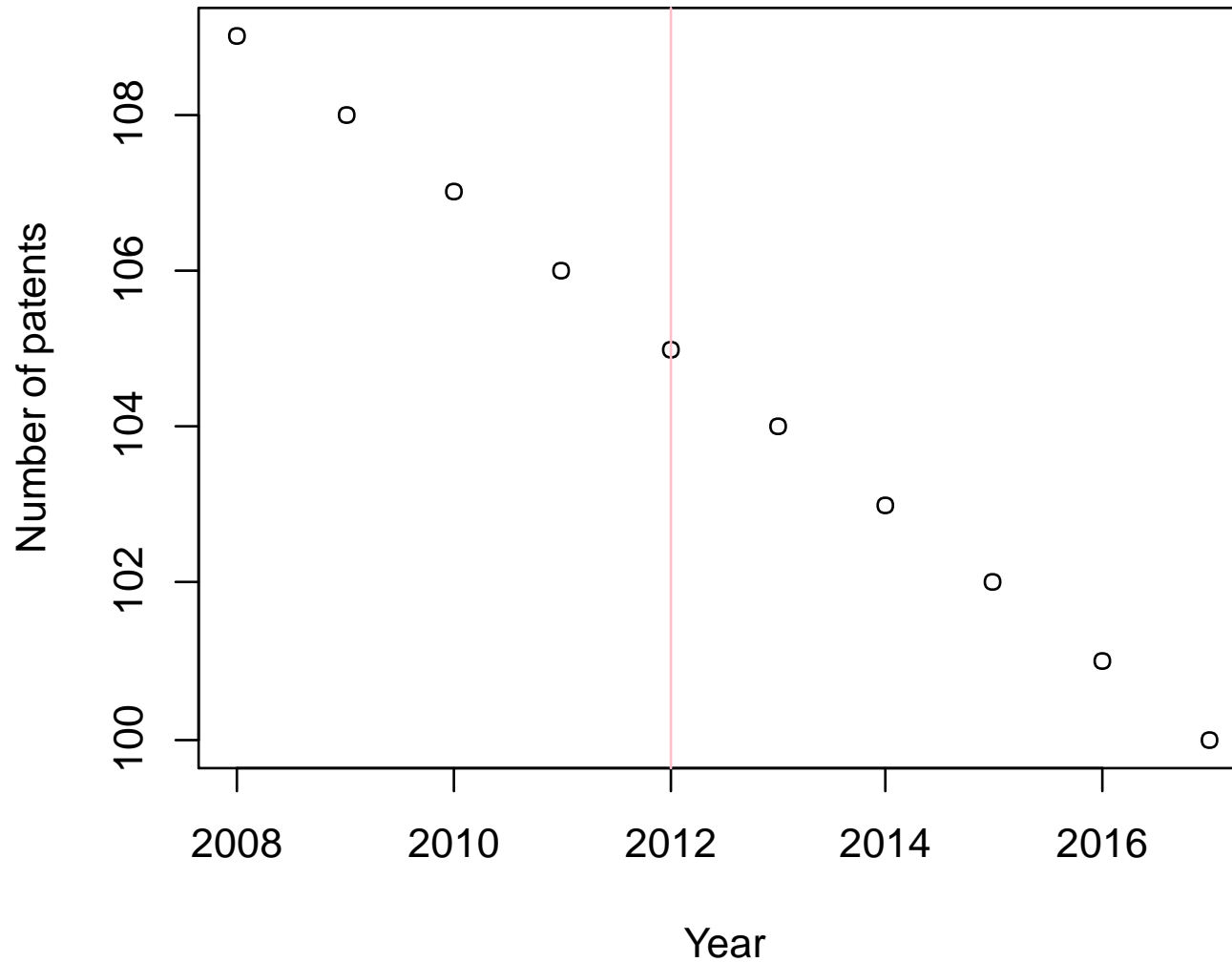


THE EVALUATION CHALLENGE (1)

- To understand the problem faced by economists when it comes to evaluating program impacts, let us imagine you are an assessor in an jurisdiction and you are interested in the impacts of a recent (2012) government program which aims at increasing the number of research patents
- The first step you take is to have a look at the evolution of the number of patents since the end of the last decade. Here is what you find:



Evolution of the number of patents since 2008



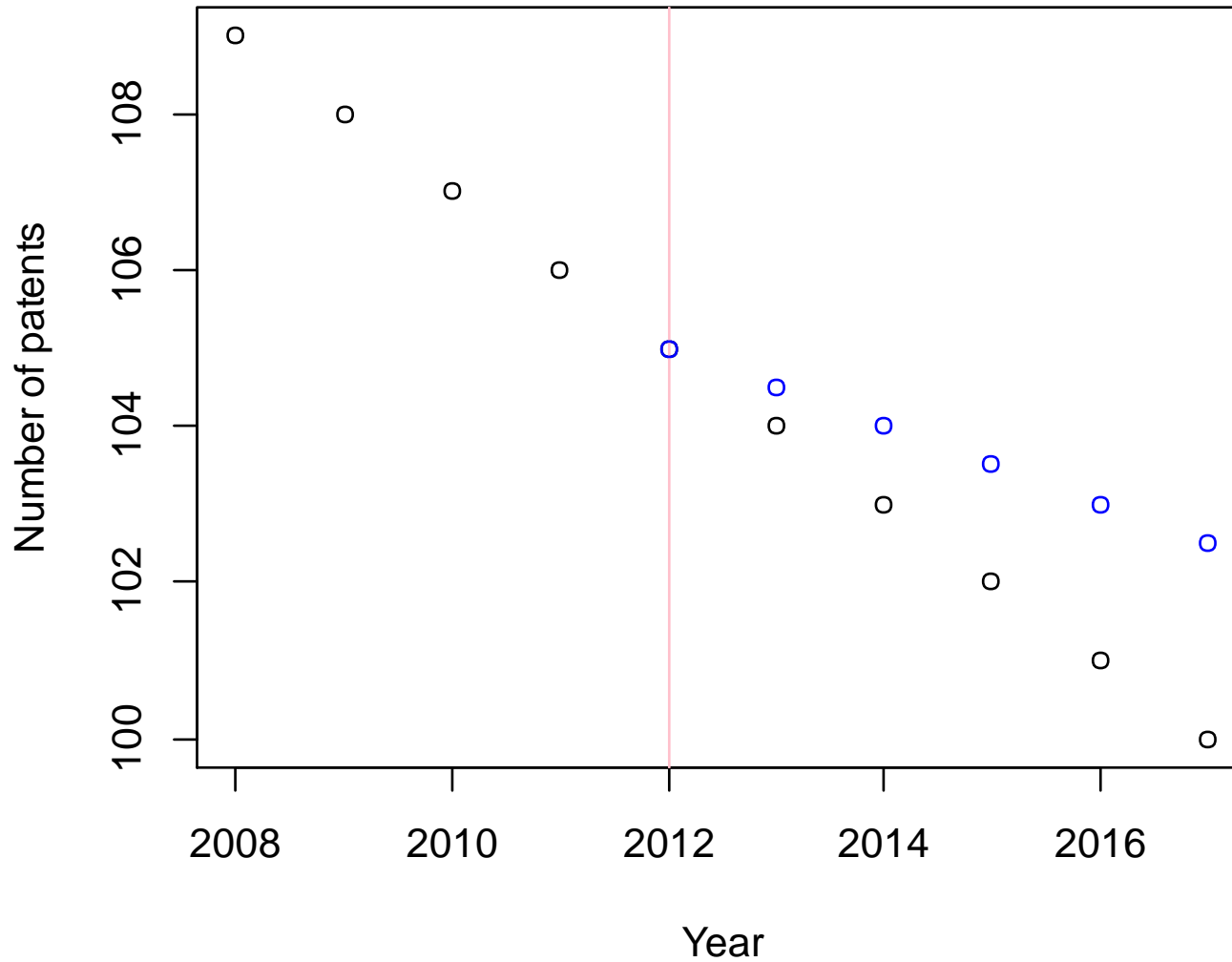


THE EVALUATION CHALLENGE (2)

- What would be your conclusion after studying this graph? You might conclude that the government intervention has not been efficient because the number of patents produced in the economy has continued to shrink
- This conclusion could be misleading because you do not know what would have happened if this policy had not been implemented by the government
- Without the program of the government, it could be well that the number of patents produced would have been higher (blue points) or that the number of patents produced would have been lower (red points)

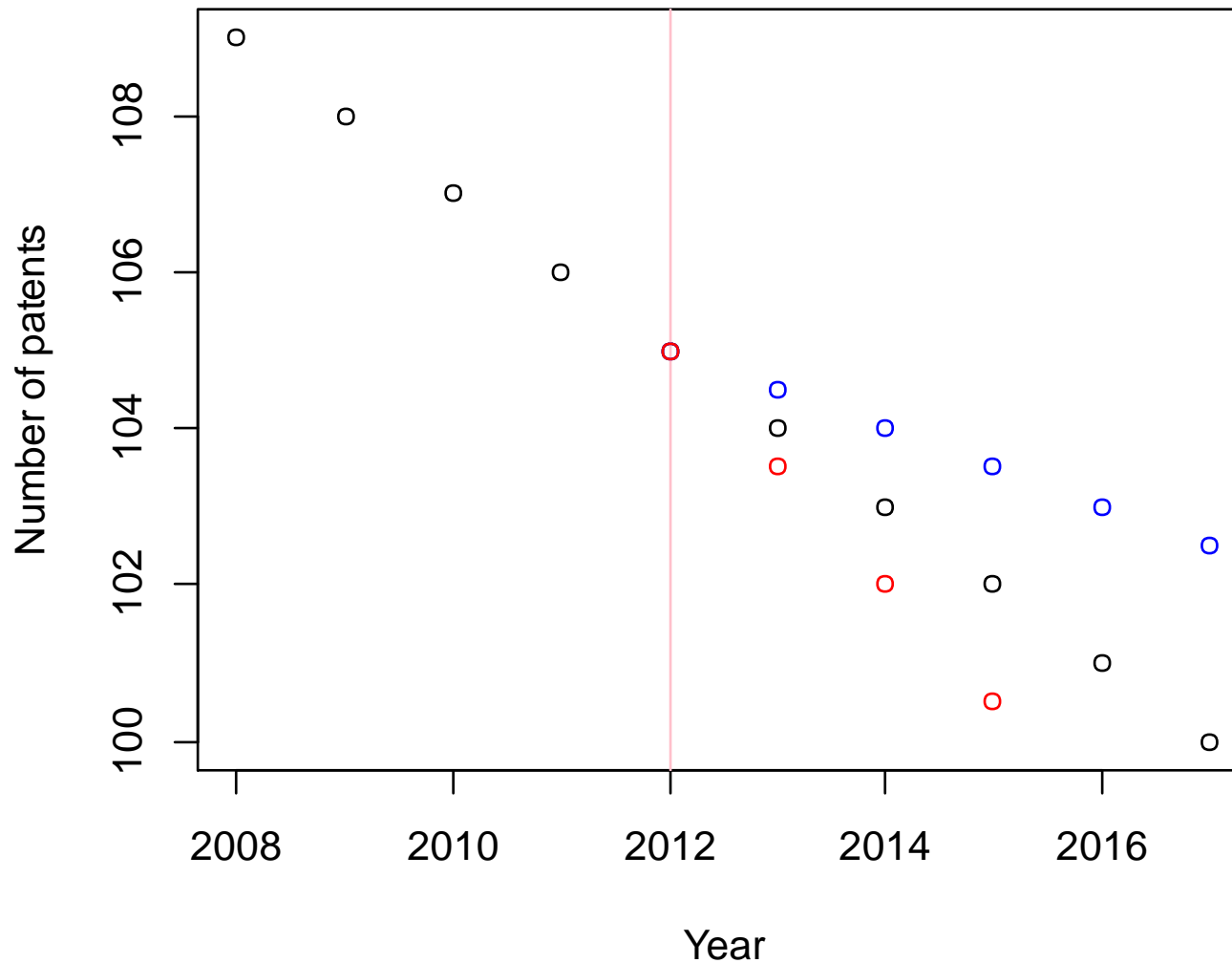


Evolution of the number of patents since 2008





Evolution of the number of patents since 2008





THE EVALUATION CHALLENGE (3)

- To measure properly the impact of the program, we need to know what would have been the number of patents produced in the absence of the program. If the number of patents produced would have been higher (blue points), the program is inefficient. In the other case, the program is efficient
- This example shows that, in order to evaluate the impacts of a social program, the economist has to determine the situation that would have prevailed in the absence of the program. In economists' terms, we say he has to build a counterfactual
- The impact of the program is the difference between the actual outcome and the counterfactual outcome. In the first case (blue points), the program destroyed around 2 patents by the year 2015 whereas in the second case, it has enabled the economy to create around 2 patents by 2015



HOW TO EVALUATE THE IMPACTS OF THE EDUCATION PRIORITY ZONES PROGRAM? (1)

- The Cour des comptes is interested in the impacts of the last reforms of the education priority zones program (2011 and 2014) on a number of outcomes: pupils' results at end of mid-school exams (« brevet des collèges »), class sizes, teachers' characteristics, the attractiveness of teachers' positions in education priority zones
- Thanks to the legal prerogatives of the Cour des comptes, we have been able to gain access to the statistical databases of the Education Department
- We have access to individual data on pupils and teachers since 2006 (around 800 000 pupils by cohort and 800 000 teachers for each year) This wealth of data will enable us to measure very precisely the impacts of the last reform of the program



HOW TO EVALUATE THE IMPACTS OF THE EDUCATION PRIORITY ZONES PROGRAM? (2)

- These data provide us with very detailed information on individual characteristics of pupils (age, social background, whether they have repeated a year of study, holders of scholarships, the subjects they study at school...) as well as teachers (age, marital status, qualifications, seniority...) and schools (size of the schools, number of pupils and teachers, social backgrounds of pupils, subjects offered...)
- In order to precisely identify the impacts of the program, we have to define an « empirical strategy »: an econometric method that ensures us that what we measure is the sole impact of the program (and not the impact of the program combined with other effects, like time effects for instance)
- Our strategy relies on the so-called difference-in-difference estimation



OUR EMPIRICAL STRATEGY: DIFFERENCE-IN-DIFFERENCE (1)

- **Difference-in-difference** estimation is a popular empirical strategy which is used when the economist has access to data which cover periods both **before** the implementation of the assessed program and **after** the execution of the program
- Let us take an example. We would like to measure the impacts of the 2011 education reform on pupils' results at the national mid-school exam (« brevet des collèges ») We can use our databases to compute pupils' results at the level of mid-schools. After these computations, we get aggregate results for each mid-school and for each year (2009-2013) For instance :

School name	Mean of pupils' results 2012	Mean of pupils' results 2013
Mid-school 1	12/20	13/20
Mid-school 2	15/20	14/20
Mid-school 3	7/20	6/20



OUR EMPIRICAL STRATEGY: DIFFERENCE-IN-DIFFERENCE (2)

- We now build two groups of mid-schools. The first one is made up of all the priority education zones schools (treatment group). In order to measure the impacts on pupils' results, we want to build another group of schools which are as similar as possible to education priority schools but that are not included into the education priority zones (control group)
- We use our databases to select schools which are as similar as possible to the treatment group. The results at the national exam of this group of schools give us the **counterfactual (that is the results education priority zones pupils would have obtained in the absence of the program)** that we need to evaluate the impacts of the program.
- We then compute the difference in the evolutions of the exam results between the two groups of schools



OUR EMPIRICAL STRATEGY: DIFFERENCE-IN-DIFFERENCE (3)

- **A numerical example**: let us imagine that the mean of the treatment group pupils' marks is 12/20 before the implementation of the program, and 14/20 after the program has been executed

- Let us imagine that, in the control group, the mean of the results was 15/20 before the reform, and 16/20 after the reform. Remember: this group of schools has not been treated

- Difference-in-difference estimation states that the impact of the program is the difference between the evolutions of the results within the two groups :
 - In the first group (treatment group), the evolution of the results is : $14-12=+2$
 - In the second group (control group), the evolution of the results is : $16-15=+1$
 - The impact of the program on pupils' results is therefore: $+2-1=1$ The program is efficient because it has allowed treated people to increase their results by 1 point



OUR EMPIRICAL STRATEGY: DIFFERENCE-IN-DIFFERENCE (4)

- We use this method to compute other effects of the 2011 and 2014 priority zones reform :
 - The impact on class sizes
 - The impact on teachers' profile (seniority, qualification, age...)
 - The impact on pupils' profiles in order to find an answer to the segregation effects problem
 - The impact on teachers' positions : are positions offered in education priority zones more attractive to teachers



THANKS FOR YOUR ATTENTION!