School Segregation and Long-Term Happiness:
Evidence from the 1981 Education Reform in Chile

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Abstract

In 1981 the Chilean Military Government introduced a voucher scheme of school choice that led to an exodus of middle-class students from public to subsidized private schools. Using historical administrative data of enrollment before and after the reform, I examine the long-term impact of increasing private enrollment –and thus segregation- on subjective well-being. The results show that children from poor families were negatively affected by the policy change. On average, being exposed to a 10 percentage point increase in subsidized private enrollment during childhood is associated with a drop in adult life satisfaction of 6% of a standard deviation, an effect equivalent to a 30% fall in earnings.

JEL Classification: I22, I24, I28, I31, Z13.

Keywords: subjective well-being, segregation, school choice, vouchers, Chile.

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1 Introduction

Chile is one of the countries with highest school segregation in the world. Around 80 percent of children from high (low) family background are concentrated in the best (worst) performing schools. Similarly, the Chilean educational system is characterized by a large presence of the private sector. In 2014, more than 60 percent of students attended private schools, the highest figure among OECD members (see Figures A.1 and A.2 in the Appendix). These two facts owe considerably to the 1981 educational reform that introduced a nation-wide voucher program for school financing. After this reform, parents could send their children to any public or subsidized private school[1] without having to pay fees. Schools would receive a flat-per-student subsidy depending on total enrollment and monthly attendance. In just five years, the share of students attending voucher private schools soared from 15 to 30 percent. However, this exodus was characterized by a composition effect; subsidized private schools attracted mainly middle-class students, leading to a sharp increase in school segregation.

The goal of this paper is to examine the long-term effect of the 1981 education reform in life satisfaction. Since the main outcome of the policy was the expansion of private education and a rise in school stratification, it indirectly tries to explore the long-run impact of school segregation on well-being. The study combines detailed household survey data with a unique historical dataset of enrollment records for each of the 346 municipalities[2] in Chile. The identification strategy exploits the unequal penetration of the private sector across municipalities following the reform and relies on the comparison of individuals differently exposed to its effects depending on their year of birth.

This study contributes to different bodies of literature. First, it lies within to the extensive research analyzing the effect of the Chilean voucher program. While the focus has been on its impact on educational performance and stratification, little is known about other outcomes and the long-term consequences of the reform. These studies tend to find mixed results regarding performance, but if any, the impact has been modest[3]. The lack of appropriate data and convincing methods has impeded reaching solid conclusions. By contrast, there seems to be a consensus pointing to a large increase in school stratification due to the voucher program (Hiseh and Urquiola, 2006; McEwan, Urquiola and

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[1] I will use the terms voucher and subsidized private schools interchangeably. They represent all private schools receiving state funding (i.e. all private schools participating in the voucher system after the reform).
[2] I will use the term municipalities to refer to the Chilean *comunas* (in Spanish), the smallest administrative entity in the country. Municipalities vary significantly in size and population but they resemble US counties. As of 2012, the 10 percent least populous municipalities had an average population of 1,900 people while the 10 percent most populous municipalities had an average population of 253,000 people. Note that the Chilean administration is divided in 15 regions, 54 provinces and 346 municipalities.
[3] For a review see Dragon and Paredes (2011).

Vegas, 2008; Elacqua, 2012; Valenzuela, Bellei and De los Rios, 2013; Santos and Elacqua, 2016). Secondly, it contributes to the literature assessing the effects of educational reforms, and especially, those related to school choice. Some papers have found that flexible school choice tends to lead to increased segregation and exacerbate inequalities between children of different social background (Sorderstrom and Uusitalo, 2005: Bohlmark et al., 2016). Finally, it aims to contribute to the literature on the effects of school segregation. Much of the research has looked at outcomes such as educational attainment (Guryan, 2004; Johnston et al., 2007; Reber, 2010; Billings et al., 2014) and crime (Kling et al., 2005: Weiner et al., 2009; Billings et al., 2014;). Echenique et al. (2006) examine the relationship between school racial segregation and several outcomes during youth. Segregation in this context seemed to reduce the probability of inter-ethnic couples but did not have any significant effect on subjective well-being. Some limitations of this body of literature are that they just consider the case of the US, segregation is measured based only on ethnic origin, and they look solely at contemporaneous or young outcomes. Recent research has assessed the long-term impact of moving to richer neighborhoods on outcomes such as health, subjective well-being and earnings (Sanbonmatsu et al., 2012; Ludwig et al. 2012; Chetty et al., 2015). Despite relying on a randomized intervention, this research has produced inconclusive findings and lacks general equilibrium considerations.

The present study makes four contributions. First, it is interested in school segregation based on socio-economic status rather than only ethnic origin. Second, it focuses on a developing country with extreme levels of segregation. Third, it assesses the impact on an understudied and broad outcome, subjective well-being. Fourth, since the reform was nation-wide, it looks at the whole population, not just minorities, and at the very-long run. Furthermore, it makes uses of administrative data of enrollment in the 1980s to appropriately measure the response to the policy change.

The results show that the 1981 reform had a long-term impact on subjective well-being, harming individuals from medium and low family background while benefiting those with the most educated parents. The impact differs remarkably depending on migration patterns. Among individuals who currently live in their birth municipality, there is a negative effect only for those with medium-educated parents. On average, a 10 percentage point increase in voucher private enrollment in their municipality when they were young is associated with a fall in adult life satisfaction in 4 percent of a standard deviation. This effect is equivalent to the impact of decreasing household income by 20 percent or reducing education by 2.5 years. Individuals who moved and have low educated parents also see their life satisfaction decreased due to the reform in a similar magnitude. Further evidence shows that, regardless of the conditions in their municipality of birth, individuals from low and medium family backgrounds who migrated to high privatization areas are considerably worse-off today. In this case, a 10 percentage point increase in voucher private enrollment in the 1980s is associated with a fall in current life satisfaction between 5 and 7 percent of a standard deviation. Importantly, altering the cohort

windows defining the treatment and control groups shows that only cohorts that were exposed to a rise in privatization during childhood seem to have been affected.

The remaining of this paper is structured as follows. Section 2 describes the historical background, focusing on the main changes introduced by the reform and why it led to a rise in segregation. Section 3 and 4 detail the data sources and the identification strategy respectively. Section 5 presents the results, discusses potential mechanisms and provides some robustness checks. Finally, Section 6 summarizes the findings and draws some policy implications.

2 Historical background

In this section I discuss the main changes introduced by the 1981 educational reform and its consequences. First, public schools' administration was transferred from the Ministry of Education to municipalities and schools were given higher flexibility. Secondly, a new financing scheme based on a flat-per-student subsidy (voucher) was implemented for both public and subsidized private schools. As a result, in just five years the number of subsidized private schools doubled and their share in total enrolment increased from 15 to 30 percent. Since the exodus from public schools was characterized by middle-class students, the privatization process induced by the voucher scheme led to a sharp increase in stratification across schools.

2.1 Pre-reform years: 1950-1981

In the period 1950-1973, the main objective of educational policy in Chile was expanding access. There were large investments in new establishments, resources, and a double-journey system was introduced[4]. Enrollment in basic education increased from 70.7 percent in 1947 to more than 97 percent in 1970 (Cruz, 1999; Cox, 2003). After the coup d'état in 1973, the Military Government carried out a cleansing of teachers and school heads who differ ideologically from the regime (Echeverria and Hevia, 1981). Teachers unions were dismantled and the curriculum was also slightly modified to incorporate national and traditional values (Cox, 2003). Enrollment in secondary education suffered a sudden stop, growing at only a 3.4 percent per year in 1973-1979 compared to 15.4 in 1967-1973. Besides these aspects, there were no significant changes in the educational system before 1981.

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[4] Besides standard morning classes, some groups started attending school in the afternoon, thus doubling the capacity of public schools (Cruz, 1999).

Regarding schools, one can distinguish three types:

- **Public schools** accounted for 70 to 80 percent of total enrollment in the 1960s and 1970s. They were financed through annual transfers from the Ministry of Education and did not charge fees. The amount of these transfers was determined from previous costs, the number of students and the characteristics of the school (Hsieh and Urquiola, 2006). Education was of similar quality across public schools since all followed the same curriculum.
- **Subsidized private schools** accounted for around 15 to 20 percent of enrollment in this period. More than half were run by the Catholic Church and the rest by Protestant churches or non-religious foundations. They did not charge fees nor had a for-profit orientation (Espinola, 1993). Although they received transfers from the Ministry of Education they were severely underfunded and had to largely rely on their own resources[5]. Most of them followed the same curriculum as public schools adding some religious content.
- **Fee-charging private schools** were elite institutions offering specialized and high quality education. They were run for-profit, outside the control of the Ministry of Education, and did not receive any public funding. Fee-charging private schools had admissions requirements, such as parental interviews or entry examinations, and served only the wealthiest children.

Prior to the reform, both public and subsidized private schools operated similarly and offered education of comparable quality. They did not charge fees nor selected students generating thus a mixed poll of children from all social classes. Leaving aside the wealthiest families, who sent their kids to fee-charging private schools, most children attended the closest school to their homes where they had priority to enroll (Hsieh and Urquiola, 2006).

2.2. The 1981 educational reform

The Military Government aimed to liberalize the educational system with the objective of making it more efficient. It believed that with higher flexibility and competition for students among schools educational outcomes would improve while costs would fall. The 1981 reform targeted these aspects by decentralizing the administration of public schools and by introducing a system of school vouchers.

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[5] Not only the amount of the subsidies were not sufficient to cover all costs but the delay in monthly payments further eroded their value due to inflation (Hiseh and Urquiola, 2006).

1) Decentralization and flexibility

The decentralization process implied the transfer of all public schools from the Ministry of Education to municipalities in the first months of 1981. This meant that local governments had to administer all financial, material and human resources of schools (Espinola, 1993). Decentralization did not imply loss of control, as municipalities' majors were appointed by the regime and these appointed school heads (Cox, 2002). The Ministry of Education kept a subsidiary role of control and supervision and suffered a large reduction in its personnel, going from 20 thousands employees in 1982 to around 3 thousand in 1989 (Prawda, 1992). Public teachers stopped being civil servants to become private employees with standard contracts with municipalities[6] and although they could be fired freely this rarely happened (Carnoy, 1998). Schools were allowed to choose between a 30 or 25 hours week and reallocate hours between subjects. In the last years of secondary education students were also allowed to choose between subjects (Espinola, 1990). Since there were no longer docent guides or methodological plans, teachers were allowed to implement the practices they would consider appropriate (Espinola, 1993). Most public schools however continued following national guidelines and barely modified the curriculum (Cox, 2002). The higher flexibility often meant fewer hours and less content in the poorest context (Espínola, 1993).

2) Vouchers and school financing

The key measure of the 1981 reform was the introduction of a flat-per-student subsidy (i.e. voucher) for public and subsidized private schools, integrally replacing the previous financing system. Under the new voucher scheme, children could attend to any public or subsidized private school regardless of its location and without having to pay any fees. Schools would receive a monthly payment proportional to the number of students enrolled with a correction for average attendance (Carnoy and McEwan, 2002; Espinola, 1993). Importantly, the value of the per-student subsidy was the same for both public and subsidized private schools and did not take into account the socio-economic status of students (Elacqua, 2012). All previously subsidized private schools (e.g. religious schools) were automatically adhered to the voucher system while many new ones entered the market and joined the system[7].). While fee-charging private schools could join the voucher scheme they rarely did so as that would have implied losing their ability to levy fees. The conditions to receive the subsidies were not to charge fees, have classes of upmost 45 students, follow general guidelines concerning the curriculum and abide to some infrastructure regulations (Espinola, 1993; Mizala and Romaguera, 2000). To incentivize the creation

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[6] Recall that teachers unions had already been dismantled in 1973.
[7] I will refer to all private schools receiving the subsidy as subsidized or voucher private schools irrespective of whether they were already present before the reform or not.

of new voucher private schools, the value of the subsidy was set 30 percent above the average spending per student in 1980 and 61 percent higher than the average per student transfer that subsidized schools use to receive before the reform (Espinola, 1993).

## 2.3 Privatization of education and rising segregation due to the 1981 reform

The extremely favorable conditions of the voucher scheme in terms of financing fostered new private schools to enter the market and adhere to the system. As shown in Figure 1, close to 15 hundred new voucher private schools opened between 1980 and 1985, doubling the existing stock of subsidized schools. According to Hsieh and Urquiola (2006), 84 percent of these new private schools were for-profit institutions. Likewise, there was a large increase in subsidized private enrollment following the reform. The share of students attending voucher private schools rocketed from 15 percent in 1981 to 33 percent in 1988 as illustrated in Figure 2. Regarding fee-charging private schools, both the total number of establishments and their enrollment remained fairly constant.

FIGURE 1: Total number of establishments by school type, 1980-1995
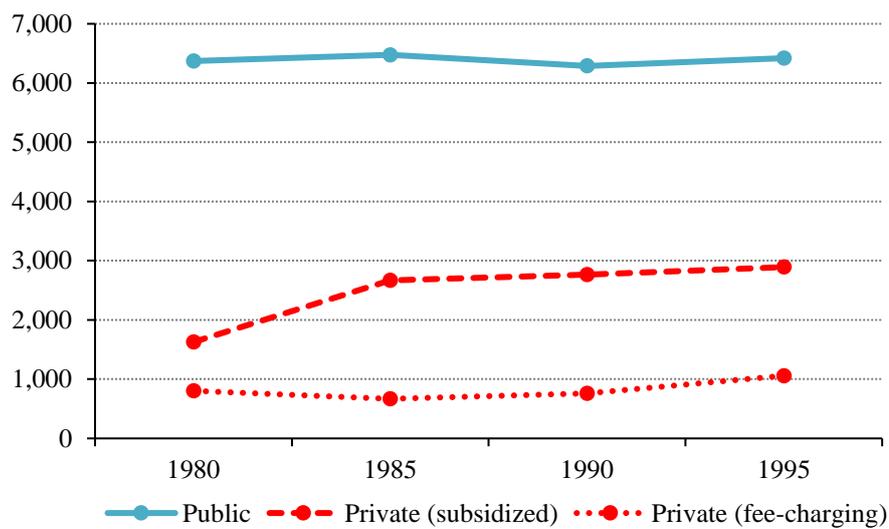
Source: data from the Ministry of Education. Note: all primary or secondary schools are included.

FIGURE 2: Total enrollment by school type, 1970-1995
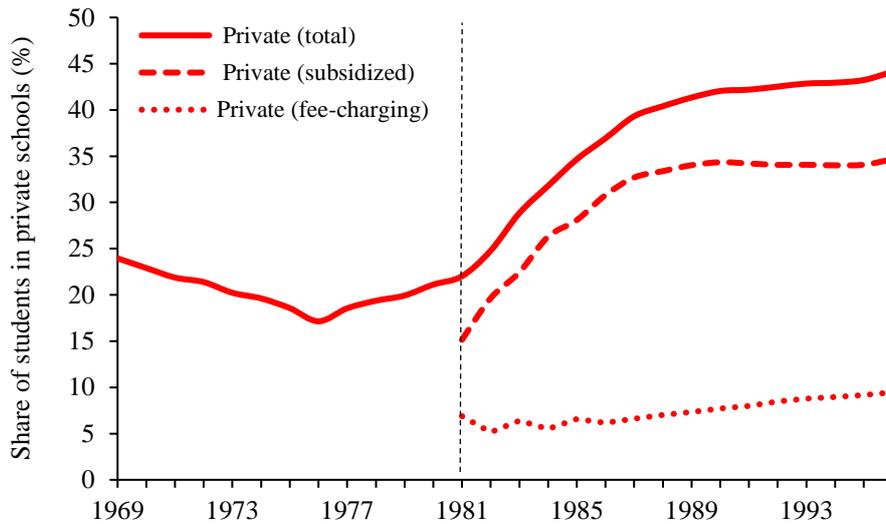
The exodus out of public schools was characterized by middle-class students, thus concentrating children from low socio-economic status in these schools (Hsieh and Urquiola, 2006). Several papers analyzing the effects of the 1981 educational reform conclude that the expansion of private schools had a negligible effect on educational quality measured by test scores but raised stratification and inequalities among schools (Auguste and Valenzuela, 2004; Hsieh and Urquiola, 2006; McEwan, Uquiola and Vegas, 2008; Valenzuela, Bellei and De los Rios, 2013).

There was a strong positive relationship between family income and children's enrollment in private schools. Therefore, increases in private enrolment translated into higher school segregation. Figure 3 plots the share of students enrolled in private schools by family income. In the bottom decile more than 80 percent of children attended public schools. Contrarily, in the top decile 80 percent of children were enrolled in private schools. Subsidized private enrollment increases linearly with income between the first and the seventh decile, going from 15 to 35 percent. Since middle-class children were much more likely than the poor to attend a voucher school, the impact of the reform may differ drastically depending on family background.

FIGURE 3: Enrollment in private schools by family income, 1990-1992
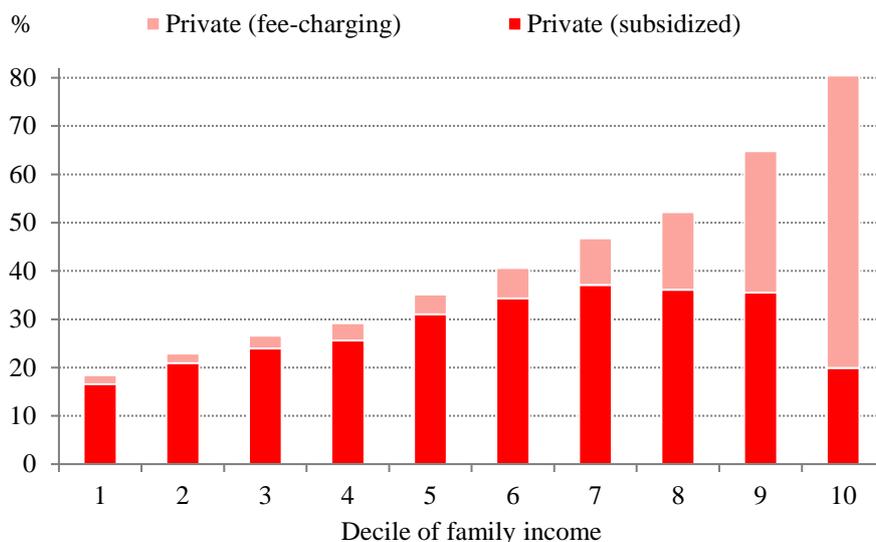
Source: own elaboration using CASEN 1990 and 1992.

Selection into private schools is also observed at a desegregated level. McEwan, Urquiola and Vegas (2008) use highly detailed district level data to compare the level of private enrollment in an area to the relative income of families with children in public schools. They show that when privatization is low, families have similar incomes regardless of the type of school. However, the higher the enrollment in voucher private schools is, the lower the relative income of public school families in those districts. Figure 4 shows the relationship between the share of students attending subsidized private schools in a province and the relative income of public school families compared to subsidized private families. There is a strong negative relationship suggesting that the higher subsidized private enrollment, the higher stratification across schools. On average, a 10 percentage point increase in the share of students attending subsidized private schools in a province is associated with a decrease in the relative income of public school families by 4 percentage points.

The rise in private enrollment led to higher stratification not only because relatively better students left public schools but also because within sector stratification is higher among private schools. Among all schools, public ones have the most diverse student body in terms of socio-economic status and indigenous origins (Elacqua, 2012; Valenzuela, Bellei and De los Rios2013). Similarly, Bravo, Contreras and Sanhueza (1999) find that public schools are much more homogenous than voucher private ones regarding performance. For instance, the share of the variation in test scores that is explained by differences between schools within a sector is 37 percent smaller in the case of public schools than subsidized private ones.

FIGURE 4: Subsidized private enrollment and stratification across schools, 1992
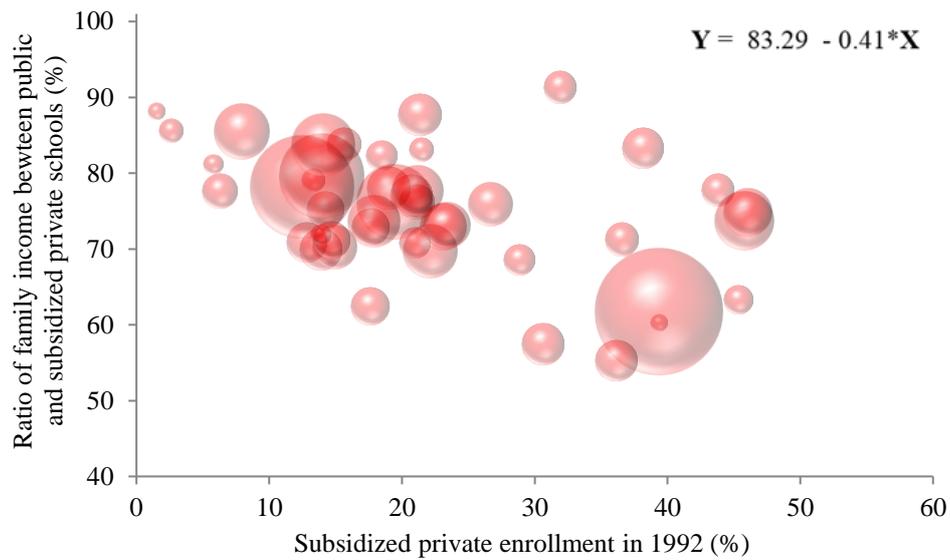
Source: own elaboration with CASEN 1992 and enrollment data from the Ministry of Education.

2.4 Why did so few low-income children attend voucher private schools?

The 1981 reform incentivized the creation of more than a thousand subsidized private schools in five years and these did not charge fees. Yet, very few low-income children attended these schools. There are least three reasons behind this striking fact: i) the strategic location of schools, ii) parents' beliefs and choice behavior and iii) schools selection procedures.

There is evidence that new voucher private schools were more likely to locate in richer municipalities and relatively better-off neighborhoods, with a larger presence of medium and upper-class families (Mizala and Romaguera, 2000; Bellei, 2009). In 1988, 28 percent of municipalities did not have a single subsidized private school; most of them rural. Even when there was a subsidized private schools in town, their strategic location in wealthier areas may have hindered enrollment of poorer children due to transportation costs exacerbating thus stratification. Survey data confirms that even today, the main reason why parents do not consider sending their children to a voucher private school is because there is none nearby (Mediavilla and Zancajo, 2015).

Lower educated parents could be less likely to send their children to higher quality schools because they do not have information about how good schools are or because they have a lower valuation for education quality. Although in the early 1980s the Military Government introduced a standardized

examination for all schools, the results were never made public[8]. As a result, parents faced important difficulties to make a judgement about the quality of schools. Espinola (1993) documents that new voucher private schools tried to attract higher socio-economic status families by endowing themselves with symbols that were previously associated with elite private schools such as uniforms or English names. Recent research on Chile has shown that the lower parents' education and income are, the greater the probability of attending the closest school irrespective of the local availability (Chumacero, Gomez and Paredes, 2011). According to Mediavilla and Zancajo (2015), parents in public schools are 63 percent more likely to cite proximity as a relevant choice factor compared to those in subsidized private schools. There is additional evidence showing that most parents, irrespective of their educational level, do put a considerable value on academic quality when exercising choice (Schneider, Elacqua and Buckley, 2006). However, they include in their choice set schools of very different performance in test scores contradicting their own answers. By contrast, schools in the choice set barely differ in socio-economic composition. These findings lead Schneider, Elacqua and Burckley (2006) conclude that the most important choice factor underlying actual parents' decision is the socio-economic status of peers.

Although private schools adhered to the voucher system could not charge fees, they cream skimmed students through different selection procedures. Some of them required income or religious certificates, held interviews with parents or even had entry examinations. For instance, Contreras, Sepulveda and Bustos (2010) find that 56 percent of children attending subsidized private schools were subject to some form of selection compared to only 5 percent of students in public schools. Moreover, the higher the socio-economic status of children is, the higher the probability of having been through a selection criteria. For example, students from the top income decile attending subsidized schools were subject to any form of selection in 74 percent of the cases (compared to 25 percent for top income students in public schools). More and more frequently, public schools also implement selection criteria and mimic the practices of private schools (Contreras, Sepulveda and Bustos, 2010; Portales and Heigil, 2015). An additional factor of stratification is that subsidized private schools had the right to expel students for behavioral and academic reasons while public schools were not allowed to so (Bellei, 2009; Elacqua, 2012). Schneider, Elacqua and Buckley (2006) find that only around half of the parents consider more than one school in their choice set which may be the result of all these barriers.

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[8] In 1982 the Ministry of Education created a national examination called PER (Programa de Evaluacion de Rendimiento Escolar) with the objective of evaluating the quality of education. The PER was implemented in all public schools and most subsidized private ones. The fierce opposition of teachers together with the high costs involved led to its disappearance after 1984. Nevertheless, a similar test was launched in 1988 under the name of SIMCE (Sistema de Medición de la Calidad de la Educación) and has been running until nowadays with subsequent improvements and expansions. Today parents have access to detailed information about the performance of their children's school and others in their municipality.

In conclusion, low income children were much less likely to attend voucher private schools because these were not available, if available they were far from their homes, because parents could not afford the associated costs or simply because these students were refused entry or expel afterwards.

3 Data

This section details the data sources used in the paper. The main data comes from the National Household Survey of Chile (CASEN), which includes a subjective well-being question. The enrollment data comes from the archives of the Ministry of Education and it is linked to each individual in the CASEN based on their municipality of birth. Additional provincial and municipality level data are also obtained from different sources. Table A.1 in the Appendix summarizes this information.

3.1 Household survey data

The main data comes from the National Household Survey of Chile (hereafter CASEN). It is conducted by the Ministry of Social Development and Planning every couple of years to assess the living conditions of the population, evaluate public policies and compute official measures of inequality and poverty. The first waves in the 1990s did not include all municipalities. Today, the survey is designed to provide accurate estimates even at the local level. CASEN contains information on demographics, education, labor market outcomes, income and health among others[9]. Retrospective information about parents' education is available since 2009. In addition, the 2011 and 2013 waves include a life satisfaction question in a 1 to 10 scale[10]. Hence, this study relies on these two years.

All individuals with no missing information on life satisfaction and parents' education are included in the analysis. This leads to a nationally representative sample of 58,825 individuals. Table A.2 in the Appendix shows descriptive statistics of the main variables for the full sample as well the average for different categories of family background based on parents' education (more details on this later). The over-representation of women can be explained by their remarkable lower participation in the labor force and therefore higher likelihood of being in the household at the moment of the interview[11].

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[9] Certain waves incorporate supplementary questions about a concrete theme such as the quality of neighborhoods, networks or gender issues.

[10] The precise wording of the question is: *"Taking into consideration all aspects of your life, how satisfied are you with your life these days? From 1 to 10 where 1 means completely unsatisfied and 10 completely satisfied"*.

[11] Based on the CASEN survey, the inactivity rate of women is 67 percent, a figure twenty percentage points above that of men.

3.2 Enrollment records

Enrollment data was obtained from the archives of the Ministry of Education of Chile. For every municipality there is information on the total number of students enrolled in public, subsidized private and fee-charging private schools for each grade and year since 1980. Given the poor state of the physical documents the data had to be digitalized manually. Three years were selected; one prior to the reform (1981)[12], one when the rise in private enrollment stopped (1988) and an additional third year for checks (1991)[13]. Using this data, I construct a measure of 1980s privatization as the increase in the share of students enrolled in subsidized private schools between 1981 and 1988 in each of the 346 municipalities[14]. Table A.3 in the Appendix shows some descriptive statistics of the enrollment data from the original sources (Municipality level) and once it has been linked to the individuals from the household survey (Individual level).

3.3 Supplementary data

I use supplementary data coming from different sources with three purposes. First, to better understand what could explain the unequal rise in subsidized private enrollment across municipalities after the reform. Second, to control for underlying trends that could be correlated both with the degree of privatization in the 1980s and subjective well-being today. Third, to explore the potential endogeneity of the measure of private enrolment increase. The data includes measures of human capital, inequality, employment, indigenous populations, urbanization, population density, religiosity, mortality, political orientation, political repression, number of schools among others. The information is either at the provincial or local levels. I provide further details in the section *Empirical Strategy* and *Robustness Checks*. All data sources are described in Table A.1 in the Appendix.

4 Empirical Strategy

The goal of this paper is to assess the long-term impact of school segregation on subjective well-being. To do so I exploit the sudden increase in subsidized private enrolment following the 1981 reform and its large heterogeneity across municipalities. Since higher subsidized private enrollment translated into higher segregation, this measure serves as an ideal proxy in the absence of more detailed data[15].

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[12] The enrolment data is of the academic year 1980/1981 while the voucher system was in place from the academic year 1981/1982 onwards.

[13] Similar data was used by Hsieh and Urquiola (2006) although it was lost afterwards.

[14] This comprises all students in primary and secondary education. Since 1965, primary education ("básica") lasts eight years while secondary ("media") only four.

[15] It is not possible to construct indexes of segregation for this period because there is no information about students' characteristics at the school or local level.

A naïve way of analyzing the long-term impact of the reform would be to look at the relationship between the increase in private enrolment in the 1980s and current life satisfaction of individuals who attended school those years. Note however that the expansion of voucher private schools during the 1980s is potentially endogenous, that is to say, it could be correlated with other factors that also affect life satisfaction. For instance, one can think that enrollment in voucher private schools grew faster in richer towns. To the extent that these towns are still relatively richer today, we could erroneously conclude that the reform had a positive impact on well-being. Since one cannot control for all local factors that may confound the effect of the reform, the naïve cross-sectional approach is problematic. To tackle this issue the identification strategy compares individuals exposed to the reform to others not exposed in the same area (exposure dimension –E-). By doing this any local effect time invariant is cancelled out. The identification considers individuals born in the early 1970s against others born in the early 1960s. The younger group (*i.e. treated*) was in school after the reform took place and hence spent some of their education years in a more segregated environment. Contrarily, individuals in the older group (*i.e. control*) did not experience the changes induced by the reform as they had already left school by 1981[16]. Given that the identification relies on the comparison of individuals born in different years, I introduce cohort fixed effects to partial out for any year specific effect on well-being. The key explanatory variable is the increase in subsidized private enrollment between 1981 and 1988 in each municipality (intensity dimension -T-). As shown in Figure A.4 in the Appendix, subsidized private enrolment grew sharply in the first years after the reform but remained flat after 1988. Each individual is linked to the raise in voucher private enrolment observed in their birth municipality[17]. By having an interaction between the raise in subsidized private enrolment and the exposure measure (instead of the rise in private enrollment alone) one can introduce municipality fixed effects to capture all local factors correlated with well-being that are fixed over time. There is a possibility that the increase in subsidized private enrolment was correlated with other unobserved trends having a long-lasting impact on well-being. For instance, one may think that voucher schools opened more frequently in places where schooling was growing faster, therefore comparing younger to older cohorts may mistakenly suggest a positive impact of the reform on well-being. To limit the concern of confounding trends I use census data to control for the evolution of population density, urbanization, schooling, unemployment and the

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[16] Individuals in the treatment group are on average 8 years old in 1982 while those in the control group are on average 18. In the next section I modify the cohort windows considered in each group and perform the analysis as if the reform had occurred in a different year.

[17] It is possible that some attended schools in other municipalities but due to the low levels of internal migration at young ages they probably represent a negligible proportion. According to the CASEN, the share of children (< 18 years old) living in the municipality in which they were born is very high. It has decreased from 83 percent in 2009 to 79 percent in 2015, which may suggest a higher figure in the 1980s.

share of indigenous people over time. These measures vary thus across municipalities and cohorts[18] and although not exhaustive, they provide further strength to the identification. It is hard to believe that unobserved trends will drive the results as they have to be strongly correlated with the increase in subsidized enrolment and to have a persistent impact. I show later that controlling for the trends that I do observe makes no difference hence reassuring the results. Figure A.5 in the Appendix provides an illustration of the setting. Children who left school before the academic year 1981-1982 were not exposed to the reform. Between 1981 and 1988 new private schools entered the market, enrollment in subsidized private schools increased substantially and in line with it segregation. Therefore, children attending school during these years were partially exposed as the process of privatization was ongoing. In addition to rising segregation, in this period there could have been some disruptive effects because some students and teachers switched schools. All children in education after 1987 were exposed to the highest degree of segregation because the level of private enrollment had attained its peak and after 1988 subsidized private enrollment stopped increasing.

Formally, the identification strategy consists in estimating by OLS the following equation:

$$y_{icj} = \delta E_c + \rho T_j E_c + X'_{icj}\beta + \lambda_j + \theta_c + Z'_{cj}\omega + \pi_i + \varepsilon_{icj} \qquad (1)$$

where y_{icj} is a standardized measure of adult life satisfaction for individual i in municipality j and cohort c, E_c is a dummy equal to one if the individual was born between 1972 and 1976 and zero if she was born between 1962 and 1966, T_j is the increase subsidized private enrollment between 1981 and 1988 in municipality j, X'_{icj} is a vector of individual characteristics, λ_j and θ_c are municipality and cohort fixed effects respectively, Z'_{cj} are municipality-cohort trends, π_i is dummy for the year of the survey and ε_i is an individual-specific error term clustered at the municipality-decade of birth level. The interaction coefficient ρ could be interpreted as the impact of one percentage point increase in subsidized private enrollment in the 1980s on adult life satisfaction.

Notice that there is no information about the type of school individuals attended in their childhood. This is problematic as we may expect that the reform affected students differently precisely depending on whether they stayed in a public school with worse peers or they went to a subsidized private one with better peers. I circumvent this issue distinguishing individuals by their family background. As shown in Figure 3, enrolment in subsidized private schools is considerably lower in the bottom income deciles than in the middle of the income distribution. Although I do not have information on parents' income, I use parents' years of schooling to construct a three-level measure of family background. Given that

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parents' education varies significantly across municipalities and over time, I construct a measure that takes these two aspects into account. Concretely, for a given cohort t, I consider the parents' schooling distribution of all individuals born between t and $t+4$ in their respective province. Then I categorized individuals as follows:

1) <u>Low family background</u> if parents' schooling falls in the bottom 4 deciles of the distribution.
2) <u>Medium family background</u> if parents' schooling falls within the 5th and 8th deciles.
3) <u>High family background</u> if parents' schooling falls in the top 2 deciles of the distribution[19].

I perform all the analysis distinguishing by family background. Most low family background children kept attending public schools after the reform but due to subsidized private schools attracting middle-class students they did so surrounded by peers of lower socio-economic status on average. Among medium family background students, some moved to subsidized private schools after the reform and hence had better peers on average while others remained in public schools therefore in a worse environment than if the reform had not occurred. Similarly, among high family background students many kept attending fee-charging private schools while others moved from public to subsidized private schools and thus were surrounded by better peers. As a result, the increase in subsidized private enrolment measures the rise in segregation and at the same type how much the socio-economic status of school peers changed.

The identification strategy relies on several assumptions. First, the exposure measure (E) assumes that children in the control group (born between 1962 and 1966) were not affected by the reform as they were outside school by the 1981/1982 and because segregation had not already been rising before. Unfortunately, it is not possible to determine whether segregation had increased before or what it was its level since there is no information of students' characteristics within municipalities. Likewise, the hypothesis of spill-overs it is difficult to test, if there were some "*contamination*" of the control group the estimates may provide a lower-bound of the true effect. A second assumption is that segregation did not continue increasing immediately after 1988, otherwise the treatment variable will be measured with error. This assumption comes because of data limitations as I only have enrollment data across municipalities for 1981, 1988 and 1991. However, at least at the national level, subsidized private enrollment barely increased after 1988 as shown in Figure A.4 in the Appendix. In the *Robustness Checks* section I also use the interval 1981-1991 instead of 1981-1988. There are two subtle assumptions regarding homogenous effects. First, it is assumed that a given increase in private enrollment has the same impact irrespective of the year it occurs, in other words, independently of the

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[19] In the robustness section I alter the definition of family background in different ways, for example, by changing the previous thresholds or by considering fixed cutoffs regardless of the location.

age of individuals. Second, it is assumed that the exposure is the same for individuals born in the same cohort irrespective of much time they spent in school. All in all, these assumptions imply that the estimates I provide represent an average treatment effect for the whole population, and not for those actually affected in a single direction or a subpopulation of them. For example, within the medium family background individuals some attended public schools and other voucher private ones, there are individuals of different ages affected differently and also staying in education for different durations, all of which brings measurement error. The identification strategy has the advantage of being conservative and conclusive about the overall impact of the reform but presents the disadvantage that the estimates will be biased toward zero and hence more difficult to identity and attribute to a concrete population. Yet, if we find any significant impact, we can presume that the true impact for the population actually affected is even larger.

5 Results

5.1 Graphical evidence of common trends

As mentioned earlier, the identification strategy relies on the crucial assumption that the increase in subsidized private enrollment is not correlated with any other omitted trend making life satisfaction differ across cohorts within the same municipality. Therefore, in the same way as treatment and control group must follow a common trend prior to a policy change in a difference-in-difference framework, I will provide evidence that the relationship between year of birth and life satisfaction is the same in areas of high and low privatization for individuals who left school before 1981.

Panel A focuses on average life satisfaction while Panel B looks at happiness inequality measured by the Gini coefficient. The two graphs on the left separate municipalities below and above the median increase in subsidized private enrollment in the 1980s while the two on the right compare municipalities where there was zero and others in which the raise was above 20 percentage points.

Looking first at Panel A, both figures confirm that for all cohorts average life satisfaction levels are not statistically different in municipalities of low and high privatization. There is a general positive trend indicating that younger individuals tend to be happier than older ones, peaking in the late 30s, in this case individuals born in the late 1970s. Although the 95 percent confidence intervals for the two groups overlap, municipalities with more privatization present a slightly higher level of life satisfaction on average. This gap, however, vanishes by 1976 which it is a first indication that something may have happened in that period. One can formally test whether the pre-trends are equal by applying the identification strategy set out in equations (1) to older cohorts. I provide further evidence on this respect in a following section.

Panel B shows that inequality of life satisfaction decreases as one goes towards younger cohorts. While the u-shape relationship between age and life satisfaction has been well documented, to the best of my knowledge this positive pattern between inequality of happiness and age has not been highlighted before. Notice that for those born in the 1960s the Gini coefficient is persistently larger in municipalities that experienced higher privatization. However, the cross-correlation between current happiness inequality for cohorts born in the 1960s and privatization during the 1980s is just 0.035. For individuals born in the 1970s and 1980s there are no significant differences in happiness inequality depending on the level of privatization.

5.2 Main Results

This subsection is organized as follows. First, I estimate the effect of 1980s school privatization on today's life satisfaction using equations (1) and distinguishing by family background. Second, I modify the cohort windows considered in the treated and control groups in multiple ways to test the robustness of the results. Then, I analyze how the impact of privatization may differ depending on sex and migration patterns. Finally, I explore the potential mechanisms at play.

5.2.1 The long-term effect of the 1981 education reform

Table 1 shows the main results from estimating equation (1) in columns 1 to 4. Remember that the coefficient of interest is the interaction between the change in subsidized private enrollment in 1981-1988 and the variable of exposure. All regressions include a set of individual controls, cohort fixed effects, municipality fixed effects and municipality trends.

Overall, the analysis suggests a null effect of the privatization reform on average life satisfaction levels. As shown in column 1, the interaction coefficient is close to zero and far from significant. However, this aggregate result masks important differences. As displayed in columns 2 and 4, individuals from low family backgrounds seem to have been harmed by the increase in privatization while the opposite is true for those coming from high family backgrounds. Additionally, individuals from medium family background do not seem to have been affected on average. This may be however the result of having a heterogeneous of both positively and negatively affected individuals.

TABLE 1: Effect of 1981 education reform on today's life satisfaction

	Life satisfaction (standardized)			
	All	Low FB	Medium FB	High FB
	(1)	(2)	(3)	(4)
Exposed to the reform	-0.0578	-0.4819	0.3300	0.1990
(born in 1972-1976 rather than 1962-1966)	(0.4101)	(0.6708)	(0.7495)	(0.7657)
Δ Private enrollment * Esposed to the reform	-0.0008	-0.0059***	-0.0013	0.0038*
	(0.0010)	(0.0018)	(0.0019)	(0.0021)
Individual controls	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
Number of observations	24033	7624	9487	6922
Adjusted R2	0.040	0.028	0.025	0.032

Notes: Columns 1 to 4 estimate the model in equation (1). The dependent variable is a standardized measure of life satisfaction. FB stands for family background based on parents' education. Standard errors clustered at the municipality-decade level in parenthesis. Statistical significance: * $p<0.1$, ** $p<0.05$, *** $p<0.01$. Individual controls include a dummy for being women, pertaining to the aboriginal populations, living with both parents during childhood, parental schooling, age and age squared.

The estimate of -0.0059 in column 2 implies that among low family background individuals, being exposed to a rise in subsidized private enrollment of 10 points (approximate one sd.) during childhood is associated with a fall in long-term life satisfaction of 5.9 percent of a standard deviation. This impact is equivalent to the effect of decreasing household income by around 30 percent or reducing education by 3 years. For individuals coming from high family backgrounds, being exposed to an increase in subsidized private enrollment of 10 points is associated with a rise in long-term life satisfaction of 3.8 percentage points of a standard deviation. The coefficient in this case is much less precisely estimated. Given this distinctive effect of the reform depending on family background it is not surprising that the net impact is not significantly different from zero. One must bear in mind that it is a point-year effect, meaning that low family background individuals exposed to higher segregation in their youth may have been systematically worse off year after year during their adulthood. It is not possible to determine when this negative effect begins to manifest, however, if present several years, it can entail large welfare losses. Notice that coefficient of the dummy "Exposed to the reform" is far from significant in all the regressions meaning that there are not systematic differences in life satisfaction between cohorts born in the early 1960s and in the early 1970s. This finding reduces the concern that the year of birth may play a role influencing the results.

5.2.2 Testing for unobserved trends

I carry out three analyses to test whether there could be unobserved municipality trends correlated with the increase in private enrollment in the 1980s and life satisfaction across cohorts. First, I perform a falsification test re-estimating equation (1) for different cohort windows as if the reform had occurred in another year. One would expect to find a significant effect only in the surroundings of the true year. Second, I fix the control group to old individuals and estimate equation (1) with treatment group of different ages. In this case, only people born in the 1970s or later should seem to be affected as they were the only to be exposed. Third, I estimate equation (1) including in the control and treatment group individuals of very similar ages and compare all the possible cohort windows. In this test I expect no significant differences between the treatment and control group with the exception when some cohorts were actually exposed while others did not.
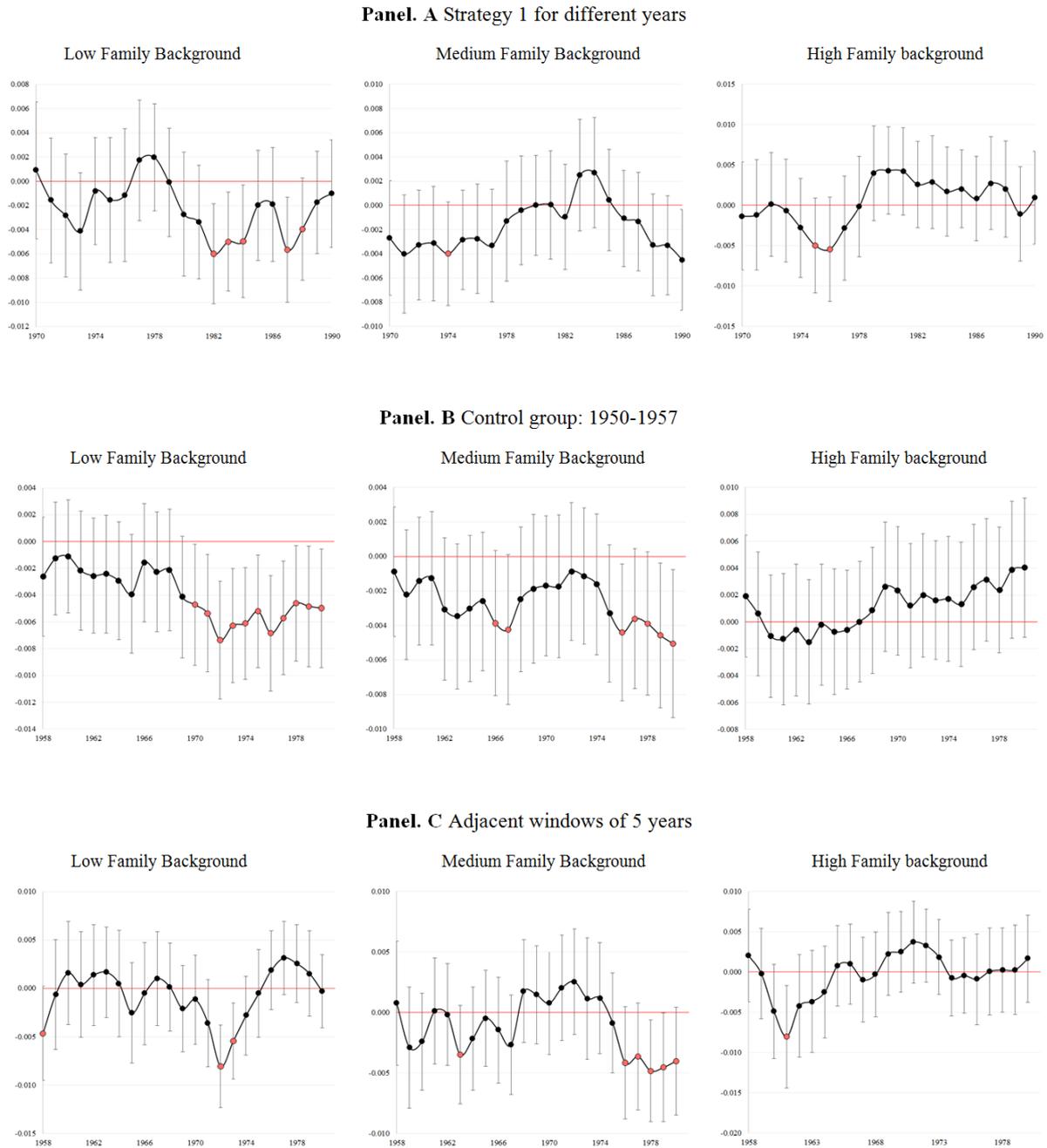
Panel A in Figure 5 plots the interaction coefficient of equation (1) for each potential year that the reform could have occurred. The estimate of year t is obtained by setting as control group individuals born between t-20 and t-16 and as treated group individuals born between t-10 and t-6. For instance, the estimate of 1982 comes from regressing equation (1) with individuals born in the period 1972-1976 (i.e. treated, $E_0 = 1$) and born in the period 1962-1966 (i.e. control, $E_0 = 0$) while the estimate of 1981 comes from decreasing in one year the two windows. In the case of low family background, the results show that the interaction coefficient is negative, large and significant only for the early 1980s. The coefficient moves between -0.005 and -0.006, implying that a 10 percentage point increase in subsidized private enrollment in the 1980s is associated with a fall in adult life satisfaction of around 5 percentage points of a standard deviation. For medium family background the estimates are not significant but display a negative trend starting in the early 1980s. The estimates for high family background are negative and slightly significant for the mid-1970s and positive and a slightly significant for the late 1980s. Overall, the figures suggest that unobservable trends are not driving the results, as the estimate are only significant when considering that the reform happened at the beginning of the 1980s as it actually did.

The second analysis sets as control group ($E = 0$) individuals born in 1950-1957 who should be completely unaffected by the reform. I estimate equation (1) for every year t, defining as treatment group ($E = 1$) individuals born between t and $t+4$. Panel B shows the interaction coefficient for each of these estimations. The estimates are insignificant for cohorts born in the late 1950s and 1960s regardless of family background. This suggests that the findings are not driven by a spurious correlation between an unobserved trend correlated both with long-run happiness and the penetration of private schools in the 1980s. Focusing on low family background individuals, those born in the 1970s in

municipalities that would experience a larger privatization are considerably less satisfied today than their older counterparts in that same municipality. The estimates fluctuate around -0.006, meaning that being exposure to a 10 percentage point rise in subsidized private schooling is associated with a reduction in adult life satisfaction of 6 percent of standard deviation. For medium family background individuals the impact of the reform seems to be delayed, only individuals born in the late 1970s show lower levels of life satisfaction when private enrollment grew in their municipalities. The estimates for high family background individuals are always non-distinguishable from zero although for the youngest cohorts the coefficients are positive, of moderate size and close to be significant.

The third approach comparing adjacent cohort windows presents the downside that individuals in treatment and control group were exposed similarly to the reform. The closer cohorts are the more difficult to find a significant effect is. Therefore I use adjacent cohort windows of 4 years and estimate equation (1) defining as control group (E = 0) individuals born between *t-5* and *t-1* and as treatment group ($E = 1$) individuals born between *t* and *t+4*. Panel C reports the estimates of the interaction term for each year *t*. The only significant and large estimates are found for low family background individuals when comparing the cohort windows 1972-1976 to 1967-1971 and 1973-1977 to 1968-1972. In these cases the treated group is composed by individuals who were on average 8 years old when the reform took place while those in the control group were on average 13 years old. Once again, this evidence suggests that the reform had a negative long-run effect on low family background individuals. Consistently with the results in Panel A and B.

FIGURE 5: Effect of the 1981 reform as if it had occurred in different years

Panel. A Strategy 1 for different years

Panel. B Control group: 1950-1957

Panel. C Adjacent windows of 5 years

Note: each point represents a coefficient from a separate regression. **Panel A** displays estimates of the interaction term from equation (1) (i.e. effect of the reform on life satisfaction) as if the reform occurred in different years. For year t the control group (E = 0) is composed of individuals born between t-20 and t-16 and the treatment group (E = 1) of those born between t -10 and t-6. **Panel B** displays estimates of the interaction term from equation (1) for different cohort windows setting as reference group individuals born in 1950-1957. The estimate of year t is obtained by estimating equation (1) with a control group (E = 0) composed of individuals born in 1950-1957 and a treatment group (E = 1) of those born between t and t+4. **Panel C** displays estimates of the interaction term from equation (1) for different cohort windows that are contiguous. The estimate of year t is obtained by estimating equation (1) with a control group (E = 0) composed of individuals born between t-5 and t-1 and a treatment group (E = 1) of those born between t and t+4. Parenthesis represent the 95 percent confidence interval; red points indicate that the estimates are significant at least at the 10 percent level.

5.2.3 Heterogeneous effects

I explore potential heterogeneous effects depending on individuals' sex and migration patterns. To do so I introduce a triple interaction term in equation (1) between the increase in subsidized private enrollment, the dummy for being exposed to the reform and a dummy for being a women or having migrated. I consider individuals as internal migrants if they do not live in the municipality of birth[20]. I further look at the well-being of internal migrants by performing equation (1) using the privatization of the municipality in which they currently live rather than the municipality of birth.

As shown in columns 1 to 3 of Table 2, the impact of the reform is not significantly different for men and women with the exception of high family background individuals. In this case the positive impact is entirely driven by men. The coefficient of the triple interaction is of similar size and opposite sign as the simple interaction implying that high family background women were not affected at all by the reform. By contrast, high family background men exposed to the reform are 9.2 percent of standard deviation happier for every 10-point increase in subsidized enrollment during the 1980s. Columns 4 to 6 focus on migration patterns. The results show that the effect on low family background individuals is driven entirely by people who stayed in their birth municipality while the effect on high family background people is driven by those who moved. Medium family background individuals do not seem to have been affected by the reform regardless of whether they migrated or not.

Lastly, I focus on individuals who moved an instead of assigning them the level of privatization of their birth municipality I estimate equation (1) using the rise in subsidized private enrollment in their current municipality of residence. The results are displayed in columns 7 to 9. Low family background individuals who moved to high privatization areas are considerably worse-off than similar individuals (from the same municipalities of birth) who moved to low privatization areas. On average, a 10 percentage point increase in subsidized private enrollment is associated with a fall in life satisfaction of 11.1 percent of a standard deviation. These findings suggest that individuals make bad choices at the time of migrating and that they would have been better off staying in their municipalities of origin. Contrarily, medium or high family background individuals seem unaffected by the degree of 1980s privatization in the area where they live.

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[20] This is the case for 45 percent of the sample.

TABLE 2: Effect of the 1981 privatization reform by sex and migration patterns

	Life satisfaction (standardized)								
	Differentiating by *sex*			Differentiating by *internal migration*			Subsample of *internal migrants*		
	Low FB (1)	Medium FB (2)	High FB (3)	Low FB (4)	Medium FB (5)	High FB (6)	Low FB (7)	Medium FB (8)	High FB (9)
Exposed to the reform (born in 1972-1976 rather than 1962-1966)	-0.4744 (0.6745)	0.3292 (0.7533)	0.0996 (0.7748)	-0.4775 (0.6753)	0.3576 (0.7487)	0.1413 (0.7740)	0.3694 (1.2149)	-0.1619 (1.0833)	-0.8133 (1.0149)
Women	-0.1074*** (0.0370)	-0.0865*** (0.0281)	-0.0825** (0.0332)	-0.1208*** (0.0262)	-0.0904*** (0.0210)	-0.1042*** (0.0230)	-0.0628 (0.0426)	-0.0961** (0.0375)	-0.1280*** (0.0329)
Lives in the municipality of birth	-0.0621** (0.0277)	-0.0148 (0.0241)	-0.0449* (0.0271)	-0.0468 (0.0345)	0.0045 (0.0299)	-0.0245 (0.0382)	-0.0111*** (0.0026)	-0.0019 (0.0023)	-0.0018 (0.0023)
Δ Private enrollment * Exposed to the reform	-0.0026 (0.0034)	0.0015 (0.0029)	0.0092*** (0.0030)	-0.0022 (0.0026)	-0.0004 (0.0026)	0.0060** (0.0027)			
Women * Exposed to the reform	0.0208 (0.0688)	0.0354 (0.0569)	0.0687 (0.0679)						
Δ Private enrollment * Exposed to the reform * Women	-0.0045 (0.0039)	-0.0040 (0.0032)	-0.0083** (0.0034)						
Lives in birth municipality * Exposed to the reform				0.0559 (0.0659)	-0.0191 (0.0632)	0.0461 (0.0693)			
Δ Private enrollment * Exposed to the reform * Lives in birth county				-0.0078** (0.0038)	-0.0022 (0.0039)	-0.0069* (0.0040)			
County FE & Cohort FE & Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	7624	9487	6922	7624	9487	6922	3195	4094	3800
Adjusted R2	0.029	0.025	0.033	0.029	0.025	0.032	0.016	0.016	0.036

Notes: all columns rely on the model in equation (1). Columns 1-3 include a partial interaction between the measure of exposure and a dummy for being women and a triple interaction term. Columns 4-6 include a partial interaction between the measure of exposure and a dummy for living in the municipality of birth and a triple interaction term. Columns 7-9 link 1980s privatization to the current location instead of the municipality of birth. The dependent variable is a standardized measure of life satisfaction. FB stands for family background based on parents' education. Standard errors clustered at the municipality-decade level in parenthesis. Statistical significance: * $p<0.1$, ** $p<0.05$, *** $p<0.01$. Individual controls include a dummy for being women, pertaining to the aboriginal populations, living with both parents during childhood, parental schooling, age and age squared.

5.2.4 Mechanisms

One way to understand through which channels the privatization of the 1980s could have affected subjective well-being today is by looking at different factors that are important for well-being and, at the same time, that could have been influenced by school segregation. Table 3 shows the results of estimating equation (1) for different outcomes such as health (in a 1-7 scale), years of education, household income, a dummy for being single (rather than in couple/married), the number of children and a dummy for having migrated (i.e. leave the municipality of birth). In the case of low family background individuals, none of these factors seems to have been affected by the reform. The interaction coefficient is always insignificant and close to zero. This is striking to the extent that these individuals appeared as the most affected by the 1980s rise in private enrollment. The same picture arises for medium family background individuals for which, with the exception of having migrated, none of the outcomes seems to have been affected by the reform. The only outcome that seems to be affected is household income in the case of high family background individuals. A 10 percentage point increase in 1980s privatization is associated with a rise in current household income of 7.6 percent.

TABLE 3: Effect of the 1981 privatization reform on different outcomes

	Panel A. Low Family Background						
	Healh (1)	Schooling (2)	Household Income (3)	Single (4)	Children (5)	Urban (6)	Migrated (7)
Exposed to the reform (born in 1972-1976 rather than 1962-1966)	-0.4624 (0.7441)	-4.8111** (2.2645)	-1.0823** (0.5182)	-0.0295 (0.2913)	-0.3684 (0.9366)	-0.2823 (0.3281)	-0.0939 (0.2963)
Δ Private enrollment * Esposed to the reform	0.0011 (0.0019)	-0.0065 (0.0069)	0.0003 (0.0015)	0.0009 (0.0007)	-0.0009 (0.0023)	0.0011 (0.0009)	-0.0003 (0.0008)
Number of observations	7593	7617	7616	7624	7624	7624	7624
Adjusted R2	0.050	0.218	0.125	0.007	0.147	0.161	0.209
	Panel B. Medium Family Background						
Exposed to the reform (born in 1972-1976 rather than 1962-1966)	-1.0763 (0.6965)	-0.6496 (2.0133)	-0.9073* (0.5215)	-0.1338 (0.2473)	0.0073 (0.7016)	-0.3741 (0.3406)	-0.0431 (0.2459)
Δ Private enrollment * Esposed to the reform	-0.0012 (0.0019)	-0.0113 (0.0070)	0.0016 (0.0014)	0.0005 (0.0006)	-0.0002 (0.0016)	-0.0001 (0.0008)	-0.0025*** (0.0007)
Number of observations	9459	9473	9478	9487	9487	9487	9487
Adjusted R2	0.032	0.174	0.128	0.012	0.127	0.157	0.166
	Panel C. High Family Background						
Exposed to the reform (born in 1972-1976 rather than 1962-1966)	-0.3156 (0.7210)	-1.1799 (2.2025)	-0.8090 (0.7461)	-0.0835 (0.2967)	0.5172 (0.8151)	0.1455 (0.3384)	0.0876 (0.2196)
Δ Private enrollment * Esposed to the reform	0.0015 (0.0023)	0.0145** (0.0067)	0.0076*** (0.0018)	-0.0010 (0.0006)	-0.0026 (0.0024)	0.0010 (0.0010)	-0.0008 (0.0007)
Number of observations	6898	6912	6911	6922	6922	6922	6922
Adjusted R2	0.058	0.251	0.182	0.014	0.100	0.182	0.115

Notes: each column (in each Panel) uses the model in equation (1) for a different dependent variable. FB stands for family background based on parents' education. Standard errors clustered at the municipality-decade level in parenthesis. Statistical significance: * $p<0.1$, ** $p<0.05$, *** $p<0.01$. Individual controls include a dummy for being women, pertaining to the aboriginal populations, living with both parents during childhood, parental schooling, age and age squared.

One could interpret the previous results in two ways. First, they bring additional support to the idea that there are not unobserved trends driving the results as otherwise we could expect that they affect other relevant outcomes such as health, schooling or income. The case of subjective health is particularly important given that it is an important driver of life satisfaction[21]. Notice that there do not seem to be trends in these outcomes for the cohorts considered as the coefficient for the variable of "Exposed to the reform" tends to be insignificant. Second, the fact that generally none of the outcomes considered seems to be affected by the reform poses a puzzle to understand through which channels the impact on subjective well-being materializes.

Some mechanisms through which the reform could have affected long-term well-being is by impacting assortative mating, income comparisons and the views on inequalities. Since schools became more stratified as privatization

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[21] Regressing life satisfaction on health provides a correlation of 0.278 and a t-statistic of 122. For the case of schooling and income the t-statistics are 65 and 54 respectively.

increased, one could expect that students attending school in the 1980s interacted with peers of more similar background, at least compared to those attending school before the reform. Hence, as a result individuals may have end up with couples of closer socio-economic status than otherwise. One way to test this hypothesis is by looking at the relative distance[22] between couples' years of schooling, income or parents' education. For each of these outcomes I apply the model of equation (1) for low family background individuals. The results displayed in columns 1 to 3 of Table 4 show that there is no relationship between the 1980s privatization and couples similarity in these dimensions. The only significant result is for the case of parents' schooling but the small size of the coefficient makes it irrelevant[23].

Being conscious about segregation and holding bad perceptions on it could make individuals more sensitive to issues of social justice. For instance, they may be tempted to see other people's success as unfair and thus be more prone to a negative effect of income comparisons. Similarly, they could be more critical with high levels of income inequality or other forms of inequities. To test for this hypothesis I construct a measure of comparison income[24] based on people of similar each in each province and I calculate a measure of income inequality in each municipality[25]. Then introduce a triple interaction between these variables, the dummy for being exposed to the reform and the variable measuring the rise in subsidized private enrollment in the 1980s[26]. The results are displayed in columns 4 and 5. None of the estimates of the triple interactions are significant, therefore rejecting the previous hypothesis. Note that neither the variable of comparison income or income inequality alone have a direct relationship with life satisfaction.

TABLE 4: The role of assortative matching, income comparisons and inequalities

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Notes: each column (in each Panel) uses the model in equation (1) for a different dependent variable. FB stands for family background based on parents' education. Standard errors clustered at the municipality-decade level in parenthesis. Statistical significance: * p<0.1, ** p<0.05, *** p<0.01. Individual controls include a dummy for being women, pertaining to the aboriginal populations, living with both parents during childhood, parental schooling, age and age squared.

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[22] Looking at the absolute distance does not provide significant results either.

[23] The coefficient implies that increasing subsidized private enrolment up to 100 percent would reduce the gap between the couples' parents schooling by 7 percent.

[24] For an individual i aged g the comparison income is the average income of all individuals in her province whose age is comprised between $g - 4$ and $g + 4$.

[25] I calculate the Gini coefficient of individual income and household income per capita for each municipality.

[26] Partial interactions are also included.

5.2.5 Robustness Checks

Table A.5 presents the results of estimating equation (1) adding sequentially all the variables, fixed effects, municipality controls and trends. All regressions focus on the sample of low family background individuals born in 1962-1966 and 1972-1976 with no missing information. Municipality controls include measures of population, urbanization, religiosity, average schooling, schooling inequality[27], schooling growth, mortality, fertility and political repression during the 1970s and 1980s. I also add the number of voucher schools in 2013 and their enrollment as a proxy for competition and current privatization. Municipality trends include measures of population density, urbanization, unemployment and schooling.

Column (1) shows the relationship between subjective well-being and the exposure measure. On average, individuals born in the early 1970s are happier than those born in the early 1960s but this is the mere effect of being younger. Column (2) shows the relationship between subjective well-being and the increase in subsidized enrollment reporting and insignificant coefficient. Including both variables and their interaction as in column (3) shows a negative effect but insignificant for the interaction term. Once on include basic individual controls and cohort fixed effects the interaction coefficient becomes significant and slightly larger (columns (4) and (5)). Adding municipal and provincial level controls makes the estimate more accurate. The coefficient however barely changes suggesting that local factors do not seem to play a role. Replacing the controls by municipality fixed effects the baseline specification is obtained (column (7)).

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[27] For the first variable I take the average of parents' schooling of all individuals born in the 1970s. I also compute the Gini of parents' schooling for these cohorts. Finally, I compute the percentage increase in average parents' schooling between individuals born in the 1950s and the 1970s.

TABLE 5: Effect of the 1981 privatization reform with and without controls

Sample: Low Family Background	Life satisfaction (standardized)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposed to the reform (born in 1972-1976 rather than 1962-1966)	0.1337*** (0.0275)		0.1814*** (0.0432)	0.0344 (0.0961)	-0.5697 (0.6649)	-0.5235 (0.6589)	-0.4661 (0.6716)	**X**
Δ Private enrollment (rise in subsidized private enrolment 1981-1988)		-0.0008 (0.0014)	0.0010 (0.0022)	-0.0009 (0.0023)	-0.0007 (0.0023)	-0.0033 (0.0029)		
Δ Private enrollment * Esposed to the reform			-0.0043 (0.0028)	-0.0050* (0.0027)	-0.0052* (0.0027)	-0.0055** (0.0027)	-0.0058*** (0.0017)	**X**
Individual controls	No	No	No	Yes	Yes	Yes	Yes	Yes
Cohort FE	No	No	No	No	Yes	Yes	Yes	Yes
Municipality controls	No	No	No	No	No	Yes	No	No
Municipality FE	No	No	No	No	No	No	Yes	Yes
Municipality trends	No	No	No	No	No	No	No	Yes
Number of observations	7624	7624	7624	7624	7624	7624	7624	7624

Notes: different variations of equation (1). The dependent variable is a standardized measure of life satisfaction. FB stands for family background based on parents' education. Standard errors clustered at the municipality-decade level in parenthesis. Statistical significance: * $p<0.1$, ** $p<0.05$, *** $p<0.01$. Individual controls include a dummy for being women, pertaining to the aboriginal populations, living with both parents during childhood, parental schooling, age and age squared. Municipality level controls include the total number of students in 1981, the share of urban students in 1981, the increase in subsidized private enrollment between 1981 and 1988, the share of students attending voucher private schools in 1981 and 2012, the number of voucher schools in 1991 and 2012, average schooling in the 1970s, schooling inequality in the 1970s, and the share of indigenous population in the 1970s. Provincial level controls include total population in 1970, the share of non-religious people, the support for Allende (left) in the 1970 presidential election, the number of missing and assassinated people by the regime during the dictatorship, and mortality and fertility rates. Municipality trends include the evolution of population density, urbanization, unemployment and average schooling. All data sources are detailed in Table A.1 in the Appendix.

6 Conclusions

This paper analyzes the impact of the 1981 education reform in Chile on long-term happiness. Exploiting geographical variation in the penetration of voucher private schools during the 1980s and comparing cohorts differently exposed depending on their year of birth, I find suggestive evidence that the reform had a long-lasting negative effect on life satisfaction for individuals of low family backgrounds. On average, a 10 percentage point increase in voucher private enrollment in their municipality when they were young is associated with a fall in adult life satisfaction in 5.9 percent of a standard deviation. This impact is equivalent to the effect of decreasing household income by around 30 percent or reducing education by 3 years. By contrast, the results tend to indicate that high family background individuals may have benefited from the reform although the evidence is less robust. The impact differs markedly depending on sex and migration patterns. The negative effect on low family background individuals is entirely driven by those who stayed in their municipality of birth. The positive effect for high family background individuals is only present among men and people who have migrated to another municipality. Focusing on those who moved, low family background individuals ending up in high privatization areas are substantially worse-off. In this case, a 10 percentage point increase in private enrollment is associated with a reduction in adult life satisfaction of 11.1 percent of a standard deviation. Altering the cohort windows considered as treated and control groups as if the reform had occurred in a different year provides coherent results supporting the main findings.

The official objective of the 1981 educational reform was to make the educational system more efficient and raise educational outcomes. While total expenditure fell considerably, there was not a meaningful effect on performance or achievement. The reason behind is that private schools competed on the basis of students' socio-economic status rather than on quality. From the evidence presented in this study one can draw important policy implications. First, when analyzing educational policies, it is not sufficient to look at educational outcomes, students can be affected in many other dimensions. The interaction between policies and social networks are a particularly important aspect often disregarded. Second, it does not suffice to look at contemporary outcomes, the impact of a policy changes can manifest in the future. For instance, certain policies could lead students to choose some careers over others and earnings differentials may only appear many years after. Furthermore, when there exists permanent impacts thorough life, the potential welfare gains or losses can be enormous. Third, under an appropriate setting, subjective well-being can be a useful indicator to take these several dimensions into account and to examine the long-term welfare consequences of policies.

The findings of this paper highlight how a policy meant to benefit the poorest students by providing them the opportunity to attend better schools had pernicious effects because of a bad design. Choice was never an option for most vulnerable families, and as result, they could not benefit from the reform. The fact that this policy change had a permanent effect on adult life satisfaction calls for a well-thought design of educational policies, otherwise, even well-intentioned measures may compromise people's well-being for life. Future research should focus on better exploring and understanding the mechanisms at play and the role played by family background in the analysis.

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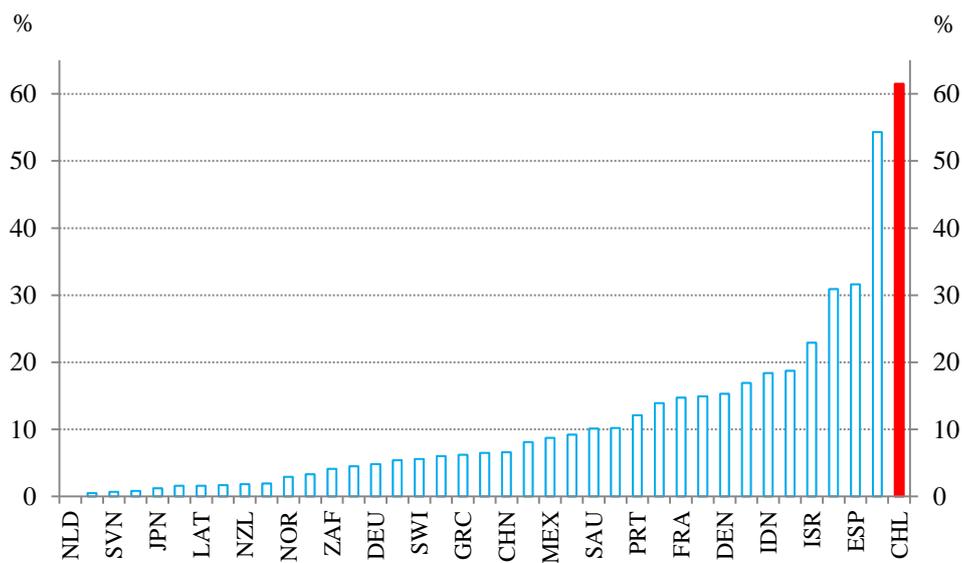
Appendix

Figures

FIGURE A.1: School stratification around the world, 2009
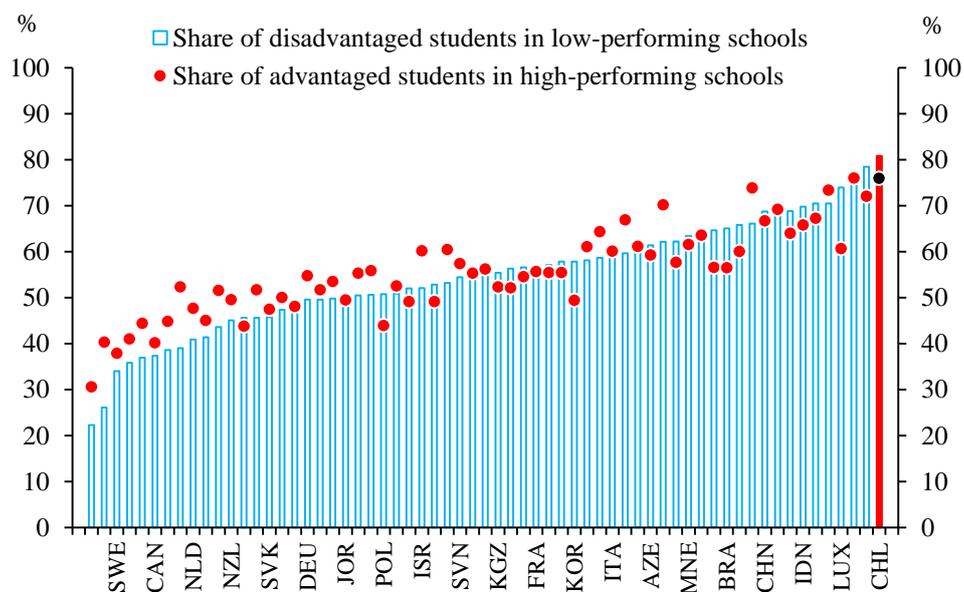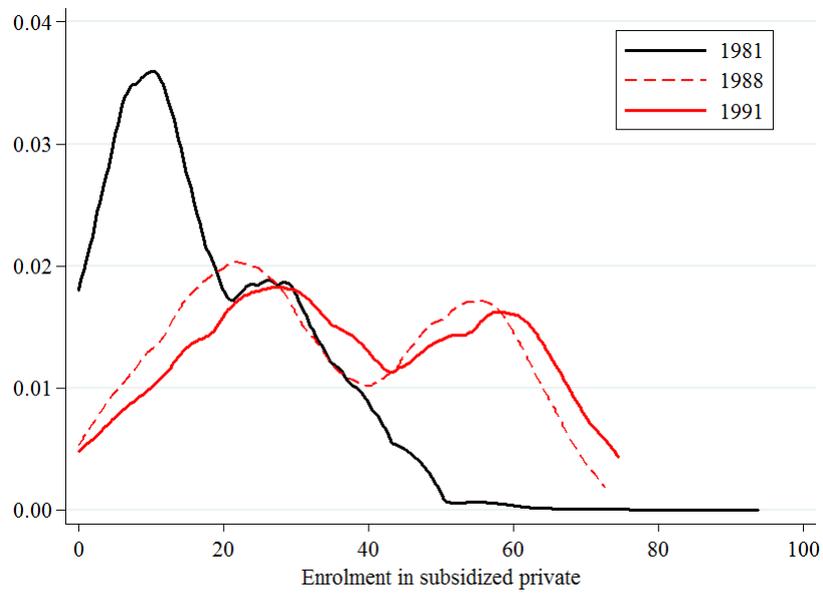

Source: own elaboration using PISA 2009 data.

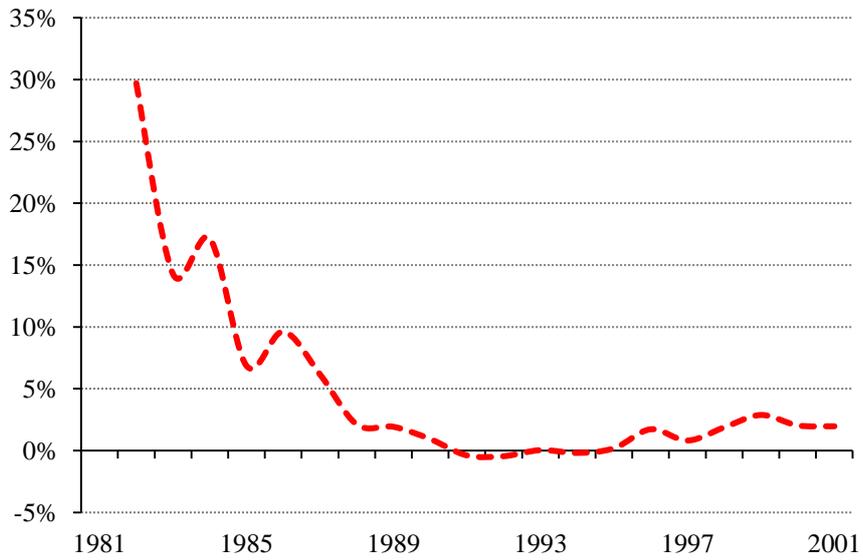FIGURE A.2: Enrollment in private schools across OECD countries, 2014

Source: own elaboration using OECD data.

FIGURE A.3: Distribution of enrollment in subsidized private schools

Source: data from Ministry of Education

FIGURE A.4: Yearly increase in subsidized private enrollment

Source: data from the Ministry of Education.

FIGURE A.5: Exposure to rising segregation due to the 1981 reform
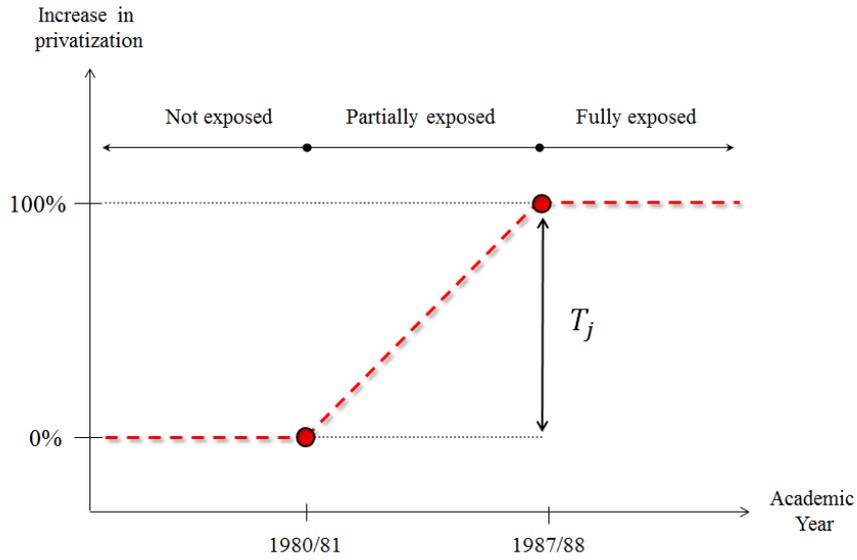
Source: own elaboration.

FIGURE A.6: Life satisfaction today by birth cohort

Panel A. Average life satisfaction by birth cohort

Panel B. Gini of life satisfaction by birth cohort

Note: dotted lines represent the 95 percent confidence interval.

Tables

TABLE A.1: Summary of data sources

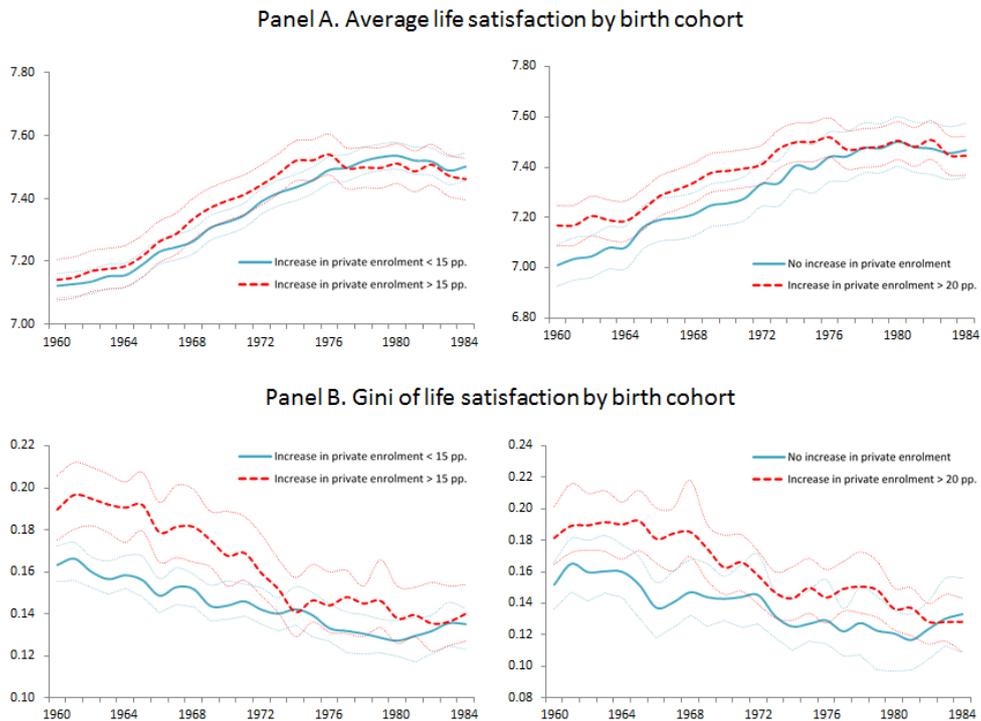| Data source	Information	Unit of observation	Years
National Household Survey (CASEN)	Life satisfaction	Individual	2011, 2013
	Demographics	Individual	2009,2011,2013, 2015
	Parents' schooling	Individual	2009,2011,2013, 2015
	Income and others	Individual	2009,2011,2013, 2015
Ministry of Education	Matriculation records	County	1981, 1988, 1991, 2012
	School records	County	1990, 2012
National Statistics	Mortality and fertility	Province	1980
Bank of Chile	GDP growth	Region	1985-1990
Census	Population	Province	1970, 1982, 1992, 2002
	Urbanization	Province	1970, 1982, 1992, 2002
	Religiosity	Province	1970, 1982, 1992, 2003
	Unemployment rate	Province	1982, 1992, 2002
Electoral Service	Electoral results	Province	1970
Museum of Memory and Human Rights	Political deaths and missing	Province	1973-1990

Source: own elaboration.

TABLE A.2: Summary statistics of individual characteristics

Variable	Obs.	Mean	Std. Dev.	Min	Max	Low FB	Medium FB	High FB
Life satisfaction	58,824	7.36	2.13	1	10	7.10	7.32	7.70
Women	58,824	0.68	0.47	0	1	0.72	0.68	0.64
Indigenous	58,824	0.13	0.33	0	1	0.17	0.12	0.08
Parents' schooling	58,824	7.19	4.62	0	22	2.76	6.87	12.64
Age	58,824	40.05	6.94	27.00	52.00	39.70	40.53	39.79
Birth comuna	58,824	0.55	0.50	0	1.00	0.59	0.57	0.47
Birth year	58,824	1972	7	1961	1984	1972	1971	1972
Schooling	58,754	11.20	3.68	0.00	22.00	9.49	11.00	13.41
Household income per member	58,824	267195	437942	0	46100000	177112	232069	416181
Single	58,824	0.22	0.41	0	1	0.23	0.21	0.21
Number of children	58,824	1.32	1.11	0	11	1.41	1.30	1.24
Urban area	58,824	0.80	0.40	0	1	0.73	0.79	0.91
Health status	58,602	5.58	1.23	1	7	5.49	5.55	5.73

Source: CASEN survey 2011 and 2013. Note: FB stands for family background. Household income per member is expressed in current Chilean pesos. Life satisfaction and health status are self-reported.

TABLE A.3: Summary statistics of enrollment data

Variable	County level					Individual level		
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.
Enrolment in public schools, 1981	346	86.83	15.81	6.25	100.00	58824	82.12	14.58
Enrolment in subsidized private schools, 1981	346	10.86	13.87	0.00	93.75	58824	13.10	12.51
Enrolment in traditional private schools, 1981	346	2.31	7.23	0.00	61.05	58824	4.79	7.64
Enrolment in public schools, 1988	346	78.31	20.91	24.71	100.00	58824	69.36	20.14
Enrolment in subsidized private schools, 1988	346	18.78	18.26	0.00	72.72	58824	24.59	17.02
Enrolment in traditional private schools, 1988	346	2.17	7.77	0.00	63.51	58824	4.52	8.03
Change in subsidized private enrolment, 1981-1988	346	7.92	11.78	-93.75	54.16	58824	11.49	9.33

Source: enrollment records from the Ministry of Education of Chile. Note: the columns under "Individual level" show the statistics once the municipality level data has been assigned to the individuals in the sample.