SLEP-less in Santiago: The Effect of Local Educational Services in Chile [*]

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Abstract

This paper presents a newly conducted evaluation of the results of a reform to the educational system in Chile, implemented in 2018. This reform created school districts, known as Local Education Services (SLEP), which marked a shift away from the decentralized spirit of the voucher system instituted in 1981. We conduct several econometric exercises to evaluate the effects of this reform on the results of standardized tests (SIMCE) taken by 4th-grade students. Our results suggest that, on average, no significant effects on SIMCE scores can be detected in schools where this process was implemented.

Keywords: Vouchers, Centralization, Chile, Propensity Score Matching, Difference-in-difference, Quantile regressions.

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"**Annie Reed**: Destiny is something that we've invented because we can't stand the fact that everything that happens is accidental."
"**Becky**: Your destiny can be your doom."
(Sleepless in Seattle, 1993)

1 Introduction

The question of how to achieve qualitatively better and more equitable public education can be approached from various perspectives. One crucial angle concerns the optimal organization of the educational system and the alignment of schools, teachers, and related staff with these goals. This paper addresses this question within the context of an ongoing reform in Chile. Specifically, public schools are being transferred from municipal administration—an arrangement in place since the early 1980s—to newly created school districts known as Local Education Services (Servicios Locales de Educación, SLEP). These entities were established as part of the New Public Education initiative (Nueva Educación Pública, NPE) launched in 2017. The NPE aims to provide comprehensive education quality, continuous quality improvement, national coverage and access guarantees, equitable development and equal opportunities, collaboration and networking, inclusive, secular, and citizen-oriented educational projects, civic education and republican values, and integration with the environment and community.

The new governance model for schools introduces two key innovations. First, it is more centralized than the previous model, as seen in its administrative, political, and fiscal dimensions. Second, it shifts the interaction between stakeholders in education delivery from a direct relationship between the municipal office and its constituency (the "short route to accountability") to an indirect relationship between the SLEP authority and the broader education community (the "long route to accountability"), incorporating new non-municipal stakeholders.

While the old model assumed that municipal governments acted as agents of their local communities, SLEPs are intended to serve as agents of the national government, which now has greater control over specific aspects of school administration. In terms of funding, the new model retains the voucher system, a key feature of the previous framework. However, under the NPE model, the SLEP bureaucracy is fully funded by the Ministry of Education, in contrast to the former system where municipalities partially funded school administration costs.

This paper aims to provide evidence on the impact of SLEPs on the standardized test scores of fourth-grade students, specifically the SIMCE test. To achieve this, we employ various econometric methods. Across these methodologies, our findings suggest that, on average, no significant effects on SIMCE scores are observed in schools where the SLEP model was implemented.

The rest of the paper is organized as follows. Section 2 provides a brief summary of the theoretical considerations involved. Section 3 presents the main characteristics of the reform under evaluation. Section 4 describes the dataset used and provides some descriptive statistics. Section 5 evaluates the effects of the program using different econometric approaches, including a brief theoretical discussion of each, and the results obtained. Finally, Section 6 concludes.

2 Some Theoretical Considerations

Several variables are typically highlighted as key determinants of students' performance at school, including family background (Mancebón et al., 2012; Nunes et al., 2023), socioeconomic status (Coleman et al., 1966; Hanushek, 1996; McEwan, 2003; Hakkinen et al., 2003; Houtenville, 2008; Hedges et al., 2016; Mizala and Torche, 2017), the characteristics of teaching staff (Gerritsen et al., 2017; Kalkan et al., 2020), and competition among schools (Chumacero et al., 2011; Chumacero et al., 2016; Hout et al., 2022). This research focuses on the governance model of schools (De la Cruz and Mergoni 2024), particularly the extent to which the ongoing reform centralizes public educational services and its potential impact on educational outcomes. The reform's effects may stem from weakened accountability and reduced representation of the local community, as well as a less efficient and more bureaucratic administration of schools.

Given the research question, this study focuses on the governance of public schools, which involves two closely related aspects. The first is the degree of autonomy that school districts have in managing schools. In our case, this feature is framed within the broader debate on the optimal level of decentralization in public education. The second aspect concerns how those responsible for school administration are held accountable for their performance. While decentralization can promote accountability, the interaction between various stakeholders is a key determinant of effective school governance. That said, the NPE model seeks to shift schools away from a competitive approach and towards a more collaborative framework, where the entire educational community works together to achieve legally defined goals.

2.1 The Decentralization Problem

As noted, a key debate in school governance design concerns the degree of autonomy school districts and individual schools should have in decision-making. This issue is part of the broader discussion on the benefits and costs of decentralization, applicable to many government functions. In education, evidence generally supports the view that decentralization positively impacts student learning outcomes (Letelier, 2012).

The benefits of decentralization are supported by several well-known hypotheses. These include improved information about the specific needs of local communities (Hayek, 1945), the creation of a more competitive environment among subnational governments (Tiebout, 1956), a community-oriented supply of local public goods (Oates, 1972), tighter control over government overreach (Brennan and Buchanan, 1980), and, most relevant in this case, enhanced accountability for those managing public services (Escobar-Lemmon and Ross, 2014; Lockwood, 2015; Machado et al., 2024).

However, decentralization also comes with challenges. These include potential losses in economies of scale for service delivery (Oates, 2001), the risk of elite capture (Bardhan and Mookherjee, 2006), a lack of skilled personnel and weak democratic representation at the local level (Prud'homme, 1995), and the possibility of increased inequality in service delivery (Galiani et al., 2008; Sumah et al., 2016).

Cross-country evidence generally supports the view that decentralization improves student performance on standardized knowledge tests and other measures of academic achievement (e.g., Falch and Fisher, 2012; Lastra-Anadón and Mukherjee, 2019), as well as subjective perceptions of service quality (Kyriacou and Roca-Sagalés, 2019). Similar findings have been observed in numerous country case studies, including Switzerland (Barankay and Lockwood, 2007), Côte d'Ivoire (Sanogo, 2019), South Korea (Jeong et al., 2017), Argentina (Galiani et al., 2008), Colombia (Melo-Becerra et al., 2020) India (Singh et. al. 2024), and Turkey (Davutyan et.al. 2010).

A comprehensive review by Channa and Faguet (2016) confirms that fiscal decentralization positively impacts educational outcomes, although it does not necessarily lead to a closer alignment between educational services and community preferences. However, less clear results have been found in studies of Spain (Guerra and Lastra-Anadón, 2019) and a panel of 65 countries (Kameshwara et al., 2020), highlighting the complexity of decentralization's effects in different contexts.

In the case of Chile, Letelier and Ormeño (2018, 2023) provide evidence that fiscal decentralization positively contributes to better learning outcomes in municipal schools. Given the significant variation in fiscal autonomy across municipal governments, their findings align with the hypothesis that a "one-size-fits-all" solution—such as the one being implemented through the SLEP—is not optimal for school administration. This suggests that flexibility in governance, tailored to local contexts, may be more effective in improving educational outcomes.

2.2 The Accountability Problem

A widely accepted hypothesis is that school administrators should be held accountable for the quality of education they provide. While evidence indicates that increased accountability pressure prompts changes in the educational community (Feng et al., 2022), the debate continues over how this accountability should be enforced. The emphasis on accountability dates back to the early 1970s (Tyack, 1974) but gained renewed attention following the publication of the World Bank Report in 2004.

The report contrasts the "long route to accountability," through democratic elections of local representatives responsible for schools, with the "short route to accountability," where schools are directly accountable to parents. Neither route alone is sufficient; effective accountability requires clear delegation of functions and funding to organizational providers, the establishment of performance metrics, and the empowerment of principals (whether parents, politicians, or policymakers) to impose sanctions on poor performers or provide incentives for success. Additionally, education stakeholders operate within distinct accountability relationships: parents (clients) hold providers accountable, policymakers contract organizational providers, frontline professionals are accountable to providers, and citizens hold policymakers accountable. A poorly designed public education model can fail due to weaknesses in any of these accountability relationships.

Since the early 1980s, Chile has been widely recognized as a pioneer in implementing a school-based accountability system (Figlio and Loeb, 2011), where a market-like mechanism allowed parents to enforce accountability by choosing their preferred school. This system was initially designed as part of the voucher-based school funding model introduced in the early 1980s. Under this model, municipal governments were made responsible for running public schools, and parents were expected to "vote with their feet" by selecting the best school for their children. Municipal schools competed with each other, and with charter schools, and teachers were employed under private labor law by municipal governments.

The accountability mechanism operated on two levels. First, underperforming schools were penalized by losing students who would transfer to better-performing schools or publicly funded private providers (charter schools). This was embedded in the "short route of accountability," which relied on parents' ability to evaluate the quality of educational services.

However, changes to this model were introduced in the early 1990s with the creation of the “Teachers’ Statute,” a new labor regulation that reduced municipal governments’ autonomy in managing teaching staff. This shift significantly weakened the “long route of accountability,” where municipal authorities were directly responsible for school performance (Letelier and Ormeño, 2018).

3 The Chilean Voucher System and the SLEP Reform

Chile implemented several pioneering reforms in the last quarter of the 20th century (Chumacero et al., 2007). The first wave of changes included price liberalization, reductions in import tariffs, and a general decrease in the government’s role in the economy. The second wave of structural reforms “revolutionized” the social security system, shifting from a pay-as-you-go model to a privately managed, fully funded system. It also involved the privatization of most state-owned enterprises and the introduction of a voucher system in education. Chile’s reforms became a model for similar initiatives later adopted in other countries (Aedo and Sapelli, 2001). As a result, the country enjoyed robust and consistent growth, which significantly reduced income gaps with developed nations and lowered poverty levels.

In 1981, Chile introduced a nationwide voucher system for education. This reform decentralized primary and secondary education by transferring public schools to municipal control. Since then, school administration has been managed by both public (municipal) and private providers, with most of the funding coming from state subsidies and, in some cases, fees paid by parents.[1]

3.1 Evolution Over Time

The original public education model implemented in Chile in the early 1980s was designed to be decentralized, market-friendly, and fully demand-driven (OECD, 2012). It was based

[1] See, for example, Chumacero et al. (2011) and references therein.

on the assumption that competition among schools would drive improvements in quality. To support this, parents were granted school choice, and a parallel system of government-funded private schools (charter schools) was established. Municipal governments were given the option to manage schools directly through a Municipal Educational Department or through a private Municipal Corporation. A voucher per student funding mechanism was implemented, aligning with the demand-driven approach to educational services.

In keeping with cost-efficiency goals, teacher contracts were governed by private labor laws, as applied to all non-public employees. This setup made local authorities directly responsible for the quality of public education, marking a significant step toward administrative decentralization by bringing many procedures closer to residents' needs. Although municipalities did not gain additional revenue-raising powers, their constitutionally recognized autonomous status allowed for greater budget flexibility and community-oriented expenditure.

The new system also simplified budget execution, and municipalities were given the option to make voluntary contributions to co-fund local schools. In sum, the original municipal education model was highly decentralized: expenditures were more flexible, local authorities were accountable to their communities, and families had the freedom to choose between municipal and government-funded private schools, as well as among specific schools within those categories.

Since the implementation of the municipal education model, it has undergone numerous reforms, many aimed at improving equal access to education. However, these changes progressively diluted the original decentralized and market-driven nature of the model. The first significant reform occurred in 1991, when teachers were integrated into the Administrative Statute, removing them from private labor law. This shift marked a step toward a more centralized administrative regime, as it greatly reduced municipal governments' ability to dismiss poorly evaluated teachers and negotiate wages.

On the revenue side, municipal schools were allowed to charge a small voluntary fee per student starting in 1993, but this option was eliminated in 2015, along with a ban on "for-profit” government-funded private schools. In the same year, student self-selection was replaced by a centrally designed algorithm. Although this algorithm still considers parental preferences, it weakened the “voting with their feet” mechanism. Additionally, charter schools were transformed into non-profit private schools.

Over time, special pro-equity programs were introduced, most notably the “Preferential School Subsidy” in 2008, which aimed to support vulnerable students. The original voucher system became more complex, with its value customized based on the type of school and the families benefiting from the program. Today, the “school subsidy unit” serves as the basis for calculating different types of subsidies, including those for educational reinforcement, school maintenance, educational excellence, student internships, and support for vulnerable students. These reforms, while addressing equity, have transformed the voucher system into a more differentiated and intricate funding mechanism.

3.2 Evaluation of the Municipal Model

Prima facie evidence suggests that the education model in place until 2017, before the creation of SLEP, contributed to a growing preference for charter schools over municipal schools. This shift is evident in the rising enrollment in charter schools, alongside a steady decline in municipal school enrollment. The share of municipal schools in total enrollment at the primary and secondary levels decreased from 75% in 2004 to 65% in 2017, corresponding to an increase in charter school enrollment during the same period.

Some authors indicate that one outcome of the pre-2017 model has been the segregation of students across schools, primarily driven by the school-based admission process and the freedom of parents to choose schools (Hsieh and Urquiola, 2006; Valenzuela et al., 2013; Santos and Elacqua, 2016). In response, the 2015 reform introduced a school selection algorithm to address this issue. Other potential weaknesses of the model include the multifunctional nature of municipal governments, loss of economies of scale, and the political dependency of local administrative teams. Voluntary financial contributions made by municipal governments to co-fund schools have also led to disparities in per-student spending across the country (Rounds Parry, 1997), as the willingness and capacity to contribute varies significantly between municipalities.

Some assumptions underlying the municipal model have also been scrutinized. One key question was whether competition among schools existed. While some studies cast doubt on this (e.g., Auguste and Valenzuela, 2003; Gallego, 2006; Bellei, 2009), Chumacero et al. (2016) found evidence supporting the existence of such competition. Additionally, separate debates have examined the relative educational quality of charter versus municipal schools (Mizala and Romaguera, 2000, 2005) and the role of a more decentralized educational model (Letelier and Ormeño, 2018, 2023).

A key aspect of this debate remains the segregation of students, which the 2015 "school inclusion" law sought to address by banning school self-selection. The new algorithm assigns students to schools based on parental applications. While this measure ended competition among schools to retain and attract students, it does not resolve the fact that wealthier municipalities continue to supplement central government funding with their own resources, leading to substantial disparities in per-student funding across schools.

The reforms significantly altered the original model, increasing the influence of central government agencies and reshaping the mechanisms by which local communities hold authorities accountable. Hooge (2016) classifies accountability models into two broad categories: vertical and horizontal. Vertical accountability depends on compliance with regulations imposed by higher authorities, while horizontal accountability emphasizes the involvement of the local community in collaboratively setting and achieving educational standards. In this model, teachers, students, parents, and educational staff all play an active role in the accountability process.

However, extensive community involvement in horizontal accountability comes with significant transaction costs, particularly when jurisdictions include multiple schools. The advantage, though, is a more comprehensive evaluation of school performance, considering a broader range of quality indicators.

These reforms raise questions about the changing nature of accountability relationships and the degree to which the new model centralizes the administration of public education. In this context, the key issue becomes identifying the most effective educational governance structure, the appropriate agency in charge, and the optimal accountability model.

3.3 The Public Education System

As mentioned earlier, a major reform occurred in 2017 in Chile with the enactment of the Law of the New Public Education. Although its implementation is gradual, this reform aims to completely overhaul the previous educational model. It introduces significant changes in governance, accountability, and the role of central and local authorities in the administration of public education. The law represents a shift from the decentralized, market-driven framework toward a more centralized model, reconfiguring the way education is managed and the mechanisms through which accountability is enforced. Next, we discuss some of the most relevant characteristics of this reform.

3.3.1 The Public Education System

Under the new law, publicly funded private schools will continue to operate under the same regulations as before. However, former municipal schools are being transferred from municipal control to 70 newly created school districts known as Local Educational Services (Servicios Locales de Educación, or SLEP). The full implementation of this transition is planned to be completed by 2029, marking a significant shift in the governance of public education in Chile.

As per the administration, the new law describes SLEPs as "decentralized" services. Legally, this means that SLEPs have their own assets and are subject to "supervision"—but not direct hierarchical control—by the national government, specifically the Ministry of Education. However, transferring schools from municipal administration to SLEPs still represents a move toward centralization, as municipalities enjoy political and fiscal autonomy, which the SLEP model reduces. Several features of the reform highlight this centralization.

The new law emphasizes national, rather than local, educational goals, along with inter- and intra-SLEP networking, and collaboration among educational service providers across the country. This is formalized through the creation of an eight-year National Education Plan, approved by the Senate via official decree. SLEPs are vertically accountable to the Directorate of General Education (Dirección de Educación Pública, DEP), housed within the Ministry of Education.

Regarding governance, SLEPs are led by an Executive Director (ED), who must sign a performance agreement upon taking office. Unlike the municipal model, where local authorities were accountable to residents (the "short route of accountability"), the SLEP ED is accountable both vertically and horizontally (Hooge, 2016). Vertically, the ED is accountable to the Director of Public Education, who coordinates all SLEPs nationally. Horizontally, the ED is accountable to the Local Steering Committee (Comité Directivo Local, CDL), composed of representatives from parent centers, the Regional Government, and municipalities within the SLEP area. The CDL provides strategic oversight and supports the ED in managing the SLEP.

Additionally, the ED engages with the SLEP community through the Education Local Council (Consejo Local de Educación, CLE), a second collegiate body. The CLE includes representatives from student centers, parent and guardian groups, teachers and teaching assistants, and local universities and technical training centers, fostering broad community involvement in educational governance.

The SLEP Executive Director is selected based on a proposal from the Civil Service (Servicio Civil), the national agency responsible for appointing high-level public managers within the Chilean central government. This proposal is first shortlisted by the Local Steering Committee (CDL) and then presented to the President, who makes the final decision. The Executive Director's term is six years, but the law outlines specific causes for removal. To insulate appointees from the national political cycle, the grounds for dismissal and the removal procedure are more restrictive than those applied to regular public managers selected by the Senior Public Management System (CADP). Public school directors undergo a similar selection process.

3.3.2 SLEP Funding

In terms of funding, the SLEP system retains key components of the previous municipal model but adds additional resources to support the new administrative structure (Irarrázabal et al., 2021). The national government budget allocated to the Ministry of Education reached US$16 billion in 2024, accounting for 25% of the central government budget and 4% of GDP. Of this total, US$10.311 billion is designated for funding school and pre-school education, covering municipal schools, SLEPs, publicly funded private schools, and kindergartens.

Educational providers receive funding from three related public agencies. The Undersecretariat of Education (Subsecretaría de Educación) supplies the majority of the funding, covering 87% of the total education budget through a demand-driven, per-student subvention, in line with the municipal model. Currently, there are 19 different types of subventions, each targeted at specific types of schools, educational levels, and student profiles. Since 2008, a "preferential subvention" has been in place to support socially vulnerable students. Additionally, this agency provides further resources through budget lines aimed at "improving the quality of education," "teaching and educational management improvement," and "educational resources."

The Public Education Directorate (DEP), established under the New Public Education law, also provides funding through the "strengthening of public education" initiative and specific support for SLEPs under the "support to SLEP implementation" program. This agency plays a crucial role in ensuring that SLEPs are effectively established and can function properly over time.

The third agency is the National Committee of Kindergartens (JUNJI), which provides financial support for pre-school education. These three agencies together form the backbone of public educational funding in Chile.

While the new law allows SLEPs to enter into cooperation agreements with municipal governments and other local public agencies, it is unlikely that these will result in significant financial contributions. The law that created the New Public Education system permits regional and municipal governments to contribute to funding SLEPs. However, this contribution is expected to be minimal, as many mayors view the reform as an opportunity to offload the responsibility of managing schools, thereby freeing up resources for other purposes. Consequently, substantial cash contributions from these governments to support SLEPs are unlikely.

A key question concerns the marginal cost associated with the operation of SLEPs. This can be estimated based on three specific funding components. First, SLEPs receive dedicated resources to cover the administrative costs of the New Public Education system. Second, the Public Education Directorate (DEP) was created specifically to provide support to SLEPs. Third, a special fund was established to support the implementation of SLEPs. In 2024, for SLEPs that are already operational, these costs are estimated at US$248 million. This estimate does not account for the withdrawal of resources from municipalities that are no longer responsible for providing educational services.

3.3.3 Implementation of the SLEP Reform

The implementation of the SLEP system is still ongoing and involves two phases. The first phase, from 2017 to 2020, saw the establishment of the initial 11 SLEPs. The second phase was initially scheduled for completion in 2025, with the installation of the remaining 59 SLEPs, but this timeline may be extended to 2029. Table 1 outlines the evolution of the implementation plan, showing that by 2024, 17% of all schools and 13% of kindergartens are expected to be transferred to SLEPs. The data also highlights a stalemate in the process during 2022-2023, followed by a clear acceleration starting in

2024. This shift aligns with the new left-wing government coalition that took office in 2022, which sped up the transfer of schools and kindergartens to SLEPs.

[TABLE 1 AROUND HERE]

Despite the current implementation plans, doubts remain about the schedule and the overall appropriateness of transferring all schools to the new SLEP system. On one hand, some municipalities that still manage schools demonstrate satisfactory educational performance compared to non-municipal schools. On the other hand, school and kindergarten services are highly visible municipal functions, making school management a valuable tool for incumbent mayors seeking re-election.

So far, 848 schools and 198 kindergartens have been transferred to the SLEP system, representing 17% of the national total for schools and 13% for kindergartens. With full implementation still far from completion, a public debate has emerged over whether the schedule should be followed strictly, regardless of the performance of schools still under municipal control. This debate intensified in March 2023 after a political episode in which teachers from the Atacama SLEP went on strike, citing unacceptable educational infrastructure and sanitary conditions. The strike lasted 73 days, during which classes were suspended until the central government committed to addressing the demands, leading the teachers to call off the strike.

One significant side effect of this crisis was increased pressure to reconsider the installation of the SLEP model. A key underlying concern is the hypothesis that transferring some municipal schools to the SLEP system might worsen the quality of educational services. Since municipal governments vary significantly in their resources and management capabilities, there is prima facie evidence that some municipal schools perform well with the resources available to them. In particular, fiscally autonomous municipalities may provide better support to schools, raising questions about the uniform application of the SLEP model across diverse municipalities.

3.3.4 Early Evaluations of the SLEP Reform

A first set of studies has been conducted to evaluate the coherence of the new model in terms of the distribution of functions among different agencies and the potential obstacles to the implementation of the New Public Education system. The initial observations highlight a lack of effective coordination among the various services involved in the proper functioning of SLEPs (Agencia de Calidad de la Educación, 2021; Eyzaguirre et al., 2022; Cabezas et al., 2024). This issue is particularly evident in the unclear role of the Public Education Directorate (DEP), insufficient collaboration among the public agencies overseeing SLEPs, and a lack of networking across schools within each SLEP's jurisdiction.

One specific area of conflict arises with the role of the "Provincial Educational Departments" (DIPROV) in each province, which provide guidance and assistance on pedagogical matters and intervene in local educational plans. This often clashes with the strategies and pedagogical plans developed by SLEPs, reflecting the ambiguity in the legal framework concerning the division of authority between these entities. Additionally, each region has a "Ministerial Regional Secretary" (SEREMI), tasked with ensuring the implementation of national education plans within its territory. The overlapping responsibilities of DIPROV, SEREMI, and SLEPs contribute to confusion and inefficiencies in governance and execution.

A second significant challenge relates to budget administration and the reduced fiscal flexibility compared to the municipal model (Eyzaguirre et al., 2022; Cabezas et al., 2024). Since SLEPs are part of the national government, they face numerous restrictions in executing their budgets. For instance, SLEPs are required to adhere to the "Public Purchases Law," which imposes complex and rigid procurement protocols. Additionally, SLEPs cannot carry over unspent funds beyond the fiscal year or reassign budgetary resources without permission from the fiscal authorities. These constraints severely limit their ability to prioritize and adjust expenditures as needed.

In contrast, when schools were under municipal control, municipalities contributed approximately 11% of the total public school education budget. This contribution was particularly important because it was executed under municipal autonomy, which offered greater flexibility. Municipalities could carry over leftover funds from one budget year to the next and had more freedom in resource allocation, enabling a more responsive and efficient use of funds in the education sector.

A third weakness relates to the extensive territories and the excessive number of schools under certain SLEPs. Although the law stipulates that SLEPs should oversee no more than 80 schools, this number is significantly higher than the average number managed by municipalities. As a result, the anticipated benefits of economies of scale in SLEP administration are unclear. SLEP officers are required to visit schools to assess problems and evaluate infrastructure, which poses logistical challenges given the large territories and school counts.

To address this issue, a Territorial Management Unit was added to the SLEP organizational structure in 2019 (Arzola, 2023). Despite this adjustment, one visible consequence of the size and complexity of SLEPs is the difficulty in attracting qualified candidates for key positions within the system. This lack of skilled applicants further exacerbates administrative challenges and hinders the effective functioning of SLEPs.

The transition from the municipal to the SLEP model represents a fourth challenge. New officers who join SLEPs are usually conformed by the former Municipal Departments of Education and/or Municipal Educational Corporations. Nonetheless, there seems to be no perfect match between the number and type of personnel being required by the SLEPs, and the number of available officers from the municipal model structure. The fact that corporations were used as a paying box of political favors, might be a factor explaining excessive number of threshing and assistant teaching personnel. A similar inherited problem exists on the type of real estate assets to be transferred to the new SLEPs.

In terms of educational outcomes, SLEPs have shown some recovery relative to pre-pandemic years, but they still lag behind remaining municipal schools. A study by Arzola (2023) highlights three important stylized facts. First, SLEP schools performed worse on the 2022 SIMCE test compared to the last cohort of students who attended these same schools under the municipal model. Second, the implementation process remains in a testing phase, with significant coordination challenges.

The empirical evaluation of SLEP educational achievements is constrained by several factors. The primary limitation is the relatively short period since SLEPs' implementation in 2017, requiring cautious interpretation of results. Notably, the initial group of SLEPs includes a higher concentration of vulnerable students compared to municipal schools, as these early SLEPs were chosen from among the worst-performing municipal schools at the time.[2]

A recent joint evaluation by the Quality Education Agency, the Ministry of Education (MINEDUC), and the Public Education Directorate (Berkowitz et al., 2024) provides a preliminary assessment across five dimensions: promotion rates, school attendance, serious non-attendance, student retention, and learning standards in language and math. The comparison with municipal and private schools shows that, on average, students in SLEPs are closing the gap relative to non-SLEP students in these areas. Additionally, students who entered the SLEP system shortly after its launch in 2018 appear to perform better, suggesting that results may be cohort-sensitive.

4 The Data

Our data spans the years 2017 (prior to the implementation of SLEP) and 2018, 2022, and 2023 (post-implementation). The student and school-level data were sourced from the Education Quality Agency ("Agencia de Calidad de la Educación"). This dataset includes students' scores on the standardized SIMCE test, which assesses math and language skills, as well as surveys completed by parents and teachers. Although the SIMCE test is typically administered annually, it was not conducted between 2019 and 2021 due to the social unrest in 2019 and the COVID-19 pandemic.

[2] An early evaluation by Rowland (2023) shows no significant results.

Additionally, we use municipal-level data from the Ministry of Interior Affairs and Public Security, obtained through the "National System of Municipal Information" ("Sistema Nacional de Información Municipal"). This dataset provides contextual information on municipal characteristics relevant to our analysis.

[TABLE 2 HERE]
[TABLE 3 HERE]

Tables 2 and 3 summarize the available information, providing figures for the number of schools and students with data on 4th-grade SIMCE results by year. As shown, there is a discrepancy between the schools that were expected to have adopted the SLEP reform (Table 1) and those that appear on the SIMCE data base (Table 3). These differences can be attributed to two factors: first, the variation in the number of schools that had 4th-grade students who took the test, and second, delays in the implementation of the SLEP reform.

By 2018, 4.7% of students and 4.46% of schools with available SIMCE test data for 4th grade were under SLEP. These figures rose to between 12% and 14% in 2022 and 2023. Moreover, there is significant regional heterogeneity in the reform's implementation. For example, by 2022, all students and schools in two regions (III and XV) were under SLEP, while in 6 of Chile's 16 regions, none of the schools or students had transitioned to the SLEP system.

[TABLE 4 HERE]

As our analysis focuses on the student and school levels, Table 4 provides summary statistics for SIMCE standardized test results by year and test type. Three key insights emerge: First, in 2022, there was a notable decrease in average test scores at both the student and school levels, with scores returning to normal levels in 2023. Second, the standard deviation of test scores is significantly larger at the student level compared to the school level. This is because the school-level standard deviations are calculated from the schools' average test scores. Finally, at least unconditionally, there are no apparent differences in test scores between students and schools that adopted the SLEP reform and those that did not. However, as the populations in both cases may differ due to other factors, a more detailed assessment of the SLEP reform's effects is conducted in the following section.

5 The Empirical Approach

The basic hypothesis being tested here is that SLEPs represent a "one-size-fits-all" solution for a system where existing educational providers display significant variation. Given this diversity, it appears unlikely that the New Public Education model will result in uniform improvements in educational attainments across the board. Instead, the model's effects may vary depending on specific local contexts and pre-existing conditions in different schools and municipalities.

As outlined above, some of the potential weaknesses of the new SLEP model are: First, it represents a significant shift back toward a more centralized system, evident in its approach to both horizontal accountability (its relationship with the community) and vertical accountability (its relationship with national authorities). This centralization contrasts with existing evidence that supports more decentralized models and may limit potential gains. Second, the new model introduces a more bureaucratic structure, involving multiple government agencies in the supervision and support of SLEPs. This increases transaction costs in school administration, demands more resources, and diminishes the potential financial contributions from municipal educational providers. Third, the larger number of schools managed within a single SLEP compared to the municipal model presents coordination challenges. It also strengthens the influence of teachers' unions and other advocacy groups, potentially complicating school governance and decision-making processes.

On the other hand, the SLEP model may lead to improvements under certain conditions, particularly where centralized oversight can enhance resource allocation and ensure adherence to national educational standards. In regions with historically underperforming municipal schools, the more structured management and additional support provided by the national government through SLEPs could lead to better outcomes. Additionally, the model's focus on equity, especially through targeted funding for vulnerable students, may help address disparities in educational access and quality. Lastly, improved coordination across schools within a SLEP, if effectively managed, could foster the sharing of best practices and lead to system-wide improvements in teaching and learning outcomes.

Given these conflicting potential outcomes, it is natural to assess the effects of the SLEP reform using econometric techniques commonly employed to evaluate the impact of a specific treatment. In this context, the "treatment" refers to the shift in school administration from municipal control to the SLEP model. These techniques can help identify the causal effects of this administrative change on a range of educational outcomes, including student performance, resource allocation, and school efficiency. By isolating the impact of the reform, we can better understand whether the SLEP model leads to improvements or presents additional challenges.

However, evaluating the effects of the SLEP reform is not straightforward. First, the mechanism determining which schools are treated first and which are not is non-random. This undermines the possibility of conducting an ideal randomized experiment, where outcomes between treated and control units are directly comparable. There may, and indeed are, systematic differences between the characteristics of treated and control schools.

Second, the gradual implementation of the SLEP reform, which will span several years, complicates the analysis. Schools that are not treated initially may become treated in subsequent years, making it difficult to maintain a clear distinction between control and treated units over time.

Lastly, the effects of the SLEP reform may vary in the short, medium, and long run. This temporal dimension of the reform necessitates accounting for heterogeneity across several factors, such as regional variations, school characteristics, and evolving administrative capacities, to properly capture the full range of its effects.

This section presents three complementary approaches to assess the effects of the SLEP implementation, which began in 2018. We will briefly summarize the key characteristics of each approach, how they were applied, and the results they produced. Since each method has its own strengths and weaknesses, using multiple approaches serves as a robustness check for the findings.

5.1 Propensity Score Matching

The causal estimand of interest when evaluating the effect of a specific treatment, commonly referred to as the Average Treatment Effect on the Treated (ATT), can be defined as:

$$\tau = E\left[Y_{i,t}\left(1\right) - Y_{i,t}\left(0\right) \middle| D_{i,t} = 1\right], \quad (1)$$

where $Y_{i,t}\left(1\right)$ corresponds to the outcome of interest (in our case, the SIMCE score) of unit i that is subject to the treatment in period t, while $Y_{i,t}\left(0\right)$ is the potential outcome if unit i had it not been treated.

The ATT measures the difference between the actual outcome for the treated units and the hypothetical outcome they would have experienced had they not received the treatment. Since the counterfactual outcome is unobservable, econometric techniques are used to estimate it by comparing the treated units with an appropriate control group.

The Propensity Score Matching (PSM) technique aims to construct a control group by selecting units that were not exposed to the treatment but were as likely to have been treated.[3] This is achieved by estimating the probability (propensity score) that each unit would receive the treatment based on observable characteristics. Once the propensity scores are calculated, treated units are matched with control units that have similar propensity scores, thus creating a comparable control group.[4] By doing so, PSM attempts

[3] See, for example, Caliendo and Kopeining (2008), Stuart (2010), Imbens and Rubin (2015), Pan and Bai (2015), and Lee (2016) for details.

[4] There are several methods for selecting control units in Propensity Score Matching. In this analysis, we use the nearest-neighbor matching method with replacement, meaning a control unit can be matched to

to reduce selection bias and approximate the conditions of a randomized experiment, allowing for a more accurate estimation of the treatment effect.

Several technical details must be considered to ensure this method is a consistent estimator of the ATT in (1). First, the propensity score must achieve good balance between treated and control units, ensuring that observable characteristics are similar after matching. This reduces selection bias and makes the control group a valid comparison. Balance can be checked by comparing both the propensity scores and covariates of the treated and control units.

Second, trimming observations may be necessary to obtain robust ATT estimates, especially when treated units have extreme propensity scores, making it hard to find comparable controls. Retaining these extremes can lead to poor balance and increase bias. Trimming or excluding observations with very high or low scores improves balance by focusing on the common support region, where treated and control units have similar characteristics (Imbens and Rubin, 2015).

Finally, inference requires adjusting standard errors to account for the matching process. It is crucial to account for potential heteroskedasticity or other assumption violations in the matching algorithm (Abadie and Imbens, 2006, 2016; Lechner, 2001).

For each year and unit of analysis (students or schools), we estimated a logit binary response model to assess the likelihood of being treated by the SLEP reform, thus obtaining the propensity score. At the school level, we included regional dummy variables to account for the heterogeneous implementation of the SLEP reform, as evidenced by Tables 2 and 3, along with characteristics of the municipality in which the school operates, such as population size, student enrollment, and financial support provided by the local government to the schools.

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more than one treated unit. In cases where multiple control units have the same propensity score, a random selection is applied to choose the matching unit. For more details on this methodology, refer to Imbens and Rubin (2015). Additionally, for considerations when there are few (and fixed) treated observations and many control observations, see Ferman (2021).

For the student-level analysis, we also incorporated individual and family characteristics, including the student's gender, the mother's years of schooling, and household income. These factors allow us to capture more granular differences in the likelihood of being treated by the SLEP reform, ensuring a more accurate estimation of the propensity score.

Once the propensity scores were estimated, we selected a control unit for each treated unit using the nearest neighbor matching method, as discussed earlier. We also checked for common support of the covariates used to estimate the propensity scores, ensuring that the treatment and control units had comparable characteristics. To improve the reliability of the estimates, we trimmed the data, excluding observations where the fitted propensity scores were not matched at the extremes of the distributions. This ensures a more balanced comparison between treated and control units, reducing bias in the estimation of the treatment effect.[5]

Figure 1 presents the non-parametric estimates of the density functions of the propensity scores for the different units of analysis and years, for both treated and control units, after trimming. As shown, regardless of the year or unit of analysis, the propensity scores of the treated and control units are similar. However, the logit model performs better in characterizing the likelihood of being treated in 2018 compared to the other years.

[FIGURE 1 HERE]

Table 5 summarizes the main findings from the Propensity Score Matching (PSM) method. The results are robust across both the full and trimmed samples. Specifically, at the student level, the Average Treatment Effect on the Treated (ATT) for SLEP is estimated to be negative and statistically significant for the years 2018 and 2022, indicating a negative impact of the reform on student performance in these years. In contrast, the effect is either non-significant or marginally positive in 2023.

[TABLE 5 HERE]

[5] All estimations were performed using GAUSS, and the corresponding code is available upon request.

At the school level, however, there is no statistically significant impact of the SLEP reform for any year or type of test, suggesting that the reform's effect, if any, is more noticeable at the individual student level rather than at the aggregate school level.

More importantly, even under the most optimistic estimates, the impact of the SLEP reform would result in only a modest improvement in SIMCE scores, ranging from 2 to 4 points. This effect is exceedingly small when considering that one standard deviation in SIMCE scores for students in these schools is in the range of 45 to 50 points (Table 4). Thus, the magnitude of the improvement is minimal in the broader context of overall student performance variability.

Finally, Figure 2 presents the non-parametric estimation of the density functions for the average of reading and math SIMCE scores, comparing both treated and control units across different units of analysis (students and schools) and years. These estimates suggest that, while the central tendency of the distribution differences—outlined in Table 5—are either not significantly different from zero or marginally negative at the student level, there may be notable differences in the impact of the treatment at the extremes of the distributions. This issue will be explored further in Section 5.3.

[FIGURE 2 HERE]

5.2 Difference-in-Differences

Difference-in-Differences (DiD) is one of the most widely used methods for assessing causal effects in non-experimental data. When there are two periods (before and after treatment) and two groups (treated and non-treated units), the two-way fixed effects (TWFE) estimator provides consistent and unbiased estimates of the treatment effect, provided that three key assumptions hold: the parallel trends assumption, which requires that in the absence of treatment, the treated and control groups would have followed similar trends over time; the homogeneous treatment effects assumption, which assumes that the treatment effect is the same for all treated units across time, with no heterogeneity in treatment effects; and the non-anticipatory effects assumption, which means that the treatment does not influence outcomes before its implementation.[6]

The simplest TWFE model can be summarized with the following specification:

$$Y_{i,t} = \alpha_i + \lambda_t + \tau D_{i,t} + u_{i,t}, \tag{2}$$

where $Y_{i,t}$ is the outcome of interest for unit i in period t; α_i represents unit fixed effects, capturing time-invariant characteristics of each unit; λ_t represents time fixed effects, accounting for common shocks or trends that affect all units similarly in each period; $D_{i,t}$ is a dummy variable equal to 1 when unit i is treated in period t and 0 otherwise; τ is the treatment effect of interest; and $u_{i,t}$ is the error term. This model estimates the treatment effect while controlling for both unit-specific and time-specific factors.

Since the students who take the tests differ each year, it is not possible to construct a panel at the student level. However, a balanced panel can be created at the school level, which is the approach used in the subsequent analysis. This allows for tracking the same schools over time, even though individual students change from year to year.

The first row of Table 6 presents the results of estimating the TWFE specification, considering two years at a time: 2017 as the pre-treatment year, and either 2018, 2022, or 2023 as the post-treatment year. Treated units are the schools incorporated into the SLEP model during or prior to the year of analysis, as once a school is treated, the treatment is irreversible. This approach allows for comparing outcomes before and after the implementation of the SLEP reform across different time frames.

[TABLE 6 HERE]

[6] Other assumptions typically required include the "stable unit treatment value" assumption (SUTVA), which posits that there is no interference between units, meaning the treatment of one unit does not affect another's outcome; the "no time-varying confounders" assumption, which implies that no unobserved factors change over time in a way that systematically impacts the outcomes of the treated or control groups; and the "exogeneity of treatment" assumption, which asserts that the assignment of the treatment is not correlated with unobserved characteristics that also influence the outcome. For an introduction to DiD, see Angrist and Pischke (2008), and for early critiques, refer to Bertrand et al. (2004).

Consistent with the results from the PSM approach, the TWFE estimators indicate that, regardless of the test type or year, there are no statistically significant changes in the scores of schools after the treatment. In line with previous findings, the numerical effects in 2018 appear to be negative. Even if the positive (though not significant) effects are taken at face value, the improvements would be modest, amounting to, at most, a 3-point increase in SIMCE scores. This corresponds to only 6% to 12% of one standard deviation in SIMCE scores, suggesting minimal, if any, educational gains from the SLEP reform.

As discussed by Callaway and Sant'Anna (2021), Goodman-Bacon (2021), Sun and Abraham (2021), Baker et al. (2022), and Roth et al. (2023), specification (2) has several critical limitations when dealing with multiple periods and variations in the timing of treatment. These issues can lead to unreliable and difficult-to-interpret estimates of the ATT, as traditional TWFE models may fail to properly account for treatment effect heterogeneity and staggered treatment adoption across units over time.

This issue is particularly relevant in our case, as schools began treatment at different times. This staggered implementation creates problems for estimating the ATT using PSM, as units that were considered controls each year may become treated in subsequent years. This overlap complicates the interpretation of treatment effects and may introduce bias, as control units are not consistently untreated throughout the study period.[7]

Furthermore, if the effects of the treatment depend on the duration of time a unit has been treated, schools treated in different years may exhibit varying outcomes in subsequent periods. For example, a school treated in 2018, and another treated in 2022 may present different effects in 2023. As a result, the TWFE estimates in specification (2)

[7] To address the potential issues with staggered treatment timing, a robustness check was conducted for the PSM approach. In this check, control units were restricted to only those students and schools that were not treated in any period. The results remain consistent even under this constraint, indicating that the findings are robust to this adjustment, and that the treatment effect estimates are not sensitive to the choice of control units.

and Table 6 cannot be directly interpreted as causal effects of the treatment, since they do not account for the heterogeneity in treatment duration across schools.

One way to deal with the staggered nature of the implementation of the treatment is to consider a "dynamic" balanced panel in which we incorporate all the years, and not only two of them, in a specification such as:

$$Y_{i,t} = \alpha_i + \lambda_t + \sum_j \tau_j D^j_{i,t} + u_{i,t}, \tag{3}$$

where $D^j_{i,t}$ is an indicator function that takes the value of 1 if unit i is treated in period j=t, and 0 otherwise. The τ_j parameters estimate the effect of being subject to the treatment in period j, irrespective of whether that year marks the first year of treatment or if the unit had already been treated in prior periods. This dynamic approach allows us to capture treatment effects over time, accounting for the staggered adoption of the treatment across different units.

In specification (3), the immediate impact of being treated for the first time in year j is captured by the coefficient τ_j. For a school that was treated prior to period j, the cumulative effect on the SIMCE score can be obtained by summing the relevant τ coefficients for the preceding periods. To conduct valid inference on this cumulative effect, the corresponding standard errors must be computed by considering the combined variance of the summed coefficients. This allows for an accurate estimation of the long-term treatment effect while properly accounting for the staggered nature of the treatment.[8]

The second row of Table 6 presents the results of estimating specification (3). The impact effects of the treatment are found to be smaller in magnitude compared to those estimated using the TWFE specification. However, as before, these effects are not statistically significant for any year. Additionally, the accumulated effects across multiple years are also statistically insignificant.

In conclusion, applying the DiD approach yields results that are quantitatively and qualitatively similar to those obtained with the PSM approach. If any treatment effects

[8] For alternative estimators in the staggered Difference-in-Differences (DiD) context, see Roth et al. (2023).

exist, they are either quantitatively small or non-existent. This suggests that the SLEP reform has not produced significant measurable improvements in the outcomes analyzed.

5.3 Quantile Regressions

Both the PSM and DiD approaches indicate that the SLEP reform appears to have had no significant effect on the average academic performance of the students subject to the treatment. However, if the effects of the treatment are heterogeneous, it is possible that while the central tendency of the distribution remains unaffected, the treatment may have had an impact on the tails of the distribution. This suggests that the reform could have influenced the performance of students at the lower or upper ends of the academic spectrum, even if the overall average remained unchanged.

For example, if schools or students in the upper quantiles of the score distribution were also those with stronger local accountability, transferring these schools to the SLEP system could potentially deteriorate test results due to a loss of localized oversight and responsiveness. Conversely, if individuals or schools in the lower quantiles of the outcome distribution are those most disadvantaged by poor management under local authorities, transferring them to SLEP might improve their performance, as the new centralized system could address inefficiencies or resource deficits more effectively. This highlights the importance of considering heterogeneous effects across different segments of the distribution when evaluating the impact of the reform.

An effective way to evaluate the potential heterogeneity of treatment effects across different quantiles of the distribution is to use the Quantile Regression (QR) approach. In general terms, we can define the model as:

$$\widehat{\beta}_t^{\delta} = \arg\min_{\beta_t^{\delta}} \sum_i \rho_\delta \left(Y_{i,t} - X'_{i,t}\beta_t^{\delta}\right), \tag{4}$$

where $X'_{i,t}\beta_t^{\delta}$ represents the δ-th conditional quantile of the distribution of Y_t conditional on a set of exogenous variables X_t in period t, and β_t^{δ} denote the quantile and period specific coefficients. The function $\rho_\delta\left(u_{i,t}\right)$, often referred to as the tilted absolute value function, is used to define the δ-th quantile of the conditional distribution of Y, and it places different weights on residuals above and below the quantile being estimated.[9]

If we specify the δ-th conditional quantile of the distribution of (4) as:

$$X'_{i,t}\beta_t^{\delta} = Z'_{i,t}\theta_t^{\delta} + \tau_t^{\delta} D_{i,t}, \tag{5}$$

where $Z_{i,t}$ are potential determinants of $Y_{i,t}$ that summarize characteristics of unit i, and $D_{i,t}$ is the same dummy variable that is activated if unit i is under treatment in period t. In this case, the treatment effect, specific to each quantile and period is τ_t^{δ}.

For each unit of analysis (students and schools) and for each year of possible treatment (2018, 2022, and 2023), we estimated the conditional quantile regression model (5). This model includes regional dummy variables, as well as relevant student, household, school, and municipality characteristics. Additionally, the treatment dummy variable was incorporated to capture the effect of the SLEP reform. By estimating the model across different quantiles, we aim to assess how the treatment effect varies across the distribution of outcomes, thus allowing for the identification of heterogeneous effects at different points in the performance distribution.

[FIGURE 3 HERE]

Figure 3 presents the estimated treatment effect coefficients for each year, unit of analysis, and quantile on the average SIMCE scores. Overall, no statistically significant effects are found for most quantiles, years, or units of analysis. Additionally, the numerical values of the effects are modest, aligning with those obtained from the previous methods. If any trend is noticeable, there is a mildly negative pattern at the student level, suggesting that the treatment—transitioning to SLEP—has been slightly detrimental to students in the upper tail of the SIMCE score distribution. This indicates that higher-performing students may have experienced a decline in outcomes following the transition to SLEP, even though the overall effects remain limited.[10]

[9] Refer to Koenker and Hallock (2001), Koenker (2017), and Hansen (2022) for details.

[10] Similar results are obtained while analyzing math and reading scores separately.

6 Concluding Remarks

After the pioneering educational reform in Chile that introduced the voucher system, several subsequent reforms have gradually diverged from its original vision. The most recent of these is the implementation of SLEPs, which transferred the responsibility of administering public schools from municipalities to more centralized authorities, signaling a shift away from the decentralized, market-oriented approach initially envisioned.

The transfer of responsibility from a more atomistic and decentralized authority (municipality) to a more centralized one, such as the SLEPs, has a theoretically ambiguous impact on the educational performance of students and schools subject to the reform. On one hand, a more centralized administration could potentially exploit economies of scale and leverage specialized talent that may not have been available at the local level. On the other hand, decentralized management is typically easier to monitor, and local accountability may create stronger incentives to improve the quality of education, as decision-makers are more directly answerable to the community.

This paper conducts three complementary econometric exercises to evaluate the causal effect of the SLEP reform on the performance of 4th-grade students in standardized tests. All results consistently show that the SLEP reform had no discernible effect on students' academic achievement, indicating that the transition to a more centralized school administration has not significantly impacted educational outcomes.

Even the most optimistic estimates suggest a modest increase in SIMCE scores of between 1 to 3 points. These magnitudes represent a small fraction of the overall variability in standardized test results, which typically, at the student level, range between 45 and 50 points, indicating that the impact of the SLEP reform on academic performance is, if any, minimal.

One crucial aspect overlooked in this evaluation is the additional resources that the SLEP reform requires. Back-of-the-envelope calculations using conservative estimates of the extra funding involved and the most optimistic estimates of the reform's impact suggest that each additional point in SIMCE scores would have cost approximately US$700 per student (US$248 million / 175 thousand students / 2 extra points in SIMCE score). In contrast, charter schools typically outperform municipal schools by an average of 15 to 20 points (Chumacero and Paredes, 2008). If these additional resources had been directed towards providing parents with access to better-performing voucher schools—at a cost of US$70 per month—the impact on student performance could have been significantly greater. This strategy would not only improve outcomes by increasing resources but also foster competition among private voucher schools to attract students, further boosting educational quality. These considerations raise important questions about the cost-effectiveness of the SLEP reform relative to alternative educational interventions that could have leveraged market-based mechanisms to achieve more substantial improvements in student performance.

Chile has a distinguished history of implementing bold, innovative reforms that have been pioneering globally, coupled with a strong tradition of rigorously evaluating their impacts. This study suggests that the SLEP reforms have not produced the desired effect on students' academic achievement. Despite the significant resources and restructuring efforts, the reform does not appear to have led to substantial improvements in educational outcomes, raising concerns about its overall effectiveness.

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Table 1

Implementation of the New Public Education

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
New SLEs per year	4	0	3	4	0	0	4	13	10	10	11	11	**70**
Schools per year	225	0	166	238	0	0	212	993	702	828	831	761	**4,956**
Kindergartens per year	56	0	38	52	0	0	52	321	216	239	304	222	**1,500**

Source: Directorate of Public Education.

Table 2

Universe of Students Potentially Affected by Region and Year (Number of Students)

Region	2017	2018	2022	2023
I	1415 (0)	1548 (0)	1594 (0)	1615 (0)
II	5416 (0)	5882 (0)	5629 (0)	5397 (0)
III	3263 (0)	3498 (976)	3332 (3332)	1512 (1512)
IV	4496 (0)	5125 (1065)	5102 (1110)	4980 (1135)
V	8802 (0)	9248 (0)	9178 (1144)	8940 (1079)
VI	7010 (0)	7275 (0)	6980 (880)	6659 (874)
VII	8566 (0)	9109 (0)	8449 (0)	8284 (0)
VIII	13570 (0)	10324 (0)	9078 (1063)	8495 (1008)
IX	5621 (0)	5973 (637)	5676 (566)	5332 (493)
X	6638 (0)	6810 (0)	5729 (920)	5497 (811)
XI	800 (0)	932 (0)	746 (0)	672 (0)
XII	1173 (0)	1256 (0)	1141 (0)	1134 (0)
XIII (RM)	25969 (0)	27989 (2199)	26486 (3143)	25619 (3028)
XIV	2852 (0)	2900 (0)	2702 (0)	2451 (0)
XV	1247 (0)	1393 (0)	1300 (1300)	1276 (1276)
XVI	0 (0)	3578 (0)	3207 (0)	3002 (0)
Total	96838 (0)	102840 (4877)	96329 (13467)	90865 (11216)

Notes: Number of students under SLEP in parenthesis.

Table 3

Universe of Schools Potentially Affected by Region and Year (Number of Schools)

Region	2017	2018	2022	2023
I	43 (0)	44 (0)	45 (0)	50 (0)
II	79 (0)	77 (0)	79 (0)	81 (0)
III	81 (0)	81 (40)	81 (81)	47 (47)
IV	295 (0)	295 (34)	271 (35)	276 (36)
V	365 (0)	361 (0)	357 (42)	365 (43)
VI	308 (0)	306 (0)	301 (48)	302 (48)
VII	431 (0)	427 (0)	418 (0)	415 (0)
VIII	657 (0)	412 (0)	399 (49)	395 (52)
IX	361 (0)	355 (53)	349 (47)	338 (45)
X	439 (0)	440 (0)	405 (52)	414 (53)
XI	42 (0)	41 (0)	42 (0)	41 (0)
XII	33 (0)	34 (0)	33 (0)	32 (0)
XIII (RM)	560 (0)	565 (46)	564 (72)	566 (72)
XIV	161 (0)	164 (0)	157 (0)	160 (0)
XV	42 (0)	44 (0)	43 (43)	45 (45)
XVI	0 (0)	228 (0)	219 (0)	211 (0)
Total	3897 (0)	3874 (173)	3763 (469)	3738 (441)

Notes: Number of schools under SLEP in parenthesis.

Table 4

Descriptive Statistics by Subject and Year

Outcome	2017	2018	2022	2023
Reading (Students)				
Observations	77696 (-)	81245 (3889)	73163 (10166)	69740 (8387)
Average	256.7 (-)	259.5 (257.7)	256.2 (253.8)	262.0 (261.4)
Std. Deviation	53.3 (-)	53.2 (52.5)	54.3 (53.9)	53.5 (52.9)
Math (Students)				
Observations	78040 (-)	81546 (3861)	74147 (10285)	70397 (8489)
Average	247.7 (-)	247.5 (246.0.7)	239.1 (235.7)	248.6 (248.7)
Std. Deviation	47.1 (-)	47.9 (48.0)	46.4 (45.4)	47.3 (46.6)
Average (Students)				
Observations	75578 (-)	79217 (3769)	71093 (9859)	68007 (8177)
Average	252.7 (-)	254.0 (252.3)	248.1 (245.3)	255.8 (255.6)
Std. Deviation	45.7 (-)	46.0 (45.9)	46.0 (45.3)	46.2 (45.6)
Reading (Schools)				
Observations	3331 (-)	3294 (147)	3198 (407)	3167 (385)
Average	257.4 (-)	257.6 (256.8)	254.1 (252.5)	260.9 (260.5)
Std. Deviation	28.0 (-)	27.1 (23.5)	24.1 (23.5)	25.0 (25.0)
Math (Schools)				
Observations	3315 (-)	3294 (146)	3191 (407)	3160 (385)
Average	243.2 (-)	243.3 (241.0)	236.7 (234.7)	246.2 (246.4)
Std. Deviation	26.2 (-)	26.5 (25.1)	22.9 (22.8)	24.6 (24.6)
Average (Students)				
Observations	3308 (-)	3279 (146)	3179 (405)	3154 (385)
Average	250.7 (-)	250.8 (249.2)	245.8 (244.1)	254.0 (253.9)
Std. Deviation	24.9 (-)	25.1 (22.9)	21.9 (21.8)	23.3 (23.6)

Notes: Values in parenthesis correspond the students or schools under SLEP. (-) indicates that SLEP was not implemented yet. Average refers to the simple average between reading and math results. The figures ate the school level are taken from averages of the students of the school.

Table 5

ATT using PSM

Outcome	2018	2022	2023
Students [Full]			
Reading	-6.38 (3.36)	-2.69 (1.46)	0.87 (1.79)
Math	-4.00 (3.12)	-4.24 (1.25)	2.93 (1.55)
Average	-4.69 (2.93)	-3.71 (1.24)	2.41 (1.53)
Observations	3301	8563	7287
Students [Trimmed]			
Reading	-6.82 (3.35)	-2.69 (1.46)	0.87 (1.79)
Math	-4.35 (3.12)	-4.24 (1.25)	2.93 (1.55)
Average	-5.10 (2.87)	-3.71 (1.24)	2.41 (1.53)
Observations	3239	8563	7287
Schools [Full]			
Reading	-2.49 (4.57)	1.75 (2.98)	4.70 (3.57)
Math	-10.89 (10.38)	-0.36 (2.72)	4.92 (3.45)
Average	-2.75 (6.88)	1.03 (2.78)	4.87 (3.39)
Observations	117	341	313
Schools [Trimmed]			
Reading	1.43 (4.55)	-0.80 (3.04)	4.31 (3.90)
Math	6.41 (5.28)	1.44 (2.85)	3.89 (3.92)
Average	0.38 (4.97)	2.27 (2.75)	5.11 (3.83)
Observations	50	307	273

Notes: Standard deviations in parenthesis. [Full] corresponds to the full sample of treated units. [Trimmed] corresponds to the sample of trimmed observations.

Table 6

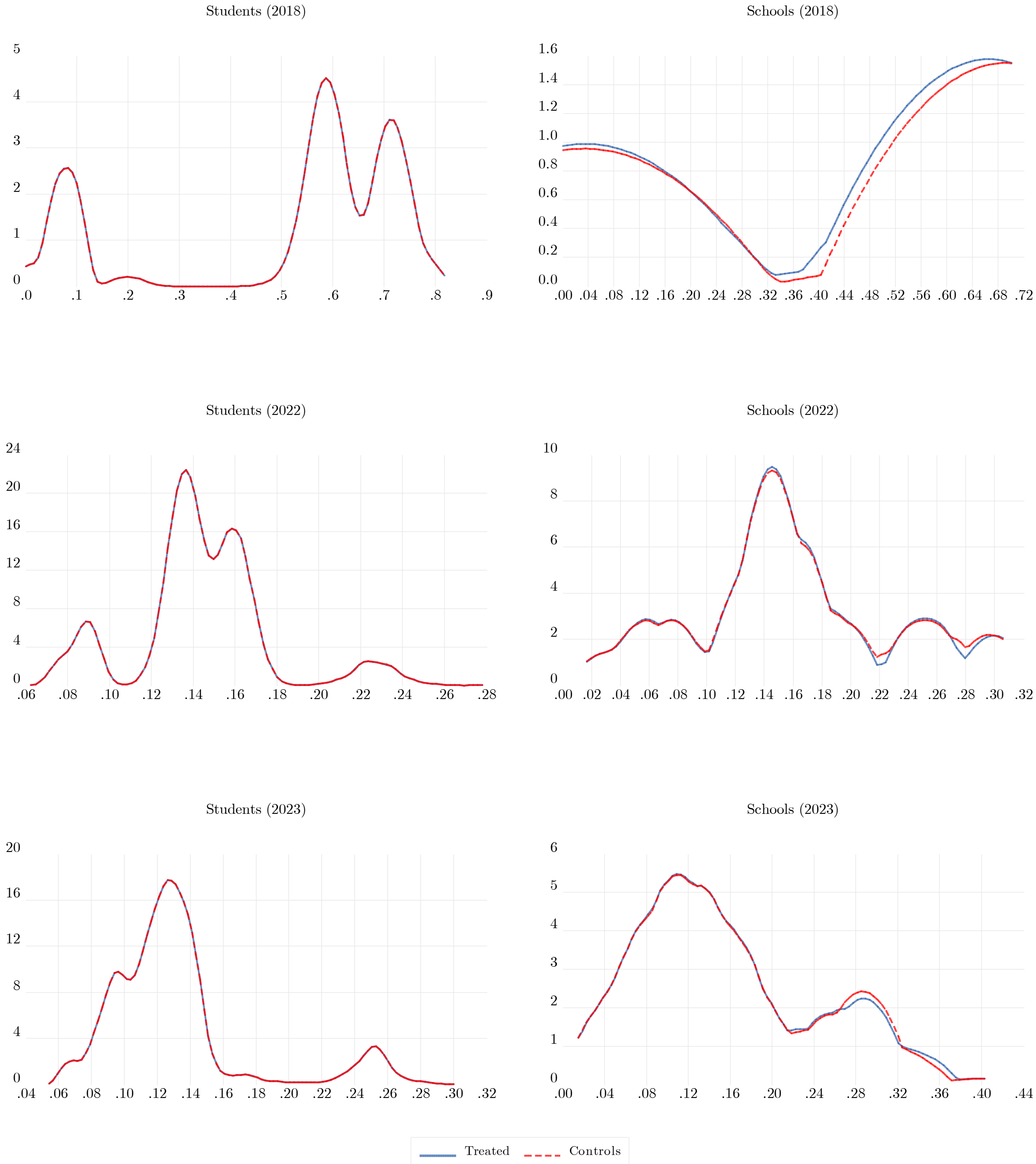
ATT using DiD

Outcome	2018	2022	2023
Schools [TWFE]			
Reading	-4.31 (2.80)	2.73 (2.15)	2.91 (2.23)
Math	-3.21 (2.84)	1.49 (2.11)	3.00 (2.15)
Average	-3.66 (2.59)	2.23 (2.05)	2.88 (2.07)
Schools [Dynamic]			
Reading	-1.72 (2.26)	2.39 (1.59)	2.20 (1.64)
Math	-1.19 (2.05)	1.50 (1.53)	2.35 (1.60)
Average	-1.22 (2.02)	2.17 (1.48)	2.59 (1.52)

Notes: [TWFE] corresponds to the two-way fixed effects DiD estimator. [Dynamic] corresponds to the DiD dynamic specification. All balanced panels include individual (school) and time (year) fixed effects. Cluster robust standard deviations in parenthesis.

Figure 1

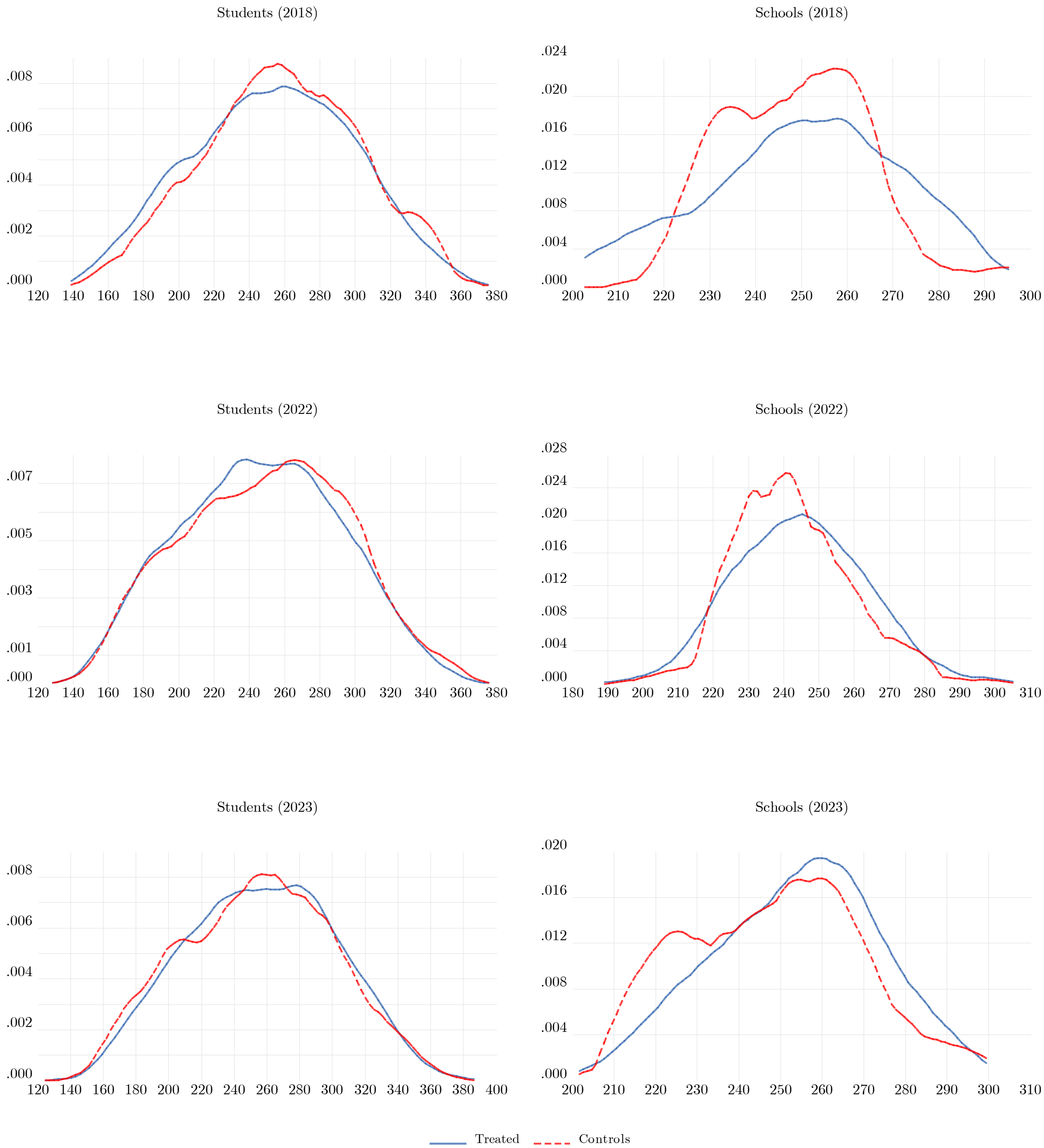
Density Functions of Propensity Scores by Unit of Analysis and Year



Notes: The solid (dashed) line represents the non-parametric estimate of the density for the propensity scores of the treated (control) observations. Density functions estimated using the bandwidth proposed by Silverman (1986) and the Epanechnikov kernel.

Figure 2

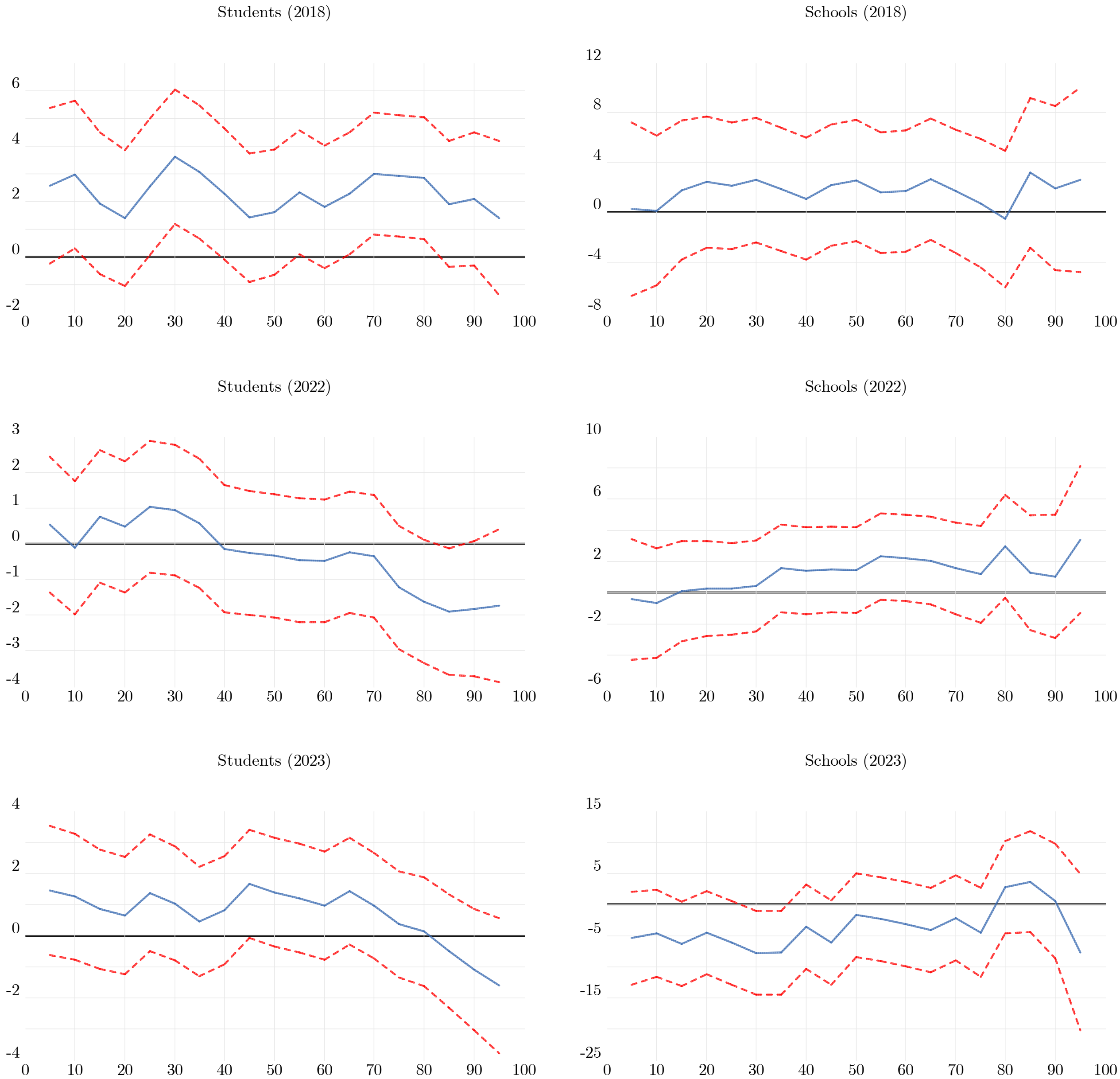
Density Functions of Average SIMCE Score by Unit of Analysis and Year



Notes: The solid (dashed) line represents the non-parametric estimate of the density for the propensity scores of the treated (control) observations. Density functions estimated using the bandwidth proposed by Silverman (1986) and the Epanechnikov kernel.

Figure 3

Effects on Average SIMCE Score at Different Quantiles by Unit of Analysis and Year



Notes: The solid line represents the quantile regression estimate of the effect of the treatment. 95% confidence intervals are represented by the dashed lines.