

Assessing the impact of Argentina's *Ley Federal de Educación* on educational and labor outcomes*

RESEARCH PROPOSAL

By

**Leonardo Gasparini (Team Leader)
Mariana Marchionni**

&

**Germán Bet
Carolina Garcia Domench
Francisco Haimovich
Mariana Viollaz**

CEDLAS ¹

Universidad Nacional de La Plata

Argentina

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Abstract

In 1994 the Argentine Congress passed a law aimed at changing some important characteristics of the educational system. Chiefly among them, there was an extension of two years on compulsory education. There is a heated debate between supporters and detractors of the reform regarding the impact on educational achievements and labor performance of youths, without almost any rigorous empirical evidence. The aim of this project is to contribute to this debate shedding light on the effect of the law on some educational and labor outcomes. Our identification strategy exploits the substantial regional variation in the timing of the reform, along with panel data to control for unobserved heterogeneity.

* Responses to specific comments made to the expression of interest may be found at the end of this proposal

¹ CEDLAS is the Center for Distributional, Labor and Social Studies at Universidad Nacional de La Plata (UNLP). Web page: www.depeco.econo.unlp.edu.ar

A. Aims and objectives (1.5 pages)

a. Study overview

In 1994 the Argentine Congress passed a law (*Ley Federal de Educación*, LFE henceforth) aimed at changing some important characteristics of the educational system. Chiefly among them, there was a significant change in the structure of the educational curricula, along with an extension in the years of compulsory education. While in the prior system a child was obliged to attend 7 years of primary school, under the new legislation that educational level was extended to 9 years.

By increasing the obligatory number of years of education, the government sought to force some (mostly poor) children to increase their human capital accumulation in at least two more years, and induce some of them to continue studying in the secondary level. More educated youths are expected to perform better in the labor market, and hence have a lower probability of falling into poverty.

The impact of this major policy change is still mostly unknown, in part due to the fact that the Argentine government did not implement a strategy to evaluate the policy intervention. Most previous studies carried out are of a descriptive nature and focused on narrating details regarding the implementation of the reform or analyzing the evolution of different educational indicators.

The Reform is still under much heated debate. In fact, the government just passed a law to undo some of the changes, though keeping the extension to mandatory schooling. The lack of causal evidence regarding the impact of the Reform on key outcomes forces the discussion among policy makers and political actors to rely merely on existing descriptive studies.

The aim of this project is to contribute to this debate shedding light on the effect of the LFE on several educational outcomes and labor market variables. In order to analyze this, we will exploit the regional heterogeneity in the timing of the reform (a commonly used strategy when evaluating policy interventions in developing countries). Argentina is a federal country where primary and secondary public education are administered and financed at the provincial level. Although the LFE was a federal law to be complied with in all provinces, there was flexibility for state governments to decide on the timing of the reforms. While in some provinces the reform was quickly implemented after the LFE was passed, in others the pace of the changes was slower. Moreover, in some districts some central aspects of the reform were never implemented

b. Main research questions and core research objectives

Taking advantage of this source of variation in the exposition to the “treatment”, we will attempt to answer the different questions that motivate this project. Our first goal is to study the impact on different educational indicators. Did the intervention alter the educational path followed by youngsters who were forced to attend two additional school years? We are particularly interested in evaluating whether youngsters show a higher likelihood of finishing high school or starting college education. We will also analyze whether the quality of the educational system improved because of the LFE.

Furthermore, assessing whether “treated” youngsters performed better in the labor market is another topic of interest. Specifically, we will assess whether they show a larger probability of finding a job. Besides, we will attempt to measure the impact of the reform on their wages and on the number of worked hours.

B. Background and policy relevance (3.5 pages)

a. Literature review directly relevant to main research questions

The impact assessment of LFE will be structured in two main sections. One section will be focused on the impact on human capital accumulation and labor market performance. Another section will evaluate the effect of the reform in terms of the quality of the educational system. Although both sections will exploit the heterogeneity in the timing of the reform, the level of aggregation in the analyses, their sources of data and the specific empirical problems to be faced will be different. For such reasons it is convenient to overview the literature separately.

i. Human capital accumulation and labor market performance

The extension in mandatory education is one of the most outstanding points of the Reform. This issue has been studied in detail in several countries employing the same methodological tools that we are considering to use.

The identification strategy proposed in this project consists in exploiting the heterogeneity in both the timing and the intensity of the reform. Specifically, we will use fixed-effects methods to control for unobserved heterogeneity across both cohorts and urban areas. Seminal work in the assessment of public policies in developing countries with these methods is Rosenzweig and Wolpin (1988). Among several evaluations that employ fixed-effects identification strategies, our study is particularly linked to the line of research followed by Duflo (2001) and Chou, Liu, Grossman and Joyce (2007), to mention but a few. The former analyzes the impact of an extended school construction program on both schooling and the labor market in Indonesia, using the interaction between cohort indicators and program intensity as an instrument for schooling. The latter investigates the child health consequences of extending the years of compulsory schooling from six years to nine years in Taiwan. This work also takes advantage of the different construction rate of new schools by region to design an instrument for schooling.

ii. Educational quality

The first strand of studies concerned with the quality of education focused on its determinants (Coleman et al, 1966; Jencks et al, 1972). Initial findings of the literature were somewhat discouraging, with components such as family background and a student's environment deemed much more relevant. Such research was based, nonetheless, on a rudimentary methodological framework, which did not account for endogeneity or selection bias.

In the past few years, the literature has turned to focus on estimating effects of educational interventions on student performance. Such contributions have exploited exogenous components of these programs to avoid issues of endogeneity. Webbink (2005) is an excellent reference for these new methodologies, reviewing a number of interventions which take into account such factors as class size, teacher training, hours of school, and expenses per student, among others. In this same paper, new methodologies are presented, which seek to properly estimate causal effects of educational interventions. In another recent study, Tiongson (2005) documents experiences of educational reforms with some recent empirical findings. Additionally, he realizes a typology of reforms according to their characteristics.

For the particular case of Argentina, some research in educational achievement has been completed using data from the Operativos Nacionales de Evaluación (ONE). Llach and Schumacher (2004) looked at academic results for students in primary education using a social equity approach, with their main results pointing at the importance of socioeconomic status and school characteristics in scholarly

performance. Taking a different approach, Cervini (2003, 2005) evaluated the differences between attending a public or private establishment on achievement and on non-cognitive outcomes (for example, attitudes and perceptions of their courses) for high school seniors. Using data from the Program for International Student Assessment (PISA) for 2000, Santos (2007) studied the determinants and distribution of schooling outcomes, finding that materials and school supplies, as well as human resources are relevant when explaining student performance.

In Argentina, impacts of reforms have been quantified for the Ley de Descentralización Educativa on certain performance variables. Eskeland and Filmer (2002), using cross sectional data, found that institutional autonomy and parental participation increase performance in primary school. Additionally, Habibi et al (2001), find a positive effect of decentralization on provincial net enrolment rates. However, none of these studies take into account possible endogeneities and spurious correlations which may arise. The only paper which uses modern techniques to deal with these issues is Galiani, Gertler and Schargrotsky (2002) which analyzes the effect of decentralization using the exogenous variation imposed by the program. The authors also find positive effects of decentralization on educational outcomes.

According to our knowledge, there are only two studies which have focused on the Ley Federal de Educación. One is that realized by Berlinski, Galiani and Gertler (2006), where they assess the impact of pre-primary education on primary school achievement. A second is that by Crosta (2007), who explore the effects of the LFE on access to schools and the quality of this access using a basic framework. His results suggest a positive relationship between both these variables and performance.

b. Explanation of what are the gaps in this literature

The project is not intended to fill a methodological gap, but instead to contribute to filling a gap in the literature on the largest educational reform in Argentina, and one of the largest in Latin America. As commented above, the Ley Federal de Educación implied a massive increase in the enrollment rates of the Argentinean youth. The LFE has dominated the scene of the educational debate for years, but there are still very few rigorous studies on the impact of the Law. In particular, to our knowledge this is the first project that will tackle the impact of the LFE on various labor outcomes, years of education and education quality at the same time, allowing a comprehensive assessment of the reform.

As explained in the previous point, the specific literature on the LFE is scarce, and based on case studies, and basic non-conditional statistical inference. To our knowledge this will be the first study that applies modern impact evaluation methods to analyze the impact of the reform on multiple outcomes.

c. Explanation of how filling these gaps is relevant to specific country policy issues

The results from this research are clearly relevant for government officials, legislators and advocacy groups. The issue of the effect of the educational reform on labor and educational outcomes is for obvious reasons very relevant for all social actors.

Potential findings about the impact of the Reform could be used as inputs to the ongoing discussion on changes in the LFE, and an eventual new Educational Law. The findings could point towards modifications in the national budget, and would be a useful resource to inform the policy-making process, promoting the inclusion of impact policy assessments in the design of education and poverty reduction programs.

C. Methods (7.5 pages)

- a. General description of the intervention, population to be studied, outcomes of interest, timing of effects, existing data and/or data to be collected, methods to be used to analyze data

The intervention

During the 1990's, Argentina's government carried out a large package of structural reforms including trade liberalization, an extended program of privatization and a general deregulation of economic activities. The educational system, which was considered to be in crisis, did not escape the structural reform. This system faced a series of drastic changes that were fundamentally imposed by two different laws.

On the one hand, in 1991, Congress commanded the transfer of the administration of all federal secondary schools to the provincial governments based on Law 24,049. This transmission progressively took place between 1992 and 1994. On the other hand, the enactment of the LFE in 1994 introduced a second set of reforms, among which a significant change in the structure of the educational curricula and an extension to mandatory education stand out. As was mentioned in the previous section, while in the old system a child was obliged to attend 7 years of primary school, under the new legislation that educational level was extended to 9 years (and renamed EGB, the acronym in Spanish for General Basic Education).

Among other goals, this policy was aimed at both updating a curriculum considered to be obsolete and diminishing the high dropout rate in the initial years of secondary school, specially regarding poor students (Braslavsky, 1999). The year Congress passed the law, net enrolment rates in secondary school were around 65% in urban areas, and under 50% in the poorest quintile of equalized income (CEDLAS, 2007).

Considering that the implementation of the reform was expected to induce an increasing pressure over the educational facilities and to require a number of organizational changes, the law allowed provinces to phase this implementation between 1995-1999. Besides, a budget of around US\$3,000 million was allocated for an extensive program of investment in both educational infrastructure and training to be supposedly carried out during these years. In particular, the government engaged in increasing the "installed capacity" around 20% (Gorostiaga et al., 2003; Llach et al, 1999).

Indeed, the new legislation was implemented in several provinces but with a substantial variation in terms of timing and intensity. While in some provinces the reforms were quickly and massively implemented, in others the changes were put into effect more gradually and involving a much smaller percentage of schools (see Rivas, 2003). Moreover, as stated before, in some districts some central aspects of the reform were never implemented.

In spite of failing to accomplish the established goal in terms of enrolment rates and school construction, important achievements in these aspects were obtained. In particular, with respect the additional mandatory school years, previous work and our preliminary exploration of microdata show that net enrolment rates increased more in the districts that implemented the policy more intensively. However, not all the results are encouraging. Rivas (2003), among others, suggests that the increase in the enrolment rate during mandatory education may be compensated later with a higher dropout rate in the non compulsory stage.

Regional heterogeneity in treatment exposure

Since our identification strategy exploits the regional heterogeneity in both the timing and intensity of the reform, it is important to analyze this aspect with more detail. A key issue is to identify which is the relevant geopolitical unit in order to determine the level of treatment.

After the enactment of the LFE in 1994, the different provinces chose whether to adhere or not this national law and, in case they decided to implement the Reform, select a starting date. Therefore, within a certain province, all the cities applied the set of reforms according to the provincial government's decision. The 23 Argentinean provinces and the city of Buenos Aires (Federal District) are listed in table 1, jointly with the year of implementation of the law:

Table 1
The process of LFE implementation

Conglomerates (i)	Year of implementation (ii)	Modality of implementation (iii)
CABA	N.I	
Buenos Aires	1996	U
Catamarca	1999	P
Córdoba	1996	U
Corrientes	1997	U
Chaco	1997	P
Chubut	1999	P
Entre Ríos	1997	U
Formosa	1998	U
Jujuy	1998	P
La Pampa	1997	U
La Rioja	1999	P
Mendoza	2000	P
Misiones	1998	U
Neuquén	1998	P
Río Negro	N.I	
Salta	1998	P
San Juan	1997	U
San Luis	1998	U
Santa Cruz	1998	U
Santa Fe	1997	U
Santiago del Estero	1998	U
Tucumán	1998	U
Tierra del fuego	1998	P

Source: Crosta (2007)

Notes:

CABA: Metropolitan areas of Buenos Aires

N.I: non-implemented; U: generalized implementation since the beginning; P: gradual implementation

Columns (i) and (ii) in table 1 show that youngsters faced the **legal** implementation of the Reform according to both their province and cohort. However, the **practical** execution of the LFE was not necessarily immediate. In fact, the different provinces decided whether to make a generalized implementation of the LFE since the beginning or to follow a gradual strategy (see column (iii) in table 1). In this sense, some crucial aspects of this law (e.g. the extension in mandatory education) required investments in infrastructure and training to become viable.

There have been certain heterogeneities between cities in terms of both school construction and the percentage of educational establishments which implemented the Reform. We consider including these differences as a measure of treatment exposure.

However, at this stage of the project we do not have accurate data regarding these issues. Nevertheless, we will gather this kind of information from the administrative records of the Argentine National Education Ministry.

Outcomes of interest, sources of information and population to be studied

We are interested in assessing the impact of LFE in different dimensions. One section of the paper will be focused on the impact on human capital accumulation and labor market performance. Another section will evaluate the effect of the reform in terms of the quality of the educational system. Although both sections will exploit the heterogeneity in the timing of the reform, the level of aggregation in the analyses and their sources of data will be different. For such reasons it is convenient to overview each case separately.

I. Human capital accumulation and labor market performance.

I.1 Outcomes of interest

A major question that motivates this proposal is the impact on human capital accumulation and labor market performance. Clearly, these aspects are strongly linked since, as we have stated before, more educated youngsters are expected to perform better in the labor market.

Regarding human capital accumulation, we will study if the law was effective in retaining youths in the educational system beyond the compulsory level. As outcome indicators we will consider years of formal education, secondary school graduation and college entrance. With respect to the labor market performance of students, the main outcomes considered will be wages, hours worked, unemployment and job formality.

I.2 Sources of information and population to be studied

This section will rely on different data sources. Our primary source of information will be the Encuesta Permanente de Hogares (EPH), the main household survey in Argentina. It now covers 32 urban areas (all the urban areas with more than 100,000 inhabitants); corresponding to 23 of the states listed in table 1 These conglomerates are home to 71% of the Argentine urban population. The EPH gathers information on individual's sociodemographic characteristics, employment status, hours of work, wages, incomes, type of job, education, and migration status.

The microdata of the EPH is available for the Greater Buenos Aires (GBA) since 1974. The rest of the urban areas have been added during the last three decades. During 2003 a major methodological change was implemented by INDEC, including changes in the questionnaires and in the frequency of the survey visits.

Though the unit of observation will be the individual, the sources of variability in exposition to treatment are both their birthplace and cohort. Data regarding exposition to treatment (percentage of schools that implemented the reform or school construction to allow the extension in compulsory education) will be obtained from the administrative records of the Argentine National Education Ministry.

An elemental decision is choosing the cohorts to be considered in the analysis. In terms of this preliminary exploration at least, we will compare the outcomes of individuals that were 17 to 21 in 1994 (presumably, they had not been exposed to the reform) to those of individuals that were 8 to 12 in 1995 (according to their birthplace,

they had potentially been fully exposed to the extension in compulsory education with new curricula).²

Besides, between the *young* cohorts (children aged 8 to 12 in 1995); there is substantial variability in terms of treatment intensity. This variability is driven by two main sources. In first place, differences in the timing of the reform involve that a given cohort could have been exposed to a variable extension in mandatory education according to their conglomerate of birth. For instance, children aged 12 in 1995 have faced a two-year increase if they lived in Buenos Aires, a one-year increase if they live in Corrientes and have not been obliged to continue studying in the secondary level if they lived in Misiones. However, in all these provinces, children aged 10 in 1995 have been exposed to a two year increase in compulsory education. In second place, differences in school construction rates and/or percentage of schools that implement the reform is another source of variability in program exposure. Children living in the two provinces that implemented the reform in the same year (Buenos Aires and Córdoba) could be exposed to considerably different treatment intensities in accordance with the investment program carried out to support these reforms.

On the other hand, the relevant period to be studied depends on the outcome of interest. For instance, in order to analyze labor performance, the period 2003-2007 seems to be adequate, since it allows us to avoid the methodological change in the EPH.

II. School quality

II.1 Outcomes of interest

In this section the paper will inquire if the changes carried out allowed the students to receive an education of better quality. Naturally, measuring educational quality is a complex issue. Given the existing informational limitations, we will focus on standardized test scores in Mathematics and Spanish as a measure of school performance. In particular, we will analyze students' achievements in the last school year of secondary education. The specific indicator considered will be the school average test score in each subject (Mathematics or Spanish)

II.2 Sources of information and population to be studied

The administrative records of the Argentine National Education Ministry will be our principal source of data. Among other variables, these records allow computation of the average test score by school, which will be our unit of observation. Our dataset will be composed of around 5,000 schools from 1997-2000. More than 10% of these schools had completed the curricular reform in the year 2000.

b. The experiment/intervention (experimental projects only)

- i. What experiment/intervention will you do?
- ii. How will this work

² In order to understand this point, we should notice that the previous system obliged students to complete the primary level. This took place in most cases when children were aged 12. Therefore, the two-year extension in compulsory education was relevant (in general) for those youngsters at most aged 13 during the year of LFE's implementation. Hence, in the case of Buenos Aires, which implemented the law massively during 1996, children aged 12 or less in 1995 would have been fully exposed to two additional years of compulsory education with new curricula.

1. Who are the beneficiaries?
 2. How will they benefit?
 3. How do you draw the control group to which you compare the treated group?
- iii. Who will do it?
 - iv. What potential problems do you foresee and how will you overcome these?

c. Data collection methods (experimental projects only)

- v. Will a baseline data be collected or will you use existing data for the baseline?
- vi. What population will be studied
- vii. Sampling design, sample size and statistical power
- viii. Key data to be collected (and how this will be done)
- ix. Additional data to be collected

d. Modeling and testing

- x. What model/idea will you test with these methods
- xi. What empirical methods will you use to do this testing
- xii. What empirical problems do you foresee

This project aims to test several hypotheses regarding the reform that have become popular among political actors and the population in general. (1) In the first place, we want to test whether the extension in compulsory schooling involves a better labor performance of youngsters forced to attend two additional school years. (2) A second hypothesis to test will be on the effectiveness of the LFE to retain students in the educational system after the years of compulsory education. (3) Finally, we will evaluate if the reform lead to a deterioration in the quality of education.

There is a heated debate between supporters and detractors of the reform on the three issues mentioned above, without almost any rigorous empirical evidence.

As in the previous section, the methods that will be used to test the hypotheses are described separately.

I. Human capital accumulation and labor market performance.

The identification strategy proposed in this project consists in exploiting the heterogeneity in both the timing and the intensity of the reform. The basic idea is to evaluate whether youngsters who were forced to attend two additional years of school (with new curricula) performed better in certain dimensions (e.g. the labor market) than their peers who were not “treated”, either because they were born in provinces that did not implement the reform quickly or because they were not affected because they were just leaving primary school when the law was passed. Besides, the differences should be larger in urban areas where the implementation of the reform involved higher percentage of schools,

A major methodological concern is that the implementation of the reform could be correlated with unobservable factors that also affect the outcomes of interest. For example, poor provinces with low secondary enrolment rates could be more motivated to extend compulsory schooling as a strategy to improve the skill level of their population. If this were the case, cross sectional data would show that enrolment rates tend to be lower in those provinces, probably misleading policy implications.

Being aware of this kind of problems, when assessing the policy intervention we will use fixed-effects methods to control for unobserved heterogeneity across both cohorts and urban areas. Essentially, fixed-effects identification strategy uses repeated observations of the unit of analysis to control for unchanged unobservable characteristics (in this case by cohorts or urban areas) that can be correlated with both causal variables and outcomes of interest (Angrist and Krueger(1998))

Seminal work in the assessment of public policies in developing countries with these methods is Rosenzweig and Wolpin (1988). Among several evaluations that employ fixed-effects identification strategies, our study is particularly linked to the line of research follow by Duflo (2001) and Chou, Liu, Grossman and Joyce (2007), to mention but a few. The former analyzes the impact of an extended school construction program on both schooling and the labor market in Indonesia, using the interaction between cohort indicators and program intensity as an instrument for schooling. The latter investigates the child health consequences of extending the years of compulsory schooling from six years to nine years in Taiwan. This work also takes advantage of the different construction rate of new schools by region to design an instrument for schooling.

Formally, following Duflo (2001), the basic model to be estimated is:

$$Y_{ijk} = C + \alpha_j + \beta_k + (P_j * T_i) \cdot \gamma + \delta (C_j * T_i) \cdot \delta + e_{ijk} \quad (1)$$

Where:

- Y_{ijk} is the outcome of interest of individual i , living in conglomerate j . The letter k indexes the individual's cohort.
- α_j and β_k stand for conglomerate of birth and cohort fixed effects, respectively
- P_j is a measure of the program intensity in the conglomerate of birth (e.g. percentage of schools that implement the reform in the conglomerate of birth)
- T_i is a dummy which identifies the treated population : T_i takes the values 1 for treated youngsters (according to both they conglomerate of birth and their cohort) and 0 otherwise.
- C_j are a set of variables regarding conglomerate of birth
- e_{ijk} is an error term

This is our basic identification strategy. In this simple model we do not consider differences in the time span of the treatment or heterogeneous effects between cohorts (that will be incorporated in the project), but it is illustrative of the sources of variability in treatment exposure.

II. School quality

The main methodological reference for this section is Galiani, Gertler and Schargodsky (2005). These authors use a similar dataset in order to study the effect of school decentralization on educational quality. Being aware that there could be unobserved

heterogeneity that confound identification, these authors use school panel data to estimate difference in differences models. These models allow controlling for unobserved characteristics that varies across schools, but are fixed across time.

In our case, the schools which chose to implement curricular reforms may possess unobserved traits which negatively affect pupils' performance. In fact, this could be the motivation to quickly execute the reform, since improving school quality might be a more pressing matter in these schools. By comparing changes in outcomes we will be able to control for this kind of unobserved heterogeneity.

The methodology will use regression analysis to estimate program effects. As was mentioned, the basic approach considered corresponds to the use of a double-differences (*diff-in-diff*) model for panel data which controls for fixed effects. The following equation corresponds to this case:

$$y_{ijt} = \alpha + \beta D_{ijt} + \delta x_{jt} + \lambda_t + \mu_i + \xi_{ijt} \quad (2)$$

Where:

- y_{ijt} is the result of the evaluation in school i , in province j , and in year t .
- D_{ijt} is a dummy variable which takes value 1 if the i th school in year t has students attending their last year of secondary schooling under the new educational system, and zero otherwise.
- x_{jt} is a vector of control variables which differ between provinces and through time. Among these variables, we have Provincial GDP per capita (PBG for its abbreviation in Spanish), unemployment rates, poverty headcounts and fiscal results as a fraction of PBG. It is also possible to expand this matrix including school-level characteristics.³
- λ_t are fixed effects common to all educational establishments in year t . Alternatively, these effects may be expanded to λ_{jt} , thus controlling for fixed effects by province, j , and year t . These dummies, capture all those factors which vary in time and are homogenous between the control and treated establishments.
- μ_i is a fixed effect which captures all factors which differ amongst schools, but are fixed in time. A more parsimonious version of the model will be estimated using municipal effects instead of school-level controls.
- ξ_{ijt} is the error term, with mean zero and assumed uncorrelated with the independent variables.

An important consideration lies in potential correlation of the error term through time periods and between observational units. To address this issue, standard errors will be estimated by clustering at provincial level.

³ There is valuable information regarding schools in our dataset, such as: funding for expanding infrastructure and building repair, as well as teacher training and capacity building of the administrative staff.

Heterogeneous impact

Since the program is aimed at improving educational and labor outcomes of the poorest, we will investigate heterogeneity by subgroups of the population and, if possible, quantile treatment effects. We could divide the population according to poverty status, and examine whether the estimated impact of the reform on labor outcomes, years of education and quality of education differ across groups. The analysis regarding labor outcomes and years of schooling will be based on the national survey (EPH) that has also information on household income, housing, water and sanitation, so we could construct both an income poverty variable, and a basic-needs poverty variable (see Gasparini, 2006 for details). Instead, the analysis for education quality will be based on administrative data. In this case, geographical areas could be classified according to a basic needs indicator constructed by the National Statistical Office (INDEC) and available at the municipal level.

Shortcomings and empirical problems

Selection-bias

It is important to be aware that, since other changes occurred during the Reform, the fixed-effect assumption underlying identification may not be enough. This is a general concern that applies to all non-experimental analysis, and that cannot be fully solved given the nature of the policy intervention under analysis (non random). In the project we exploit all possible sources of variation to reduce the potential biases: before and after the intervention, regional variation in the exposure to treatment, and controls for observable variables. We argue that although other unobservable socioeconomic factors may have also played a role, the LFE was a massive intervention specifically aimed at affecting the outcomes under analysis, and hence it is believed to be the main potential driving force of the differences in the outcomes changes across geographical areas with different exposures to treatment, after controlling for other observable factors. Anyway, we will devote a section of the analysis to discuss other socioeconomic changes in Argentina that we cannot control for, and that may be biasing the results.

General equilibrium effects

The LFE implied a large reform, and then it is expected to have general equilibrium effects. Some of them could be captured in our estimations. For instance, the reform could imply a large increase in the share of skilled workers in some region, and that in turn may imply, at least in the short run, a fall in their relative wages. Our estimates of the effect of the reform on wages may be including the direct effect of the reform on productivity, and an indirect effect through the workings of the labor market. Of course, the evaluation may miss some other general equilibrium effects. For instance, the increase in education in one region may attract skilled-intensive firms into an area, and that could increase labor productivity, and create all sorts of second round effects that may take time to show up. Most of these effects will be missed by our short-sighted analysis, which nevertheless we find helpful in identifying the main direct effects of the reform. Again, we plan to include a section discussing many potential general equilibrium effects of the policy intervention, although, as most of the literature, we do not estimate them.

Selective migration

Reallocation of children across schools could threaten the validity of the proposed impact evaluation. This is a key issue, particularly when assessing the impact on educational quality. If the most motivated and informed individuals reallocate their children to those schools that quickly implement the Reform, a simple change in the composition of the students in both treated and non-treated schools could be misleading with the effect of treatment on quality. In order to evaluate the severity of this empirical problem, we will use a similar strategy to that of Galiani, Gertler and Schargodsky (2005). As mentioned in the proposal, these authors use a similar database in order to study the effect of a previous law on the same outcome (educational quality). Basically, they test if within a certain municipality there was a change in the relative enrollment rates in treated and non-treated schools. They assume that if these relative rates did not change, then there was no selective migration. They are aware that *perfect equalizing movements* (that exactly offset the migrations of good and bad students) are not being considered but, as these authors point out, this kind of phenomena is highly unlikely.

e. Human subjects concerns

The proposed research has no ethical, social, or environmental issues or risks

D. Consultation and dissemination strategy (1 page)

- a. How, in the elaboration and execution of your project, will you consult with policy makers, civil society representatives and other parties interested in the research issues you examine?

Team members are fully engaged in the debate of social issues in Argentina, so the ideas of this project will be extensively discussed with policy makers, researchers and civil society representatives. We interact with these actors in different places, like conferences, seminars and meetings. As an example, CEDLAS is currently the host institution for the Network of Inequality and Poverty – Argentina (LACEA-IDB-World Bank) and organizes annual meetings, where issues like the one proposed in the project are discussed with researchers and policy makers.

- b. How and where research results will be disseminated to academics, policy-makers and the public: publications, policy briefs, seminars, conferences, etc. (see [PEP's consultation and dissemination strategy](#) for ideas)

The expected output from the research project is a report, which will lead to one or two short articles to be sent to specialized refereed academic journals. The project report (and its derived articles, as they become available) will be posted on the CEDLAS website (www.cedlas.org), and will be freely accessible as a working paper. Moreover, brief accounts of this research will appear in the CEDLAS-UNLP annual report and in its regular bulletin mailed to a large group of scholars, policy makers, and journalists.

We will place great care in writing a short, standalone, non technical policy brief to be distributed to the press, and among policy makers, legislators, and advocacy groups, such as pro-poor NGOs. The purpose of this dissemination will be to engage these stakeholders in a debate on the impact of the Ley Federal de Educación, and the analysis of new policy initiatives. The ultimate goal in terms of the policy relevance of the project for Argentina is to contribute to a more informed discussion on future modifications of the Federal Education Law.

The project has also an implicit “methodological advocacy” objective, in terms of promoting the rigorous evaluation of policy initiatives like the LFE. By stressing the problems that faces a non-experimental evaluation, we hope to encourage policy makers to take impact evaluation issues more seriously.

Other consultation and dissemination aspects will include the presentation of the research in seminars at universities, ministries (of Labor, and of Social Development, for instance) and other institutions in Argentina and Latin America. At the international level, we will seek to present this work in annual events such as the Latin American and Caribbean Economic Association (LACEA) meeting and/or the Latin American Meeting of the Econometric Society (LAMES).

Finally, there will be a specific effort to disseminate the methodology and the results in policy makers and international organization’s circles. This implies presentations at institutions and network meetings, such as the United Nation’s Development Program (UNDP), the United Nation’s Economic Commission for Latin America and the Caribbean (ECLAC), the Inter American Development Bank (IADB), the World Bank, the Network of Inequality and Poverty (WB/IADB/LACEA) and the Corporación Andina de Fomento (CAF), among others.

E. The study team (1 page)

- a. Principal investigator; brief bio and explanation as to why they are well suited to lead this project.

Leonardo Gasparini (male, 42 years old). Mr. Gasparini is a Ph.D in Economics at Princeton University. He is the director of the Center for Distributional, Labor and Social Studies (CEDLAS) at University of La Plata (UNLP). He teaches undergraduate and graduate courses on Income Distribution, Impact Evaluation, and Labor Economics at UNLP and UdeSA. He has published articles on income distribution, education and labor issues in the Review of Income and Wealth, Journal of Public Economics, Economic Development and Cultural Change, Social Choice and Welfare, Journal of Economic Inequality, Applied Economics, Journal of Income Distribution, Economics Bulletin, Latin American Journal of Economics, International Social Security Review, Desarrollo Económico and Económica. Gasparini has published three books, and has contributed in chapters of several books on social issues in Latin America (e.g. the 2003, 2004 and 2006 World Bank Flagship Reports, and Bourguignon et al. (2004) on microsimulations). He has worked for the World Bank, the IADB, ILO, Eurosocial, UNICEF, and UNDP.

Gasparini is well suited to lead the project for several reasons. (1) As Director of CEDLAS he is used to lead large projects and organize large work teams (see www.cedlas.org); (2) his academic background is a sign of his skills in conducting high-quality research; (3) he teaches a graduate course and does research on impact evaluation, so he knows the main issues in this literature; and (4) he has been doing research on social issues in Argentina for 20 years.

- b. Other key research staff and their roles. List indicating age (or if they are under 30), sex, prior training and experience in the issues for each of the team members.

All team members have a solid graduate background in econometric analysis and have different levels of expertise in impact evaluation issues. Besides, they are familiarized with the sources of information mentioned in the previous section.

Mariana Marchionni (female, 37 years old). Dr. Marchionni holds a PhD from the Universidad Nacional de La Plata and she is a senior researcher at CEDLAS. She teaches undergraduate and graduate courses on Econometrics at UNLP and UdeSA. She is a specialist in microeconometrics and has extensive experience in the assessment of public policies. She has worked in many different projects that required household surveys analysis. Recently, she designed a special module of the main household survey in Argentina that gathers information on social background, educational antecedents and labor trajectories of young people.

Francisco Haimovich (male, 29 years old). Mr. Haimovich finished his undergraduate studies in Economics in 2005 at the Universidad Nacional de Rosario, Santa Fe, and obtained a MSc. degree in Economics at the UNLP. He has been a junior researcher at CEDLAS since March 2004, and a researcher since July 2005. He has lectured seminars on impact evaluation at UNLP and UNS. He has participated in several reports on poverty, income distribution and social policy in Latin America. He has specialized on microeconometrics and has considerable experience in impact analysis of public policies

Mariana Viollaz (female, 25 years old). Ms. Viollaz finished her undergraduate degree in Economics at the UNLP, in August 2005, and enrolled in the University's MSc. program in Economics in June 2007. She is a junior researcher at CEDLAS since May 2007. She is also research assistant at the Ministry of Economy of Buenos Aires, where she studies the distributive incidence of public spending on education alongside other research.

German Bet (male, 25 years old) Mr. Bet finished his undergraduate studies in Economics in 2002 at the UNLP where he is preparing his dissertation for his MSc. degree in Economics. He is a teaching assistant of graduate and undergraduate Microeconomics at UNLP. He acts as a consultant to the Ministry of Infrastructure, Housing and Public Services of Buenos Aires. At CEDLAS his research has been linked to studying the relationship among education, social environment and labor market.

Carolina Garcia Domench (female, 27 years old). Ms. Garcia Domench enrolled in the UNLP's MSc. program in Economics in June 2007. She has been a junior researcher at CEDLAS since June 2005, with an active participation in numerous projects. In particular, she has been considerable involved in one of the major projects of the Center, the development of the Socio-Economic Database for Latin America and the Caribbean. Besides, she has specialized on Labor Economics and Gender Studies.

Note: Please see CVs uploaded to the PEP network website for more details on academic and professional experience

Expected Capacity Building and Specific Tasks

This project's capacity building potential covers the team members and the research center where they are based (CEDLAS). However, it is the team's objective to extend the project's scope beyond the research center and the academic community, bringing building capacity within government officials and policy makers circles in Argentina

In first place, all team members will increase their research capacity in impact analysis. As mentioned elsewhere, even though there has been some progress in recent years, policy evaluation is not a common practice in Argentina. The team is expected to deepen and refine their general knowledge regarding impact evaluation tools but, in particular, emphasize use of non-experimental techniques. This kind of evaluation is the most frequently used in developing countries, since experimental designs tend to be very expensive and face financial constraints. Thus team members will intensively study diverse topics related with this kind of assessment, with respect to both

methodological issues (fixed effects estimations, clustering, discontinuity designs, placebo experiments, to mention but a few) and computational techniques.

Secondly, all team members will benefit from the detailed analysis of Argentina's educational reform. This will help junior members acquire a deeper understanding of the policy making process and the complex interaction between levels of government in the Argentine case.

With respect to the tasks expected from the team's members, Dr. Gasparini and Dr. Marchionni will supervise the entire project. The supervisors will be mainly responsible for the methodological decisions. After discussions and feedback about the methodology with the rest of the team, a second phase implies the data processing of datasets. This task will be allocated to Mr. Bet, Ms. Garcia Domench, Mr. Haimovich and Ms. Viollaz. In a third phase, team supervisors and members will devise a specific empirical strategy for the impact evaluation of the Reform, mainly with the statistical package Stata, and the members of the team will carry out the estimations for different outcomes of interest. The team members will submit a short report on their findings, which will form the basis of the main project document to be written by the supervisors. Comments and feedback from team members will be encouraged, as well as their active participation in the preparation of policy briefs, and in the presentation and dissemination of the project's results.

It should be noted, however, CEDLAS' work dynamic implies an important amount of interaction between project supervisors and researchers, and between researchers. The paragraph above describes the main guidelines for the team's work, but this does not preclude a fair amount of flexibility in terms of sharing the workload and helping fellow team members with difficulties that might be encountered.

c. Collaborators/consortium arrangements

- i. Are there collaborators involved?
- ii. Who does what?
- iii. How will you resolve disputes?

There are not collaborators involved

d. Past, current or pending projects in related areas involving team members: list with name of funding institution, title of project, list of team members involved.

Projects related to impact evaluation of public policies in Latin America:

- CEDLAS (2007) *Assessing the effect of the Programa Nacional de Becas Estudiantiles on educational achievements and labor performance*. Background paper for CINEA. Funded by the Inter American Development Bank. Team member involved: Haimovich
- CEDLAS (2007). *El impacto distributivo de las tarifas sociales*. Funded by Fundación de Investigaciones Económicas Latinoamericanas. Team member involved: Marchionni
- CEDLAS (2006): *Employability in the southern cone*. Funded by the Inter American Development Bank. Team members involved: Gasparini and Haimovich
- CEDLAS (2006): *The impact of the Programa Jefes de Hogar on Labor Informality*. Funded by the World Bank. Team members involved: Gasparini and Haimovich
- CEDLAS (2005) *Impact of a Universal Minimum Pension on Old Age Poverty in Developing Countries* Funded by the World Bank. Team member involved: Gasparini

Projects related to the evaluation of distributive impact of social public spending in Latin America:

- Ministry of Economy of Buenos Aires (2007) *Distributive Incidence of Public Spending on Education. The case of Buenos Aires*. Funded by the Ministry of Economy of Buenos Aires. Team member involved: Viollaz
- CEDLAS (2006): *Incidence of Public Spending in Panama*. Work commissioned and funded by the Government of Panama and the World Bank. Team members involved: Gasparini and Haimovich.
- CEDLAS (2006): *Distributive incidence of social public spending in Nicaragua*. Work done for the World Bank's Poverty Assessment of Nicaragua. Team members involved: Gasparini and Haimovich.
- CEDLAS (2006): *Incidence of Fiscal Policy in Honduras*. Work commissioned and funded by the Government of Honduras and the Inter American Development Bank. Document produced and on-site training provided. Team member involved: Haimovich.
- CEDLAS (2005): *Distributive incidence of social public spending in Honduras*. Work done for the World Bank's Poverty Assessment of Honduras. Document produced and on-site training provided. Team members involved: Gasparini and Haimovich.
- CEDLAS (2004): *Incidence of Public Spending in Argentina*. Funded by the Directorate of Consolidated Social spending, Ministry of the Economy, Argentina. Team members involved: Team members involved: Gasparini, Haimovich and Marchionni. Document produced and on-site training provided

Others projects related to the analysis of policy interventions, education and labor performance

- CEDLAS (2007) *Fiscal Cost and Social Impact of Implementing a Threshold of Social Protection in Latin America*. Funded by the International Labor Organization and Eurosocial. Team members involved: Gasparini and Haimovich

- CEDLAS (2007) Poverty Impact of Economic Policies in Argentina: A Dynamic CGE-Microsimulation. Funded by Poverty and Economic Policy Network. Team member involved: Gasparini
- CEDLAS (2007) *Education, Social Environment and Labor Market: a New Source of Information*. Funded by FONCyT. Team member involved: Bet and Marchionni
- CEDLAS (2006) *MDGs and Microcredit: An Empirical Evaluation for Latin American Countries*. Funded by Nations Development Programme. Team member involved: Haimovich

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F. Timeline

- July - October, 2008: review and survey of literature; construction of database; basic statistical analysis; elaboration of Interim report
- October 30, 2008: Interim report (initial results)
- November-December: discussion, exploratory analysis, initial estimations.
- December 2008: Presentation of interim report at PEP general meeting
- January-July, 2009: Discussion; incorporation of comments; estimations, preparation of final report draft
- August 2009: Draft final report
- September-December, 2009: further estimations, departures from basic models, discussion and incorporation of comments.
- January-April, 2009: final report draw up
- May 2010: Final report⁰

Poverty and Economic Policy (PEP) Research Network

Answers

- (1) The treatment which the project seeks to analyze is the educational reform imposed by the *Ley Federal de Educación* (LFE henceforth). This reform involved a set of changes in the educational system, including an extension in mandatory education and modification of the curricula of both primary and secondary levels, among the most outstanding points. Additionally, in order to allow the practical implementation of these changes, an investment program on both school construction and training was funded. The treatment design does not allow us to isolate the impact of each of these components. Therefore, as pointed by the referee, the treatment is a bundle of these three elements. Nevertheless, we believe that the extension of two years on compulsory education was the most drastic change imposed by the LFE. In the quality assessment section the units of observation are secondary schools. We define the treated population as those schools that have completed the curricular reform.
- (2) The main sources of variation in the exposition to the “treatment” are states and time. The different provinces chose whether to adhere or not the LFE and, in case they decided to implement the Reform, select a starting date. Therefore, within a certain province, all the cities applied the set of reforms according to the provincial government’s decision. The 23 Argentinean provinces and the city of Buenos Aires (Federal District) are listed in table 1, jointly with the year of implementation of the law:

Table 1
The process of LFE implementation

Conglomerates (i)	Year of implementation (ii)	Modality of implementation (iii)
CABA	N.I	
Buenos Aires	1996	U
Catamarca	1999	P
Córdoba	1996	U
Corrientes	1997	U
Chaco	1997	P
Chubut	1999	P
Entre Ríos	1997	U
Formosa	1998	U
Jujuy	1998	P
La Pampa	1997	U
La Rioja	1999	P
Mendoza	2000	P
Misiones	1998	U
Neuquén	1998	P
Río Negro	N.I	
Salta	1998	P
San Juan	1997	U
San Luis	1998	U
Santa Cruz	1998	U
Santa Fe	1997	U
Santiago del Estero	1998	U
Tucumán	1998	U
Tierra del fuego	1998	P

Source: Crosta (2007)

Notes:

CABA: Metropolitan areas of Buenos Aires

N.I: non-implemented; U: generalized implementation since the beginning; P: gradual implementation

Columns (i) and (ii) in table 1 show that youngsters faced the **legal** implementation of the Reform according to both their province and cohort. However, the **practical** execution of the LFE was not necessarily immediate. In fact, the different provinces decided whether to make a generalized implementation of the LFE since the beginning or to follow a gradual strategy (see column (iii) in table 1). In this sense, some crucial aspects of this law (e.g. the extension in mandatory education) required investments in infrastructure and training to become viable. There have been certain heterogeneities between cities in terms of both school construction and the percentage of educational establishments which implemented the reform. We consider including these differences as a measure of treatment exposure. However, at this stage of the project we do not have accurate data regarding these issues. Nevertheless, we will gather this kind of information from the administrative records of the Argentine National Education Ministry.

The Encuesta Permanente de Hogares (EPH) is the main source of information for the section of the paper that will be focused on the LFE's impact on human capital accumulation and labor market performance. The EPH collects information from 32 urban conglomerates corresponding to 23 of the states listed in table 1. Therefore, when analyzing these issues, the level of treatment will be determined by youngsters' conglomerate and cohort.

With respect to the quality assessment, secondary schools will be the unit of analysis and our database will be composed of around 5,000 educational institutions. As pointed by the referee, the level of treatment is finer in this case since we are able to identify which schools complete the curricular reform.

(3) The referee properly points out that high drop-out rates could be a more serious problem in rural areas. However, we think that analyzing the LFE's impact on urban conglomerates is a primary concern since Argentina is predominantly urban. Around 95% of its population lives in urban centers with more than 5,000 inhabitants. The EPH, our main dataset, collects information from large conglomerates (all the urban areas with more than 100,000 inhabitants), which are home to 71% of the Argentine urban population.

(4) The referee correctly points out that other changes occurred in the same period under analysis, so the fixed-effect assumption underlying identification may not be enough. This is a general concern that applies to all non-experimental analysis, and that cannot be fully solved given the nature of the policy intervention under analysis (non random). In the project we exploit all possible sources of variation to reduce the potential biases: before and after the intervention, regional variation in the exposure to treatment, and controls for observable variables. We argue that although other unobservable socioeconomic factors may have also played a role, the LFE (Ley Federal de Educación) was a massive intervention specifically aimed at affecting the outcomes under analysis, and hence it is believed to be the main potential driving force of the differences in the outcomes changes across geographical areas with different exposures to treatment, after controlling for other observable factors. Anyway, we will devote a section of the analysis to discuss other socioeconomic changes in Argentina that we cannot control for, and that may be biasing the results.

(5) The referee asks about general equilibrium effects of the policy intervention. The LFE implied a large reform, and then it is expected to have general equilibrium effects. Some of them could be captured in our estimations. For instance, the reform could imply a large increase in the share of skilled workers in some region, and that in turn may imply, at least in the short run, a fall in their relative wages. Our

estimates of the effect of the reform on wages may be including the direct effect of the reform on productivity, and an indirect effect through the workings of the labor market. Of course, the evaluation may miss some other general equilibrium effects. For instance, the increase in education in one region may attract skilled-intensive firms into an area, and that could increase labor productivity, and create all sorts of second round effects that may take time to show up. Most of these effects will be missed by our short-sighted analysis, which nevertheless we find helpful in identifying the main direct effects of the reform. Again, we plan to include a section discussing many potential general equilibrium effects of the policy intervention, although, as most of the literature, we do not estimate them.

(6) Reallocation of children across schools could threaten the validity of the proposed impact evaluation. This is a key issue, particularly when assessing the impact on educational quality. If the most motivated and informed individuals reallocate their children to those schools that quickly implement the Reform, a simple change in the composition of the students in both treated and non-treated schools could be misleading with the effect of treatment on quality. In order to evaluate the severity of this empirical problem, we will use a similar strategy to that of Galiani, Gertler and Schargodsky (2005). As mentioned in the proposal, these authors use a similar database in order to study the effect of a previous law on the same outcome (educational quality). Basically, they test if within a certain municipality there was a change in the relative enrollment rates in treated and non-treated schools. They assume that if these relative rates did not change, then there was no selective migration. They are aware that *perfect equalizing movements* (that exactly offset the migrations of good and bad students) are not being considered but, as these authors point out, this kind of phenomena is highly unlikely.

(7) It is hard to believe that there were substantial anticipation effects in the places that did not adopt the reform. Probably, the main anticipation behavior would be to move to a region known to implement the reform, but as argued elsewhere, migration movements have been slow in Argentina for decades, and have not significantly changed in the years around the reform.

(8) There was a mistake regarding the years listed in the proposal. Instead of “aged 8 to 12 in 1994” it should have said “8 to 12 in **1995**”.

In first place, we should notice that the previous system obliged students to complete the primary level. This took place in most cases when children were aged 12. Therefore, the two-year extension in compulsory education was relevant (in general) for those youngsters at most aged 13 during the year of LFE’s implementation. Hence, in the case of Buenos Aires, which implemented the law massively during 1996, children aged 12 or less in **1995** would have been fully exposed to two additional years of compulsory education with new curricula.

We are aware that these aspects were not perfectly clear in the expression of interest and, therefore, we included some additional paragraphs in order to shed light on these issues.

(9) The school quality section is focused on the assessment of the curricular reform in the last three years in secondary education. During the year 2000, 10% of schools in our dataset have a cohort of students (in the last year of secondary education) fully exposed to this curricular reform. Therefore, our span, 1997-2000, is adequate for this objective. We further analyze this issue in the following point.

(10) There are two main aspects regarding the size of the treatment group. The first is strictly technical, and corresponds to the sample size and the empirical strategy taken to estimate the impact of the intervention. In our case (5,000

observations per year with more than 10% making up the treated), the quantity of observations is more than satisfactory when it comes to evaluating a social program. A larger number of observations would be utterly necessary in cases in which the variable separating both treatment and control groups presents high levels of heterogeneity⁴; or if extrapolation is a fundamental objective, since estimates need to be precise. However, due to information constraints, it is not possible to exploit the aforementioned heterogeneities; causing the empirical strategy to focus on a binary variable indicative of treatment. Another important point lies in the fact that for consistent estimates a well established control group is required, since choosing any particular estimation strategy from the data imposes structure on counterfactual outcomes, and if the control group is specified properly program effects are estimated without bias⁵.

The second aspect is tied to the research proposal's objectives. Ideally, in order to assess differences in treatment intensity, a larger timeframe is desired. Nonetheless, there is no available data since 2000. Up to this point, however, the sample is representative of the immediate effects of the program, since it includes all secondary schools in the country, with exception of those created after 1997 (motivated by the necessity of a balanced panel).⁶

(11) We have included some equations in this version.

(12) As suggested by the referee, since the program is aimed at improving educational and labor outcomes of the poorest, we will investigate heterogeneity by subgroups of the population and, if possible, quantile treatment effects. We could divide the population according to poverty status, and examine whether the estimated impact of the reform on labor outcomes, years of education and quality of education differ across groups. The analysis regarding labor outcomes and years of schooling will be based on the national survey (EPH) that has also information on household income, housing, water and sanitation, so we could construct both an income poverty variable, and a basic-needs poverty variable (see Gasparini, 2006 for details). Instead, the analysis for education quality will be based on administrative data. In this case, geographical areas could be classified according to a basic needs indicator constructed by the National Statistical Office (INDEC) and available at the municipal level.

⁴ This would correspond to a case of measuring intensity of treatment

⁵ See Colin, Cameron and Pravin Trivedi (2005) for more on this.

⁶ Between 1997 and 2000, 398 educational public establishments were opened, with 229 being secondary schools (Argentine National Education Ministry, 1996-2005). In this proposal, the data on which estimates will be based relies on a balanced panel for the period 1997-2000. Therefore, incorporating the newer establishments opened in that timeframe is not possible.