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Not All Dollars Are Equal: The Composition of School Spending and Student Outcomes*

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Abstract

This paper analyzes the association between the composition of school spending and various measures of school effectiveness. Using audited financial accounts for the universe of publicly funded urban schools in Chile between 2015 and 2022, disaggregated into six expenditure categories and 37 subcategories, we link spending patterns to school value-added measures of test scores, attendance, chronic absenteeism, and dropout. Aggregate spending per student is only weakly associated with school effectiveness. In contrast, spending composition matters substantially: we reject equal associations across expenditure categories for all outcomes, and no category is associated with all four dimensions of effectiveness. Personnel spending is associated with higher test-score value added but not attendance, whereas operations spending is associated with higher attendance and lower chronic absenteeism but not with test-score gains. Infrastructure spending is associated with both learning and attendance outcomes. We also find considerable heterogeneity across school types and student populations. The categories prioritized by Chile's targeted equity subsidy, quality programs and student well-being, are associated with higher test-score value added primarily in the most disadvantaged schools, while operations and infrastructure expenditures exhibit opposite associations in public and private voucher schools. The estimated associations are modest in magnitude: a one-standard-deviation increase in the most predictive spending categories corresponds to 2 to 7 percent of the cross-school dispersion in value added. Nevertheless, the findings have important policy implications because education funding policies typically target specific expenditure categories rather than overall spending levels. Overall, the results suggest that the composition of spending is more informative than expenditure levels alone and that evaluating education finance policies using a single outcome or pooled estimates can understate the benefits of targeted investments

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*All errors are our own.

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1 Introduction

Whether money matters for student achievement is among the most contested questions in the economics of education. For decades, the debate centered on a simple binary: do higher expenditures improve outcomes? A generation of studies, from Hanushek (2003)’s skepticism to the meta-analytic rebuttals of Greenwald et al. (1996), the quasi-experimental evidence of Card and Payne (2002), Jackson et al. (2016), and Lafortune et al. (2018), and the meta-analysis of Jackson and Mackevicius (2024), has largely resolved this question in the affirmative. Yet a policy-relevant frontier remains: not whether schools should spend more, but *how* the composition of spending shapes distinct dimensions of human capital formation. This gap is consequential: school principals and policymakers do not choose how much to spend in the aggregate; they decide how to allocate fixed budgets across personnel categories, pedagogical programs, student services, and infrastructure. Which allocations matter, and for which outcomes, is the policy-relevant margin.

This paper brings new evidence to that frontier. We exploit detailed administrative records on the universe of publicly funded Chilean schools over 2015–2022, linking audited expenditure data, disaggregated into personnel, quality programs, student well-being, operations, and infrastructure and further into dozens of subcategories, to several measures of school effectiveness. Chile is a useful setting for three reasons. First, a national voucher system generates wide variation in spending decisions across public and private-voucher schools operating under a common regulatory framework. Roughly 90 percent of Chilean students attend publicly funded schools, 40 percent in municipal public schools and 45 percent in privately managed voucher schools, which gives a large and institutionally diverse sample. Second, a targeted equity subsidy (Subvención Escolar Preferencial, or SEP) creates within-school variation in earmarked versus discretionary resources. Third, the government administers standardized assessments of both academic achievement and non-cognitive outcomes (attendance, chronic absenteeism, and

dropout), which lets us construct school value-added measures across four distinct dimensions of human capital. All publicly funded schools submit detailed annual accounts to the Superintendent of Education, disaggregating spending into dozens of functional categories: six types of personnel, five quality-program subcategories, eight student well-being subcategories, and further categories for operations and infrastructure. Accounts this detailed, audited and reported under a common framework, are rare in education finance data. Merging these accounts with student-level test score data, attendance records, and enrollment files yields a balanced panel of approximately 6,000 schools observed annually over eight years (2015–2022).

The dataset is itself a contribution. The quasi-experimental literature on school spending measures inputs as district-level per-pupil expenditure, at most split into operational and capital outlays (Baron, 2022; Biasi et al., 2025; Jackson et al., 2016; Lafortune et al., 2018), and measures outputs with test scores or with the adult outcomes of the cohorts exposed. We observe, for the universe of publicly funded schools and for eight consecutive years, audited school-level accounts that record where each dollar went, in six categories and 37 subcategories (Appendix Table A.1), together with staff headcounts and contract hours that let us separate pay from staffing. On the output side, we estimate school value added on four margins of student outcomes with the empirical Bayes shrinkage estimators of Chetty et al. (2014) and Angrist et al. (2017), whose lottery-based validations show that shrunken value-added estimates are close to unbiased forecasts of causal school and teacher effects (Angrist et al., 2017; D. J. Deming, 2014), and we extend them to attendance, chronic absenteeism, and dropout in the spirit of Jackson (2020). The result is a census panel in which the composition of spending and several validated measures of effectiveness are observed for the same schools over time, so that the composition margin can be studied within schools rather than across districts. To our knowledge, no comparable dataset exists.

Our first finding is that the *composition* of spending is informative beyond its *level*,

but not along the lines that policy earmarks assume. Aggregate per-student expenditure is weakly related to value added: an additional USD 1,000 per student, a third of the average budget, is associated with 0.039 standard deviations higher test-score value added and with lower dropout, and is unrelated to attendance. We reject that a dollar is a dollar: the six category coefficients differ at conventional levels for every outcome, and the aggregate coefficient is a weighted average that personnel dominates, because two thirds to three quarters of a marginal within-school dollar goes to personnel. Within schools, the categories that predict test-score value added are personnel, through classroom teachers and instructional support teachers, infrastructure, and, in math, quality programs; the categories that predict attendance and lower chronic absenteeism are operations and infrastructure, which keep the school running and open; and the category that predicts retention is personnel. Student well-being, the other category toward which the targeted equity subsidy channels resources, shows no robust association with any value-added measure once we condition on school fixed effects, even though in cross-sectional comparisons schools with higher test-score value added spend less on it. Magnitudes are small: one standard deviation of within-school variation in the most predictive categories moves value added by 2 to 7 percent of its dispersion across schools.

Second, these associations are outcome-specific. No single spending category is associated with all four outcomes, and several categories are associated with one outcome in one direction and with another in the opposite direction. Infrastructure spending is associated with higher attendance but, in the annual specification, with higher dropout; classroom-teacher spending with lower dropout but lower attendance, a pattern consistent with schools that retain marginal students keeping students who attend less. Within personnel, administrative and paraprofessional staff predict attendance, and non-teaching professionals (counselors, psychologists, social workers) are negatively associated with attendance value added, consistent with compensatory deployment where attendance problems are greatest. Some of these associations are fragile: the dropout results reverse

when dropout value added is constructed with the cohort structure of the test-score measures, and we say so. Single-outcome evaluations would therefore mischaracterize the productivity of specific expenditure types.

Third, the associations differ by sector, and for operations and infrastructure they have opposite signs. Personnel spending is associated with higher test-score value added in both sectors, but quality programs, learning resources, and student well-being are associated with it in public schools only, and infrastructure in private schools only; operations spending is negatively associated with test scores and positively with attendance and retention in public schools, and the reverse in private schools. For attendance, administrative and paraprofessional staff matter in public schools and school leadership in private schools. These contrasts line up with the institutional differences we document: public schools operate under the Teacher Statute and spend more per student on every staff type except leadership, while private schools pay a premium for leadership and professionals and spend more on operations and infrastructure. Pooled estimates average associations of opposite sign. The associations also vary with the population served: personnel and infrastructure spending predict test-score value added in the schools with the fewest priority students, whereas quality programs and student well-being predict it in the schools with the most, and well-being spending is associated with attendance only in the most disadvantaged tercile.

These findings advance several strands of the literature. A first strand estimates the returns to aggregate school spending. The seminal work of Jackson et al. (2016) uses court-ordered finance reforms to show that a 10 percent increase in per-pupil spending throughout the school years increases adult earnings by 7 percent for children from low-income families. Lafortune et al. (2018) exploit post-*Serrano* finance equalization to document positive effects on test scores, with the largest gains in low-income districts. Later work extends the evidence to college enrollment and attainment (Hyman, 2017; Kreisman & Steinberg, 2019; Rothstein & Schanzenbach, 2022), to the complementarity be-

tween early and later spending (Johnson & Jackson, 2019), and to spending cuts (Jackson et al., 2021). Jackson and Mackevicius (2024) synthesize 31 quasi-experimental studies and estimate that a sustained increase of USD 1,000 per pupil raises test scores by 0.03 standard deviations and college-going by 2.8 percentage points, with larger effects for low-income students. Evidence on the composition margin is thinner and mostly binary. Baron (2022) exploits close referenda in Wisconsin, where districts vote separately on operational and capital spending, and finds that operational spending raises test scores and postsecondary enrollment and reduces dropout, whereas capital spending has little effect; Abbott et al. (2020) find comparable effects of operational spending approved in tax elections across seven states, and Jackson and Mackevicius (2024), by contrast, find similar average marginal effects for capital and non-capital spending. The capital literature itself ranges from null effects (Martorell et al., 2016) to gains in test scores and attendance (Cellini et al., 2010; Lafortune & Schönholzer, 2022; Neilson & Zimmerman, 2014). Biasi et al. (2025) isolate the effects of capital investments using narrow bond-election victories and find that infrastructure spending raises test scores, with returns that depend on what the money buys and on who receives it: basic infrastructure and pollutant removal raise achievement while athletic facilities do not, and socioeconomically disadvantaged districts benefit more from a given outlay even conditional on project type and the existing capital stock. This second result implies that the productivity of a spending category is not a fixed parameter but varies with the population served and the resources already in place, a margin we examine directly by estimating our specifications separately by school socioeconomic composition and baseline spending. Brunner et al. (2020) show that how districts spend a marginal dollar of state aid, on teacher compensation or on hiring, shapes its effect on achievement, and Holden (2016) that a one-time grant earmarked for textbooks raised elementary test scores. Dobbie and Fryer (2013) show that management practices, high-dosage tutoring, and data-driven instruction, rather than class size (Angrist & Lavy, 1999; Krueger, 1999), per-pupil spending, or teacher certification, explain

charter school effectiveness, which points to composition. We complement this work by decomposing expenditure into narrowly defined functional categories and showing that the composition margin dominates the level margin across multiple outcome dimensions. This granularity matters because policy levers operate at the level of hiring decisions, program investments, and budget line items, not at the level of total spending.

A second strand extends the measurement of school effectiveness beyond test scores. Jackson et al. (2020) show that schools' effects on socioemotional development are only weakly correlated with their effects on test scores and predict arrests, graduation, and college going conditional on them; Beuermann et al. (2023) find the same weak correlation for schools' effects on crime, teen motherhood, and labor market participation, and Jackson (2018) and Petek and Pope (2023) for teachers. Attendance is itself an input into later outcomes (Gershenson, 2016; Liu et al., 2021), and non-cognitive skills carry returns of their own (Heckman et al., 2006). Chetty et al. (2011) find that students randomly assigned to higher-quality kindergarten classrooms earn more as adults, even though the test-score advantage fades by middle school, which suggests that non-cognitive channels drive the long-run returns. D. Deming (2011) documents that access to better schools through lotteries reduces criminal behavior, an effect concentrated among students whose test scores did not improve. We contribute by linking spending composition directly to these multiple dimensions, providing evidence on *which inputs* are associated with *which outputs*. The operations and infrastructure results are a concrete illustration: the categories most consistently associated with attendance and reduced absenteeism are ones that a test-score evaluation would rate as unproductive or, for operations, ignore.

A third strand examines education production in developing and middle-income countries, where institutional constraints, teacher labor markets, and resource levels differ substantially from high-income settings. While the school spending literature has concentrated overwhelmingly on the United States, the question it addresses, how to allocate scarce resources across competing uses, is more pressing in middle-income coun-

tries, where per-pupil budgets are tighter. The experimental literature on school inputs in developing countries finds that the return to an input depends on what households and schools do around it (Das et al., 2013; Glewwe et al., 2009) and on the incentives that accompany it (Mbiti et al., 2019), that some expensive inputs, such as an unconditional teacher pay rise, have no effect (de Ree et al., 2018), and that the same budget produces different results under different providers (Muralidharan & Sundararaman, 2015; Romero et al., 2020); Glewwe and Muralidharan (2016) and McEwan (2015) survey this evidence. Chile’s universal voucher system, centralized admissions, and mandatory expenditure reporting make it an informative setting for studying how schools allocate resources under a common funding formula but with substantial autonomy over internal budget decisions. The coexistence of public and private providers allows us to examine whether spending-effectiveness associations differ by sector. They do: the quality-program associations are concentrated in public schools, where discretionary budgets are more likely to flow through formal quality programs.

Our identification strategy relies on within-school variation over time, controlling for school fixed effects and common year shocks. We estimate school value-added using empirical Bayes shrinkage following Morris (1983) and Angrist et al. (2017), with separate models for test-score outcomes (which exploit a cohort-based structure) and non-cognitive outcomes (which use an annual panel). Chile’s institutional features support identification: mechanical per-student funding formulas limit discretionary reallocation of total resources, and centralized admissions with lottery tie-breaking, rolled out by region between 2017 and 2020, constrain schools’ ability to selectively attract students in response to spending changes in the second half of the sample period. While our estimates are descriptive rather than causal, the within-school design absorbs the main confounders, neighborhood characteristics, parental sorting, and time-invariant school quality, and the specificity of the findings limits the scope for generic ones. A balance test shows that within-school changes in spending composition are unrelated to gender com-

position and, apart from a small association between personnel spending and the baseline achievement of incoming cohorts, unrelated to the student characteristics that the funding formula does not govern. Different spending categories predict different outcomes in detailed, category-specific patterns that are difficult to reconcile with a single omitted confounder: a positive shock to school quality would not explain why operations spending predicts attendance but not test scores, why classroom-teacher spending predicts lower dropout but lower attendance, or why the same category has opposite signs in public and private schools.

The remainder of the paper is organized as follows. Section 2 describes the Chilean education system and the SEP policy. Section 3 presents the data sources. Section 4 describes how we estimate school value added and the specifications relating spending composition to SVA. Section 5 documents descriptive patterns in spending composition and school effectiveness. Section 6 presents the main results, and Section 7 concludes.

2 Context

Chile's K–12 system combines three types of schools: municipal public, privately managed but publicly funded voucher schools, and a small fully private sector. By 2017, about 40 percent of students attended public schools, 45 percent voucher schools, which span religious, secular, Montessori, and Waldorf models among others, and the rest fully private institutions.

The school finance system was established during the 1980s reforms. Municipalities assumed responsibility for public schools, while private providers were allowed to enter the system with public funding. Core financing takes the form of a per-student subsidy (*Subvención Escolar*), which is conditional on verified monthly attendance. This basic voucher has been gradually complemented with additional components: higher transfers for rural schools, increments for boarding schools, and targeted subsidies for students

with special educational needs (IDB, 2015). In 2008, the Preferential School Subsidy (*SEP*) introduced an equity dimension, allocating higher funding for disadvantaged students, conditional on schools signing an improvement agreement and implementing a School Improvement Plan (IDB, 2015). The subsidy raised the voucher by about 50 percent for eligible students. Evaluations find test-score gains and narrower income gaps after its introduction (Correa et al., 2014; Murnane et al., 2017; Neilson, 2025), gains that Feigenberg et al. (2019) attribute largely to changes in the tested population, and no effect of eligibility on the schools that families choose (Aguirre, 2022). SEP resources may be used for instructional materials, professional development, psychosocial support, infrastructure improvements, and student well-being services, but not for base personnel salaries or general operating costs already covered by the regular voucher. Schools classified as high-performing enjoy greater autonomy in how they allocate SEP funds, while those with lower performance ratings face tighter oversight and prescribed spending targets.

Per-student revenue is therefore determined by a small set of observable factors: the base voucher, paid monthly on verified attendance and varying by level and type of education; increments for rurality, zone, and special educational needs; the SEP amount, which depends on the number of priority students and the school's concentration tier; special subsidies for maintenance, retention, and boarding; statutory remuneration transfers that pass through the school accounts; copayments where they persist and a gratuity contribution where they do not; and, for public schools, contributions from the municipal budget. Appendix Table A.2 quantifies these sources in our data. For urban public schools, the base voucher is 38 percent of income, voucher increments 21 percent, SEP 11 percent, statutory remuneration transfers 14 percent, and municipal contributions 4 percent. For urban private schools, the base voucher is 50 percent, SEP 11 percent, copayments 9 percent, and other own income and donations about 1 percent. Total income and total expenditure coincide closely in every group, so the spending we analyze is financed by the sources the accounts report.

For many years, voucher schools were also permitted to charge fees to parents. These charges allowed schools to combine public subsidies with private contributions but also created socioeconomic stratification. Empirical evidence shows that higher-income students clustered in voucher schools charging copayments, while lower-income students were concentrated in public schools (Elacqua, 2009; Hsieh & Urquiola, 2006; Mizala & Torche, 2012). Responding to concerns over equity and segregation, the 2015 Inclusion Law (Ley 20.845) prohibited for-profit operation among voucher schools, banned selective admissions, and began a gradual phase-out of copayments: existing charges were frozen in real terms and are reduced as a new per-student gratuity contribution grows, and schools that stop charging receive the contribution (IDB, 2015). Copayments were not eliminated during our sample period. In our panel, half of private urban schools reported copayment revenue in 2016 and 28 percent still did in 2022; for private urban schools as a group, copayment revenue fell from USD 234 per student in 2016 (12 percent of income) to USD 176 in 2022 (8 percent). A complementary reform in 2017 began transferring public school administration from municipalities to new Local Public Education Services (*SLEP*), designed to improve oversight and reduce disparities across municipalities.

Personnel rules differ by sector. Teachers in municipal schools are covered by the Teacher Statute (*Estatuto Docente*), which sets a national salary scale with seniority and qualification increments, regulates contract hours, and restricts dismissals; teachers in private voucher schools are hired under the general labor code, with pay and contracts set by each provider. The Teacher Career Law (Ley 20.903, published in April 2016) raised teacher salaries substantially and created a career ladder with pay tied to certified stages. Municipal teachers entered the system, and its new remuneration structure, in July 2017. Private voucher schools enter through annual voluntary application processes, open since 2017: the first cohort of 765 schools entered in July 2019, a second cohort of 786 schools in July 2020, further cohorts in later years, and all publicly funded schools must be incorporated by 2026. Education assistants in both sectors are hired under the general labor code

with a separate statute for the public sector. These rules mean that part of the sectoral differences in personnel spending documented below is set outside the school.

Schools have discretion over how to use general subsidies, but earmarked funds such as SEP must be spent according to program guidelines. Regulations define eligible uses and require schools to submit annual audited reports through the Ministry of Education's reporting platform. Since 2012, the Superintendency of Education has monitored compliance, with authority to demand restitution or impose sanctions in cases of misuse (IDB, 2015). The Quality Assurance Agency complements this oversight by linking resource use with learning outcomes and equity indicators.

Admissions policies were also restructured. Before 2015, many voucher schools selected students directly, reinforcing stratification. The Inclusion Law created the Centralized Admission System (SAE), which assigns students through a deferred-acceptance algorithm with lotteries to break ties in oversubscribed schools (Arteaga et al., 2022). The system was rolled out by region: it was piloted in Magallanes for the 2017 school year, extended to four more regions for 2018 and to all regions except the Metropolitan Region for 2019, and covered the whole country from the 2020 school year. In our panel, the share of schools admitting students through SAE was 1 percent in 2017, 23 percent in 2018, 75 percent in 2019, and 99 percent from 2020. Until their entry into SAE, publicly funded schools could still select applicants, which we take into account in the identification discussion of Section 4.2.

3 Data

Our analysis brings together several administrative datasets that cover nearly all publicly funded schools in Chile.

3.1 School Finance Data

We use audited annual reports of income and expenditures submitted by schools to the Ministry of Education between 2015 and 2022. These accounts disaggregate resources into detailed categories. On the income side, schools report all resources received during the year: the base subsidy, increments for special education needs (*PIE*), rurality, and zone adjustments, the targeted equity subsidy, earmarked funds such as maintenance grants and retention programs, statutory remuneration transfers, copayments charged to families (*financiamiento compartido*), other own income such as fees and rentals, donations from parents, institutions, and individuals, and, for public schools, municipal contributions. Transfers from the foundations or networks that operate private voucher schools enter as donations or other income; they are small in the aggregate (about 1 percent of private schools' income; Appendix Table A.2). Reported income and expenditure coincide closely, so the expenditure side covers spending from all these sources, including copayments. As a check on coverage, Appendix Table A.3 re-estimates the main specifications separately for public schools, private schools that never charged copayments, and private schools that did. On the spending side, we group the accounts into six categories that exhaust the budget: *personnel* (base salaries, statutory increments, allowances, social security contributions), *quality programs* (technical assistance, professional development, learning resources, pedagogical equipment), *student well-being* (uniforms, meals, transportation, health and psychosocial support, supplies), *operations* (utilities, security, general services), *infrastructure* (rentals, construction and maintenance, acquisition of assets), and a residual *other* category (transfers, taxes and municipal charges, financial items, and public-sector funds such as FAEP). Appendix Table A.1 lists the accounts in each category and subcategory with their average per-student amounts. Regulations require schools to classify all resources into these categories and to submit annual audited reports through the Ministry's online platform, which the Superintendency of Education monitors for

compliance. All monetary values are expressed in 2015 U.S. dollars.

3.2 Test-Score Data

We use student-level results from Chile’s national standardized assessment system (SIMCE) and the university entrance exam (PSU/PAES) to construct measures of test-score SVA. As SIMCE is applied in selected grades of basic and secondary education, while the exit exam is taken annually by 12th graders, the data allow us to estimate the academic value added for primary and secondary institutions. At the primary level, we follow cohorts from 4th to 6th grade, from 6th to 8th grade, and from 4th to 8th grade. At the secondary level, we construct SVA from 8th grade to 10th grade, from 10th grade to the exit exam, and from 8th grade to the exit exam. Table A.4 summarizes the pairs of grades and years for which the academic SVA can be constructed.

Because SIMCE is not administered every year in every grade, test-score SVA is observed only for specific cohort transitions, not annually. Section 4.1 describes the estimation.

3.3 Attendance, Chronic Absenteeism, and Dropout Records

We complement the test-score measures with SVA estimates for three non-cognitive outcomes drawn from annual enrollment and attendance records: attendance rate, chronic absenteeism (the proportion of students missing more than 10 percent of school days), and dropout rate. Unlike test scores, these outcomes are observed annually for every student enrolled in every school, yielding a balanced panel of school-year observations over the period 2015–2022.

An important distinction between the two types of SVA is worth emphasizing. Test-score SVA is identified from cohort-specific transitions between testing points; because SIMCE is not administered annually, SVA can only be computed for the particular cohort-grade-year combinations in which both a baseline and an endline test are observed. At-

tendance, chronic absenteeism, and dropout SVA, by contrast, are computed from an annual panel of all schools, exploiting year-to-year variation within schools. This difference in data structure has implications for the empirical strategy, which we discuss in Section 4.

3.4 Questionnaire-Based Indicators

The Agencia de Calidad constructs four school-level Personal and Social Development Indicators (IDPS) from the student and parent questionnaires administered with SIMCE: academic self-esteem and school motivation, school climate, civic participation and citizenship education, and healthy lifestyle habits, each on a 0–100 scale. They are published by school, grade, and year for the SIMCE grades (4th, 6th, 8th, and 10th) and, within our window, for 2015–2019 and 2022. Because they are school aggregates, they do not allow a value-added model with a prior-outcome control; we use them in Section 6.9.3 as additional outcomes in within-school regressions.

3.5 School, Student, and Teacher Administrative Records

We complement these data with administrative records on schools (enrollment, grade offerings, gender composition), students (socioeconomic distribution, demographic profiles), and teachers (number of teachers, contract type, qualification levels). These covariates allow us to benchmark schools by the populations they serve and to study heterogeneity in the relationship between spending and outcomes.

3.6 Panel Structure and Sample

A central strength of the data is its longitudinal dimension. We observe detailed spending, school outcomes, and demographics for up to eight years per school, enabling us to track trajectories of investment and to mitigate concerns that observed correlations simply reflect persistent differences across institutions. Our estimation sample restricts

attention to schools that offer basic or secondary education, have at least ten enrolled students, report per-student spending between USD 100 and USD 10,000, and appear in all eight years of the panel. These restrictions yield a balanced panel of approximately 6,000 schools observed annually between 2015 and 2022, which we use for the descriptive analysis. The regression analysis further restricts the sample to urban schools, about 4,300, because per-student spending in rural schools is dominated by fixed costs and rurality adjustments that vary little with school decisions (Section 5); rural schools account for 30 percent of schools but a much smaller share of students. We also drop the few school-year observations whose accounts are incomplete, in that they report only operational spending; they are all from 2022 and amount to less than 0.4 percent of each estimation sample.

4 Empirical Strategy

This section describes our empirical approach. We first define how school value added is estimated for each of the four outcome dimensions. We then present the specifications that relate spending composition to SVA, exploiting within-school variation over time. The SVA measures defined here are used in the descriptive analysis of Section 5 and in the regression results of Section 6.

4.1 School Value Added (SVA)

We estimate school value added (SVA) for four outcome dimensions: test scores (reading and math), attendance, chronic absenteeism, and dropout. The estimation approach is the same in all cases. We regress a student’s outcome on the student’s own prior outcome, extract school fixed effects, and apply empirical Bayes shrinkage. Lagged-outcome value-added models of this kind have been validated against experimental and lottery variation (Abdulkadiroğlu et al., 2020; Angrist et al., 2013, 2017; Chetty et al., 2014; D. J.

Deming, 2014; Kane & Staiger, 2008), although selection on unobserved dynamics can bias them (Rothstein, 2010). What differs is the data structure. Test scores are observed only in specific grades and years, so test-score SVA is estimated for cohort transitions between two testing points. Attendance, chronic absenteeism, and dropout are observed for every student every year, so their SVA is estimated annually.

4.1.1 Test-Score SVA

We estimate test-score SVA separately for math and reading using SIMCE microdata from 2015–2024 and PSU/PAES scores for the 12th-grade exit exam. Table A.4 lists the feasible transitions, which span two to four grades at the primary level (2nd to 4th, 4th to 6th, 6th to 8th, and 4th to 8th grade) and at the secondary level (6th to 10th, 8th to 10th, 8th to 12th, and 10th to 12th grade).

Following the literature on SVA (Andrabi et al., 2025; Angrist et al., 2017; Bau & Das, 2020; Chetty et al., 2014), for each transition τ (a baseline grade-year and an endline grade-year) and subject we estimate, on the sample of students tested at both points,

$$(1) \quad y_{is\tau} = \alpha_{\tau} y_{i\tau}^0 + \theta_{s\tau} + \varepsilon_{is\tau},$$

where $y_{is\tau}$ is the standardized endline score of student i in school s , $y_{i\tau}^0$ is the student's own standardized baseline score, and $\theta_{s\tau}$ is a school fixed effect. Estimating each transition separately lets the persistence coefficient α_{τ} vary across grades and horizons (Andrabi et al., 2025; Chetty et al., 2014). The school fixed effect captures the school's contribution to learning growth between the two tests. We center $\hat{\theta}_{s\tau}$ within each transition and apply empirical Bayes shrinkage, pulling the estimate toward zero in proportion to its sampling variance, with variance components estimated from a random-effects model for the same transition (Morris, 1983). The resulting SVA is in standard deviation units of the endline test and is observed at the school-by-transition level. Standard errors are

clustered by the student’s baseline school.

Because SIMCE is not administered annually in every grade, test-score SVA is observed only for specific cohort-transition combinations (e.g., 4th grade in 2016 and 6th grade in 2018). This cohort-based structure means that spending variables must be aligned with each transition, and the fixed effects in the spending equation must account for the transition structure rather than simple calendar years.

4.1.2 Attendance, Chronic Absenteeism, and Dropout SVA

For the three non-cognitive outcomes we apply the same student-level logic to an annual panel. On the pooled student-year data we estimate

$$(2) \quad y_{isgt} = \alpha a_{i,t-1} + \lambda_g + \theta_{st} + \varepsilon_{isgt},$$

where y_{isgt} is the outcome of student i in school s , grade g , and year t : the annual attendance rate, an indicator for chronic absenteeism (attendance below 90 percent), or an indicator for permanent exit from the school system (the student is not enrolled in any school in $t + 1$ and does not re-enroll through 2023; students in the terminal 12th grade are excluded). The control $a_{i,t-1}$ is the student’s own attendance rate in the previous year. It plays the role of the lagged test score in (1): it absorbs persistent differences in attendance behavior, so that schools serving students with poor prior attendance are not mechanically assigned lower SVA. λ_g are grade fixed effects and θ_{st} are school-by-year fixed effects, which constitute the raw SVA. Because attendance records begin in 2015, the estimation sample covers 2016 onward. Binary outcomes are estimated by linear probability models, as in Jackson (2018) and Jackson et al. (2020). As with test scores, we shrink the raw school-year effects with empirical Bayes weights and center them within each year. The chronic absenteeism and dropout measures are sign-reversed so that higher SVA always indicates a better outcome.

The annual panel structure of (2) has two implications for the spending analysis. First, spending is aligned with each school-year rather than with a cohort transition. Second, the identification of school effects exploits year-to-year variation within schools, which is more granular but potentially noisier than the cohort-to-cohort variation underlying test-score SVA. Section 6.9.1 re-estimates the three measures with the cohort structure of the test-score SVA and shows which results depend on this choice.

4.1.3 Attribution of Students to Schools and Treatment of Movers

Student mobility is high in Chile: about 15 percent of students attend a different school from the one they attended the previous year, and the share of a cohort that changes school between two testing points ranges from 9 percent for the 10th-to-12th grade transition to about one half for transitions that span the move from primary to secondary school. We treat movers in the same way in all four measures. Each student is attributed to the school in which the outcome is observed (the endline school for test scores, the school with the most attended days for attendance and chronic absenteeism, the school of enrollment for dropout), and the student's prior outcome enters as a control regardless of where it was obtained. This is the conventional treatment in the value-added literature (Chetty et al., 2014; Jackson et al., 2020; Kane & Staiger, 2008). Its cost is that, for transitions with many movers, part of the measured growth reflects the sending school. Two features of the design limit the concern: movers' baseline outcomes are controlled for, and the spending regressions use only within-school variation in SVA, so a school's SVA in one transition is compared with its own SVA in other transitions rather than with schools that receive different mixes of movers.

4.1.4 Compositional Interdependence Across Outcomes

The four outcomes interact through student composition. A school that retains students who would otherwise leave keeps students who attend less and score lower: stu-

dents who permanently exit the system after a given year attend 24 percentage points less than their schoolmates in that year. A school with high dropout SVA therefore holds a marginally more disadvantaged student body, which can depress its measured attendance and test-score SVA and make a category that reduces dropout look less productive for the other outcomes. Three considerations bound the concern. The mechanical effect is small: a school one standard deviation more effective at retention keeps about 2 percent more of its students, which lowers its mean attendance by at most 0.5 percentage points, one fifth of a standard deviation of attendance SVA. The observed correlations have the opposite sign from the one the channel predicts: across schools, dropout SVA is positively correlated with attendance SVA (0.36) and with reading and math SVA (0.35 and 0.25). And test-score SVA is computed only for students tested at both points. We flag the channel where it applies, in particular for classroom-teacher spending, which under the annual structure is positively associated with dropout SVA and negatively with attendance SVA (Section 6.9.1).

4.2 Relating Spending to SVA

Our primary interest is not only whether more resources improve outcomes, but *which types of spending matter most* and *for which dimensions of school effectiveness*. Schools face binding budget constraints, so understanding the effectiveness of different allocations, between teachers, support staff, materials, operations, or infrastructure, matters for policy. We therefore study the relationship between school effectiveness and the *composition* of spending, rather than focusing solely on levels.

4.2.1 Test-Score Specification

For test-score SVA, we measure spending as the average over the three years ending in the endline year of each transition, which is the full exposure window for two-year transitions and the final three years for longer ones. Denote per-student spending in category

k as $C_{st}^{(k)}$, with $k = 1, \dots, K$ exhausting the budget (personnel, quality programs, student well-being, operations, infrastructure, and other), where t indexes the cohort transition.

Our baseline specification is:

$$(3) \quad \text{SVA}_{st} = \sum_{k=1}^K \theta_k C_{st}^{(k)} + \beta' \mathbf{X}_{st} + \mu_s + \lambda_\tau + \epsilon_{st},$$

where $\mathbf{X}_{st}$ includes time-varying school covariates (enrollment, student composition), μ_s represents school fixed effects, and λ_τ represents transition fixed effects that absorb common shocks to all schools tested in the same grade-year combination. Transition fixed effects are essential because SIMCE is administered in different grades across different years; the cohort structure means that variation in the timing of testing must be absorbed to isolate the within-school spending association. The categories enter jointly and exhaust total spending, so no separate control for total spending is needed: $\hat{\theta}_k$ is the association between SVA and an additional dollar per student in category k holding spending in every other category fixed, and the difference $\hat{\theta}_k - \hat{\theta}_j$ is the association with reallocating a dollar per student from category j to category k at constant total spending. When we disaggregate within a category (staff types within personnel, subcategories within quality programs or student well-being), the subcategories of that domain enter jointly together with total spending per student, so that each coefficient is the association with a dollar more in the subcategory financed from outside the domain.

4.2.2 Non-Cognitive Outcome Specification

For attendance, chronic absenteeism, and dropout SVA, the annual panel structure permits a simpler specification:

$$(4) \quad \text{SVA}_{st} = \sum_{k=1}^K \theta_k C_{st}^{(k)} + \beta' \mathbf{X}_{st} + \mu_s + \lambda_t + \epsilon_{st},$$

where t now indexes calendar years and λ_t are year fixed effects. Because these outcomes are observed annually for all schools, the transition-specific fixed effects required for test scores are replaced by standard year fixed effects that absorb common annual shocks (e.g., pandemic disruptions in 2020–2021). The spending variables are averaged over a three-year window aligned with each school-year: the three years preceding the outcome year for attendance and chronic absenteeism, and the outcome year and the two preceding years for dropout. The windows differ for a reason. The voucher is paid on verified attendance, so a school’s spending in a given year responds mechanically to that year’s attendance; lagging the window for the attendance margins removes this channel. Dropout is defined as leaving the system after the outcome year, so that year’s resources are part of the relevant exposure and the window includes it. For test scores the window is the exposure of the tested cohort. Section 6.9.1 shows that using the test-score window for all outcomes leaves the main patterns unchanged, except for the dropout results discussed there.

4.2.3 Estimation and Inference

We estimate (3) and (4) separately by outcome on the urban schools of the balanced panel (Section 3). For test scores, the main tables report reading and the appendix reports math. We progressively disaggregate spending from the six broad categories (personnel, quality programs, student well-being, operations, infrastructure, and other) to six personnel subcategories (classroom teachers, administrative and paraprofessional staff, non-teaching professionals, instructional support teachers, school leadership, operational staff) and further to quality subcategories (educational technical assistance, staff professional development, courses and training outside ATE, learning resources, pedagogical support equipment) and well-being subcategories (uniforms and clothing, school meals, transportation, student support, medical appointments, sports programs, school supplies, and other well-being services).

All regressions cluster standard errors at the school level. Spending categories enter per student, in thousands of 2015 USD per student, so that $\hat{\theta}_k$ is the association between SVA and an additional USD 1,000 per student in category k . Test-score SVA is measured in standard deviations of the endline test; attendance, chronic absenteeism, and dropout SVA in percentage points. Our estimates should be interpreted as conditional associations rather than causal effects, though the within-school, over-time variation they exploit is substantially more demanding than cross-sectional comparisons.

4.2.4 Identifying Assumption and Balance Test

The within-school design identifies θ_k from changes in the composition of spending over time. The identifying assumption is that, conditional on the other categories, the controls, and the fixed effects, these changes are unrelated to other determinants of SVA. The main threat is that schools change the composition of their spending and the composition of their student body at the same time. This can happen mechanically, because targeted equity (SEP) resources scale with the number of priority students and can be spent only on eligible categories, or behaviorally, because schools respond to shifts in the population they serve or, before their entry into the centralized admission system between 2017 and 2020, select applicants. We assess this threat directly. We re-estimate (3) and (4) replacing SVA with measures of student composition: the shares of priority, preferential, and female students, log enrollment, and, for the test-score sample, the mean baseline score of the incoming cohort. Each coefficient then measures the within-school change in a composition variable associated with a change in a spending category, holding the other categories fixed. Section 6.9.4 reports the results.

5 Descriptive Patterns of Spending and School Effectiveness

This section documents how Chilean schools allocate resources and how these patterns relate to differences in school value added (SVA) across multiple outcome dimensions: test scores, attendance, chronic absenteeism, and dropout, using the SVA measures defined in Section 4.1. We begin by describing overall spending levels and composition, then compare schools with high and low value added separately for each outcome.

5.1 Baseline Patterns of School Spending

We begin by documenting the level and composition of school spending. Figures 1 and 2, Appendix Figures A.1 and A.2, and Table 1 summarize how resources evolve over time, how they are distributed across schools, and how schools allocate them across categories.

5.1.1 Spending Levels

Figure 1 plots per-student expenditure between 2015 and 2022, separating targeted equity funding (SEP) from discretionary funding and public from private voucher schools. Targeted equity spending grows slowly until 2019 and then plateaus, as expected from a program whose allocations depend mechanically on the number of priority students and which was not expanded during the period. Discretionary spending rises for both sectors but much faster in public schools, so the public–private gap in discretionary expenditure widens over time. Most of the secular rise in school funding comes from flexible, non-targeted subsidies.

Spending levels differ widely across schools (Appendix Figure A.1). Private urban schools have the lowest and most compressed distribution, centered near USD 2,000–2,500 per student; public urban schools center near USD 3,000; rural schools of both sec-

tors spend more, with public rural schools ranging from about USD 3,000 to 7,000 because of rurality adjustments and the fixed costs of small enrollments. The distributions overlap only partially, so the finance system produces distinct resource regimes by sector and geography. The regression analysis uses the urban schools, whose per-student spending averages USD 2,609 (Table 1, Panel E).

5.1.2 The Composition of School Budgets

Figure 2 shows how schools allocate their budgets across the six categories, by sector and area, in USD per student; Appendix Figure A.3 reports the corresponding shares and Appendix Table A.5 2015–2022 averages of both. Personnel is 80 to 85 percent of the budget in public schools and 65 to 75 percent in private schools, and the gap has widened: public personnel shares have been stable while private schools have shifted toward non-personnel spending. The remaining 15 to 35 percent is spread across several functions rather than concentrated in one: operations, infrastructure, and quality programs each average 4 to 6 percent of spending, and student well-being 2 to 3 percent.

Because total spending differs across sectors, shares and levels tell different stories. Among urban schools, public schools spend USD 2,833 per student against USD 2,127 in private schools, and the entire gap is personnel (USD 2,344 versus 1,529). The private orientation toward operations and infrastructure holds in levels as well as in shares: private urban schools spend USD 158 per student on operations and USD 234 on infrastructure, against USD 95 and 40 in public urban schools, so a larger share of a smaller budget still buys more. Quality programs are the same size in both sectors in levels (about USD 100 per student in urban schools), and student well-being is similar across urban sectors (USD 55 versus 41). The residual “other” category is larger in public schools (USD 199 versus 66) because it includes transfers and public-sector items such as FAEP funds that private providers do not book. Public schools show a temporary rise in personnel shares around 2020, when school closures constrained non-personnel procurement.

Within personnel (Appendix Figure A.2), classroom teachers account for 63 percent of spending in public urban schools and 59 percent in private urban schools. Private schools devote a larger share to school leadership (9.6 versus 5.6 percent) and slightly more to non-teaching professionals, but in per-student levels the comparison reverses for every staff type except leadership, where the two sectors are nearly identical (USD 130 versus 137), because the public personnel budget is about USD 900 per student larger. The higher public share for classroom teachers reflects a much larger classroom-teacher payroll per student (USD 1,473 versus 836), not a leaner support structure.

5.1.3 Headcounts versus Pay

The spending differences across sectors could reflect more staff per student, higher pay, or both. We merge the school accounts with the Ministry of Education's staff records, which report contract hours for every teacher and education assistant, convert hours into full-time equivalents (FTE, 44 hours per week), and decompose remuneration per student into FTE per student and remuneration per FTE. Table 2 reports both components by sector and area, averaged over 2015–2022, with a log decomposition of the urban public–private gap.

Quantities dominate. Public urban schools employ 5.5 classroom-teacher FTE per 100 students against 3.8 in private urban schools, 47 percent more, and pay 18 percent more per FTE (USD 26,700 versus 22,700 a year); of the 0.55 log-point gap in classroom-teacher spending per student, 70 percent is staffing and 30 percent pay. For administrative and paraprofessional staff and for instructional support teachers, pay per FTE is nearly identical across sectors and the entire gap is staffing. For non-teaching professionals, public schools employ 84 percent more FTE per student but pay 26 percent less per FTE. School leadership is the one staff type where private schools pay more, USD 43,100 per FTE against 30,300, with fewer leadership FTE per student, so that leadership spending per student is the same in both sectors. These patterns follow the institutional rules of Sec-

tion 2: the Estatuto Docente sets a seniority-based scale for municipal teachers, whereas private voucher schools, under the general labor code, pay a premium for principals and professionals and economize on support staff. For the regression analysis, the decomposition implies that within-school variation in personnel spending mixes changes in staffing with changes in pay, so the personnel coefficients should be read as the association with total payroll.

5.1.4 Institutional Rules and the Room for Discretion

Two sets of rules shape composition from outside the school: the personnel rules just described and the targeted equity subsidy, whose amount scales with the number of priority students and which can be spent only on eligible categories. Table 3 asks how much of the variation in budget shares these rules account for. For each category we report the R^2 of the share on sector-by-area indicators, then on those indicators plus the mechanical funding drivers (the shares of priority and SEP-beneficiary students, log enrollment, and region and year effects), then on school fixed effects, and finally the within-school R^2 of the funding drivers; the last three columns split the variance of each share into between-group, between-school-within-group, and within-school components.

The rules explain a modest part of the cross-sectional variation and almost none of the variation over time. Sector and area explain 16 percent of the variance of the personnel share and 36 percent of the infrastructure share, but only 2 percent for quality programs and 7 percent for operations. Adding the funding drivers raises the explained share to between 9 and 39 percent, with the largest gains for student well-being (from 15 to 26 percent) and quality programs (from 2 to 12 percent), the categories toward which SEP earmarks channel resources. The expense records by funding source confirm the earmark (Appendix Table A.6): SEP finances 81 percent of quality-program spending and 63 percent of student well-being spending, against 12 percent of personnel spending. Seen from the other side, the subsidy is mostly a personnel fund: 53 percent of SEP spending

goes to personnel, 21 percent to quality programs, 18 percent to operations, and 4 percent to student well-being, in both sectors. Persistent school differences are much larger than the rules: school fixed effects explain 37 to 71 percent of the variance in shares, and the within-school component, which the regressions of Section 6 use, accounts for 29 to 63 percent of the total variance, of which the funding drivers explain at most 2 percent. Year-to-year reallocation within a school is therefore not a mechanical response to changes in SEP entitlements or enrollment; it reflects decisions taken at the school or provider level, together with reporting noise, which we cannot separate.

The sectoral pay rules are visible in the data. Figure 3 plots remuneration per classroom-teacher FTE by sector. Public urban schools paid USD 24,500 per FTE in 2015–2016, 7 percent more than private urban schools; with the entry of municipal teachers into the new career law in July 2017, public pay rose to USD 26,300 in 2017 and USD 28,300 in 2019, a 15 percent increase over 2015, whereas private pay rose by 3 percent over the same years and moved up only in 2020, when the first cohorts of private voucher schools had entered the career system. The staggered rollout generates a sector-specific trend in personnel spending that year fixed effects absorb only on average, which is one reason Section 6 reports the public and private samples separately.

5.2 Between-School Patterns and the Case for Within-School Variation

Before turning to within-school estimates, Appendix Table A.7 compares spending between schools grouped into terciles of their mean SVA over the period. First, effective schools are not richer. In raw terms, high-SVA schools spend USD 150 to 510 less per student than low-SVA schools, because they are larger and enroll fewer priority students; once we condition on sector, PIE participation, enrollment, the number and share of priority students, and region, the difference in total spending is zero for every outcome, and the difference in personnel spending is zero for test scores and dropout and negative for the attendance margins (USD –47 to –88). Second, effective schools spend differently,

but the between-school pattern does not survive within schools. High-SVA schools spend USD 9 to 17 more per student on quality programs whichever outcome defines effectiveness; they spend less on student well-being when effectiveness is measured by test scores or retention (USD -7 to -14) and more when it is measured by attendance or chronic absenteeism (USD 10 to 17). The fixed-effects estimates of Section 6 find no association between well-being spending and test-score SVA, and an association of quality programs with test scores only in math and in the most disadvantaged schools. The between-school signs are what compensatory allocation produces: schools serving students with greater socioemotional needs spend more on well-being and post lower learning gains for reasons the covariates do not capture. This is why the paper identifies the spending–SVA associations from within-school variation, and why Section 6.9.4 tests whether within-school changes in spending composition are balanced with respect to student composition.

6 Results

This section presents the estimates from the empirical strategy described in Section 4. We organize the results by level of disaggregation, moving from the six broad spending categories, entered jointly, to personnel subcategories and then to quality and well-being subcategories, and present results for all four outcome dimensions throughout: test scores (reading in the main tables; math in Appendix Figures A.5 and A.6), attendance, chronic absenteeism, and dropout. All spending variables are per student, in USD 1,000 at 2015 prices. Because the smaller categories average between USD 50 and USD 130 per student (Panel B of Table 4), we describe magnitudes for an additional USD 100 per student, one tenth of the tabulated coefficient, and compare them with the dispersion of SVA across schools: 0.14–0.15 standard deviations for test scores, 2.8 percentage points for attendance, 12.7 for chronic absenteeism, and 2.2 for dropout.

As a starting point, Appendix Figure A.7 relates SVA to aggregate spending. Total

spending per student is positively associated with test-score SVA (0.039 standard deviations per USD 1,000 in reading, 0.045 in math) and with dropout SVA (0.35 percentage points), and is unrelated to attendance and chronic absenteeism. The associations are small: a school that raises spending by USD 1,000 per student, a third of the average budget, moves its test-score SVA by less than a fifth of a standard deviation of SVA. Splitting the total by funding source, targeted equity (SEP) and discretionary spending have opposite signs for the attendance margins, with discretionary spending negatively associated with attendance and absenteeism SVA and SEP spending weakly positive. These aggregate patterns are weak enough to motivate examining the internal composition of spending.

6.1 Broad Spending Categories

Table 4 and Figure 4 report the estimates of (3) and (4) with the six categories that exhaust the budget entered jointly: personnel, quality programs, student well-being, operations, infrastructure, and the residual “other” category. Each coefficient is the association between SVA and an additional USD 1,000 per student in the category, holding spending in the other five fixed.

For test scores, two categories are associated with SVA. Personnel spending is positively associated with reading and math SVA (0.004 and 0.005 standard deviations per USD 100), and infrastructure spending with reading SVA (0.009 standard deviations per USD 100). Quality programs are positively associated with math SVA (0.013 standard deviations per USD 100) but imprecisely with reading. Student well-being, operations, and the residual category are unrelated to test scores. For the attendance margins, the picture is different: operations spending, which covers day-to-day running costs, utilities, security, and general services, has the strongest association, with USD 100 per student corresponding to 0.12 percentage points of attendance SVA and 0.45 percentage points of chronic-absenteeism SVA, both significant at the one-percent level; infrastructure is also

positively associated with both (0.07 and 0.30 percentage points per USD 100). The attendance association matches the effect of new facilities on attendance in Lafortune and Schönholzer (2022). Personnel, quality programs, and well-being are unrelated to attendance and absenteeism. For dropout, personnel spending is the category that matters (0.05 percentage points per USD 100, significant at the one-percent level), with a weaker positive association for operations.

The two categories toward which the targeted equity subsidy channels resources therefore fare differently. Quality programs are associated with higher test-score SVA in math and, less precisely, in reading, but not with the attendance margins or dropout in the annual specification; when the non-cognitive SVA are built with the cohort structure of the test-score measures (Section 6.9.1), quality programs become positively associated with all three, so this null is not robust to the construction of the outcome. Student well-being shows no robust association with any of the four SVA measures. We do not find the negative association between well-being spending and test-score SVA that the descriptive tercile comparisons of Section 5 suggested: within schools, well-being spending is unrelated to test-score SVA and weakly positively related to the non-cognitive measures. Both categories are small budget lines with limited within-school variation, which limits precision.

Magnitudes are modest. In the test-score sample, the within-school standard deviation of per-student personnel spending is USD 225 and that of infrastructure spending USD 57, so one within-school standard deviation of either corresponds to 0.010 and 0.005 standard deviations of reading SVA, 7 and 4 percent of its dispersion across schools. In the annual sample, the within-school standard deviation of operations spending is USD 59, which corresponds to 0.07 percentage points of attendance SVA and 0.27 percentage points of chronic-absenteeism SVA, 2 to 3 percent of their dispersion; one within-school standard deviation of personnel spending (USD 222 in the dropout sample) corresponds to 0.11 percentage points of dropout SVA, 5 percent of its dispersion.

6.2 Personnel Subcategories

Table 5 and Figure 5 disaggregate personnel spending into six staff types, entered jointly and controlling for total spending per student; the sample is smaller because it requires a positive remuneration entry for every type, and instructional support teachers are reported by fewer than half of the schools. Classroom-teacher spending carries the personnel–test-score association: an additional USD 100 per student in classroom-teacher remunerations corresponds to 0.011 standard deviations of reading and math SVA. Evidence that teacher pay itself raises achievement is mixed: positive under wage regulation in England and under flexible pay in Wisconsin (Biasi, 2021; Britton & Propper, 2016), absent for an unconditional doubling of pay in Indonesia (de Ree et al., 2018). Instructional support teachers, the pedagogical specialists funded largely through the targeted equity subsidy, show a larger coefficient (0.019 standard deviations per USD 100 in reading, 0.030 in math), significant at ten and five percent. No other staff type is associated with test scores.

The personnel–dropout association also operates through classroom teachers (0.13 percentage points per USD 100) and instructional support teachers (0.25 percentage points), with a weaker association for administrative and paraprofessional staff. Classroom-teacher spending is, however, negatively associated with attendance and chronic-absenteeism SVA (0.06 and 0.38 percentage points per USD 100), a pattern consistent with the compositional interdependence discussed in Section 4.1: schools that retain marginal students keep students who attend less. We return to the robustness of the dropout result in Section 6.9.1. Non-teaching professionals, the psychologists, social workers, and counselors, are negatively associated with attendance SVA (0.14 percentage points per USD 100), the one staffing result that points to compensatory allocation: these professionals are deployed where attendance problems are greatest. Quasi-random assignment of counselors in the United States finds positive effects on behavior and attainment (Mulhern, 2023;

Reback, 2010), which supports the compensatory reading. School leadership and operational staff are unrelated to any outcome in the pooled sample; Bloom et al. (2015) likewise find that management practices, rather than leadership pay, distinguish effective schools.

6.3 Quality and Well-Being Subcategories

Appendix Tables A.8 and A.9 decompose the two earmarked categories into their subcategories, entered jointly. Within quality programs, learning resources are positively associated with math SVA (0.023 standard deviations per USD 100) and, less precisely, with reading SVA, in line with the textbook-funding effect in Holden (2016); technical assistance is positively associated with dropout SVA (0.31 percentage points per USD 100); and staff professional development is negatively associated with attendance and chronic-absenteeism SVA, a compensatory pattern that is stronger in public schools. The components most tightly connected to classroom instruction are the ones associated with test scores, but the estimates are imprecise and none is significant for reading. Within student well-being, the subcategories associated with attendance and lower chronic absenteeism are those that remove barriers to attending school: school supplies (0.81 and 3.7 percentage points per USD 100), sports programs, and medical appointments (4.0 and 13.7 percentage points, on a category that averages USD 1 per student); transportation is associated with retention; no subcategory is significant for reading. The subcategory results explain why the aggregate well-being coefficient is small: the category bundles items with different functions, several of which support attendance without registering in test scores.

6.4 Public versus Private Schools

Table 6 and Appendix Figures A.8–A.11 examine whether the spending–SVA associations differ by school sector, estimating (3) and (4) separately for public and private voucher schools.

Some associations are common to both sectors. Personnel spending is positively associated with test-score SVA in both (0.003 standard deviations per USD 100 in public schools, 0.006 in private schools) and with attendance SVA in both. Others belong to one sector only, and a few have opposite signs. Quality programs and student well-being are positively associated with test-score SVA in public schools (0.019 and 0.030 standard deviations per USD 100) and unrelated in private schools; within quality programs, learning resources are significant in public schools only (Appendix Table A.10). Operations spending is negatively associated with test-score SVA in public schools (0.015 per USD 100) and positively in private schools (0.012, at ten percent), while for the attendance margins and dropout it is positively associated in public schools only (0.19 percentage points of attendance, 0.54 of chronic absenteeism, and 0.18 of dropout SVA per USD 100). Infrastructure spending is positively associated with test-score SVA in private schools only (0.011 per USD 100) and negatively with attendance SVA in public schools. Student well-being is positively associated with attendance and chronic-absenteeism SVA in private schools only (0.25 and 1.5 percentage points per USD 100).

Within personnel (Appendix Table A.11, Appendix Figure A.12), administrative and paraprofessional staff are positively associated with attendance and chronic-absenteeism SVA in public schools only, consistent with administrative capacity being a binding constraint where bureaucratic demands on principals are higher. Non-teaching professionals are negatively associated with attendance SVA in public schools and positively with chronic-absenteeism SVA in private schools. School leadership is positively associated with attendance SVA in private schools, the one staff type for which private schools spend more per student than public schools (Section 5). Instructional support teachers are positive for test scores in public schools but imprecisely estimated. Among well-being subcategories (Appendix Table A.12), school supplies are associated with higher attendance SVA in both sectors, and medical appointments and the residual well-being category with higher test-score SVA in public schools.

The sector contrast is consistent with the institutional differences documented in Section 5. Public schools operate under the Teacher Statute, spend more per student on every staff type except leadership, and channel a larger share of discretionary resources through quality programs; private schools pay a premium for leadership and professionals and spend more on operations and infrastructure. The same dollar buys different things in the two sectors, and for operations and infrastructure the pooled estimates average associations of opposite sign. We treat the sector-specific estimates as the more informative ones.

6.5 Heterogeneity by Student Composition and Baseline Spending

Biasi et al. (2025) show that the return to a spending category depends on the population served and on the resources already in place. Table 7 and Appendix Table A.13 examine this margin by splitting the urban schools into terciles of the 2015 share of priority students and of 2015 spending per student, and re-estimating the joint specification within each tercile; Panel D of each table tests the difference between the high and the low tercile.

The associations with test-score SVA depend on whom the school serves. In the tercile with the fewest priority students, personnel and infrastructure spending are the categories associated with reading SVA (0.089 and 0.080 standard deviations per USD 1,000), and quality programs and student well-being are not. In the tercile with the most priority students the pattern reverses: personnel is a third as large and imprecise (0.025), infrastructure is zero, and quality programs (0.211) and student well-being (0.256) are the categories associated with reading SVA. The personnel difference across terciles is significant at five percent; the others are not, because the well-being coefficients are imprecise in the advantaged tercile. The two categories that the targeted equity subsidy favors are therefore associated with test scores where the subsidy concentrates them, in the most disadvantaged schools, and not elsewhere. Baseline spending matters less for test scores:

personnel is associated with reading SVA in the middle and high spending terciles, quality programs in the high tercile, and no difference between the high and the low tercile is significant.

For the attendance margins the composition of the student body matters more than the level of resources. Student well-being spending is negatively associated with attendance SVA in the most advantaged tercile and positively in the most disadvantaged one (4.0 percentage points per USD 1,000), a difference of 10 percentage points significant at one percent; the same sign pattern appears by baseline spending. Operations spending is associated with attendance and lower chronic absenteeism only in the disadvantaged tercile. By baseline spending, infrastructure is associated with attendance and lower absenteeism only in the low-spending tercile, where the stock is presumably lowest, and the difference with the high tercile is significant.

For dropout, the personnel association is concentrated in advantaged and low-spending schools: 2.2 percentage points per USD 1,000 in the tercile with the fewest priority students against 0.1 in the tercile with the most, and 0.7 against 0.0 by baseline spending, both differences significant at one percent. Operations spending is associated with retention only in the disadvantaged and high-spending terciles. Within personnel (staff-type estimates by tercile are available on request), the attendance associations of operational staff and of administrative and paraprofessional staff are confined to the advantaged tercile, and that of school leadership to the low-spending tercile.

Two caveats apply. Splitting the sample in three multiplies the number of coefficients, and several of the within-tercile estimates are imprecise; we therefore emphasize the differences that survive the high-minus-low test. And the two dimensions are correlated: 59 percent of the schools in the high tercile of priority students are in the high tercile of spending, and 84 percent of those in the low tercile of priority students are in the low or middle tercile of spending, so they are not independent sources of heterogeneity.

6.6 Earmarked versus Discretionary Dollars

The targeted equity subsidy finances four fifths of quality-program spending and two thirds of well-being spending, but half of the subsidy itself goes to personnel (Appendix Table A.6). The expense records by funding source therefore allow a more precise version of the earmark question: does a dollar of SEP money predict value added differently from a dollar of discretionary money spent on the same category? Appendix Table A.14 re-estimates the joint specification with personnel, quality programs, and student well-being each split into their SEP-financed and other-financed parts, with all spending built from the source records.

The answer differs by margin. For attendance and chronic absenteeism, the positive associations run through SEP-financed spending. SEP-financed personnel is associated with 4.0 percentage points of attendance SVA and 24.6 points of chronic-absenteeism SVA per USD 1,000, while personnel financed from other sources is negatively associated with both (−1.3 and −4.7), and the two coefficients differ at the one-percent level; SEP-financed well-being is positively associated with both margins (9.8 and 42 points) and discretionary well-being is not; discretionary quality-program spending is negatively associated with chronic-absenteeism SVA. For test scores and retention the pattern reverses: discretionary quality-program spending is associated with reading SVA (0.49 standard deviations per USD 1,000) and its SEP-financed part is not, and discretionary personnel is associated with retention (0.58 percentage points) while SEP-financed personnel is not, with equality rejected at five percent for personnel.

We read these estimates with two cautions. SEP-financed spending moves with the number and concentration of priority students, and although the specification controls for the number and share of priority students, changes in the concentration tier that raise the per-student subsidy are not absorbed, so the SEP coefficients may partly reflect changes in the student body that the balance test of Section 6.9.4 associates with SEP-eligible cate-

gories. And the source records exist at the level of parent accounts and for 2015–2021, so the attendance sample shrinks to the years with complete windows. With these caveats, the split says that what the earmark buys on the attendance margins is the SEP-financed part of personnel and well-being, most plausibly the assistants and psychosocial teams that SEP plans hire, whereas the associations with learning and retention come from dollars the school allocates at its discretion.

6.7 Summary of Results and Interpretation

Table 8 summarizes the direction and significance of the associations. First, the composition of spending is informative beyond its level, and no category is associated with all four outcomes. Second, the categories associated with test-score value added are personnel, through classroom teachers and instructional support teachers, infrastructure, and, in math, quality programs; the categories associated with attendance and lower chronic absenteeism are operations and infrastructure; and the category associated with retention is personnel. Student well-being, the other category that policy earmarks favor, shows no robust association with any SVA measure. Third, the associations are outcome-specific in ways that single-outcome evaluations would miss: operations spending predicts attendance but not test scores, and classroom-teacher spending predicts retention but lower attendance. Fourth, the associations differ by sector, with opposite signs for operations and infrastructure in public and private schools, so that pooled estimates understate what spending composition predicts within each sector.

These results should be read as conditional associations, and their magnitudes are small relative to the dispersion of school effectiveness. One standard deviation of within-school variation in the most predictive categories moves SVA by 2 to 7 percent of its cross-school standard deviation. Section 6.9 examines whether the results depend on how the non-cognitive measures are constructed, on the two-step estimation, and on the outcome set, and whether within-school spending changes are related to student composition.

6.8 What the Disaggregated Accounts Add

The literature on school spending observes, at most, the level of per-pupil expenditure. Table 9 quantifies what the disaggregated accounts add to that information in three ways, on the samples of Table 4.

Panel A tests the restriction under which the joint specification collapses to the aggregate one: that the six category coefficients are equal, so that a dollar is a dollar regardless of where it is spent. The test rejects for every outcome, at the five-percent level for reading and at the one-percent level for attendance, chronic absenteeism, and dropout (math rejects at ten percent). Among the six staff types, equality is rejected only for attendance, where classroom teachers and non-teaching professionals are negatively associated with attendance SVA and administrative and paraprofessional staff positively.

Panel B shows what the aggregate coefficient averages. Following Gelbach (2016), the coefficient of total spending, δ , equals $\sum_k \theta_k \Gamma_k$ exactly, where θ_k is the category coefficient of Table 4 and Γ_k is the share of a marginal within-school dollar that goes to category k . That share is 66 to 76 percent for personnel, 6 to 8 percent for infrastructure, and 10 to 18 percent for the residual category, so δ is essentially the personnel coefficient scaled down. For reading, personnel accounts for 0.034 of the 0.039 standard deviations per USD 1,000, infrastructure for 0.006, and the “other” category subtracts 0.004; quality programs and student well-being contribute nothing because they receive almost none of the marginal dollar. For attendance, δ is a null of 0.10 percentage points that averages positive contributions of personnel, operations, infrastructure, and well-being against negative contributions of quality programs and the residual category. For dropout, personnel again accounts for all of δ . An aggregate coefficient therefore measures the productivity of personnel spending in this setting and says nothing about the categories that policy earmarks target.

Panel C reports the within-school R^2 of nested specifications. All are small, as ex-

pected for shrunken value added regressed on spending, so we read them relative to each other. Net of the controls, moving from total spending to the six categories raises the explained within-school variance of SVA by 70 percent for reading, by half for math, and by 130 percent for dropout; for attendance and chronic absenteeism, total spending explains nothing and the six categories explain 0.2 percentage points of the within-school variance. On the subsamples where the finer accounts are available, adding the quality and well-being subcategories or the six staff types raises the explained variance further, most for dropout. The disaggregation thus adds information at every level, and most of what spending predicts about SVA is predicted by its composition rather than its level.

6.9 Robustness and Balance

6.9.1 A Cohort-Based Structure for the Non-Cognitive Outcomes

The test-score and non-cognitive SVA measures differ in structure, cohort transitions versus annual school-by-year effects, and a central claim of the paper is that the associations are outcome-specific. We therefore re-estimate attendance, chronic absenteeism, and dropout SVA with exactly the cohort structure of the test-score measures (the transitions of Appendix Table A.4, students observed at both points, baseline attendance as the prior-outcome control, endline-school effects, shrinkage within transition), with dropout defined as permanent exit between baseline and endline attributed to the baseline school, and re-run the spending regressions with the test-score specification (Appendix Table A.15; staff-type estimates available on request). For attendance and chronic absenteeism the results are robust: operations and infrastructure are positively associated with both measures under either structure, and classroom-teacher spending negatively with attendance. The cohort structure adds a positive association of quality programs with all three non-cognitive measures, so it gives the earmarked categories a more favorable reading than the annual measures do. For dropout the results are not robust:

the personnel and classroom-teacher associations disappear under the cohort structure, which captures cumulative exit over a two- to four-year window rather than exits in a given year. We therefore do not treat the association between staffing expenditures and retention as a robust finding.

6.9.2 One-Step Specification

The two-step procedure shrinks noisy school effects, but the shrinkage and the school-level second stage could shape the results. We also regress the student-level outcome directly on spending, controlling for the student's own prior outcome, total spending, the main controls, grade fixed effects for the annual outcomes, and school and period fixed effects (Appendix Table A.16). The two approaches give the same answer: signs coincide in every cell that is significant in either specification, and the one-step coefficients are somewhat larger, as expected when the outcome is not shrunk toward zero (personnel and reading SVA, 0.059 versus 0.044 standard deviations per USD 1,000; infrastructure, 0.155 versus 0.089; personnel and retention, 0.9 versus 0.5 percentage points).

6.9.3 Questionnaire-Based Outcomes

We also use four school-level indicators from the SIMCE questionnaires as outcomes: academic self-esteem and motivation, school climate, civic participation, and healthy habits, standardized within grade and year and regressed on spending averaged over the three years ending in the survey year, with school and grade-by-year fixed effects and the main controls (Appendix Table A.17); no prior-outcome control is available, so these associations deserve more caution. Total spending per student is associated with all four indicators (0.11 to 0.20 standard deviations per USD 1,000), and the composition results are the mirror image of those for SVA: personnel, quality programs, and student well-being are associated with the indicators (0.14 to 0.47 standard deviations per USD 1,000), whereas operations and infrastructure, the categories most consistently associated with

attendance and test-score SVA, are unrelated to all four. The categories that the subsidy favors, and that the SVA regressions rate as unproductive for attendance, are the ones associated with how students and parents report experiencing the school.

6.9.4 Balance

Table 10 reports the balance test of Section 4.2 for the test-score sample and Appendix Table A.18 for the annual sample; spending regressors are per student and standardized, so each coefficient is the within-school change in a composition variable associated with a one-standard-deviation increase in the category, holding the other five fixed. Spending composition is not orthogonal to socioeconomic composition or school size: a one-standard-deviation increase in quality-program or personnel spending is associated with a 2.1 to 2.2 percentage point higher share of priority students, and the six category coefficients are jointly significant for the shares of priority and preferential students and for log enrollment. These associations follow from the funding rules (SEP resources scale with priority students and can be spent only on eligible categories) and from the per-student denominator, and they are the reason the main specification controls for enrollment and for the number and share of priority and preferential students. The two composition variables that the formula does not govern behave differently. Gender composition is unrelated to every category (joint p -value of 0.62, 0.70 with controls). The baseline achievement of incoming cohorts is related to spending composition only through personnel, by 0.04 (reading) to 0.06 (math) standard deviations per standard deviation of spending, with the other five coefficients below 0.011 and insignificant; because SVA conditions on each student's own prior score, this association would bias the estimates only if it proxied for unobserved determinants of learning growth. Within-school variation in spending composition is thus not random, but its non-random component is concentrated in observables that the specification controls for. The balance test does not address reverse causality from SVA to spending, which we discuss next.

6.10 Caveats

Several caveats remain. First, contemporaneous SVA may influence current spending choices (reverse causality). Schools experiencing declines in performance may redirect spending toward student well-being or security services. Second, omitted time-varying factors, such as leadership changes, neighborhood shocks, or municipal budget reallocations, may affect both expenditures and SVA. Third, many spending categories likely operate with lags. Infrastructure, professional development, and staffing changes may affect outcomes only after several years, whereas our fixed-effects specification captures relatively short-run associations. Fourth, the outcomes are compositionally interdependent (Section 4.1.4): retaining marginal students lowers measured attendance and test-score SVA, so negative associations for categories that reduce dropout should be read with this in mind. Finally, measurement error in expenditure reporting may bias estimates toward zero if it varies within schools over time. The fact that the spending–SVA associations differ systematically across outcome dimensions provides some additional reassurance against generic confounders, as a simple omitted variable would need to generate outcome-specific patterns matching the detailed category-level associations we document.

The estimates should therefore be read as short-run, within-school associations rather than as the causal effect of reallocating a dollar.

7 Conclusion

This paper documents how the composition of school spending relates to multiple dimensions of school effectiveness. Using a new national panel of audited, highly disaggregated expenditure data linked to shrinkage-adjusted measures of school value added (SVA) for test scores, attendance, chronic absenteeism, and dropout, we document how schools allocate their resources across dozens of functional categories and how these allo-

cations correlate with student outcomes along cognitive and non-cognitive margins. The panel itself is a contribution: it covers the universe of publicly funded schools for eight years, records spending in 37 subcategories at the school level, and pairs it with value-added measures estimated with the tools of Chetty et al. (2014) and Angrist et al. (2017). No existing dataset observes the composition of spending and several validated measures of effectiveness for the same schools over time, and this one can support the causal designs we leave for future work.

First, schools exhibit substantial and persistent heterogeneity in spending composition, even among institutions with similar total resources and student demographics, and the funding rules explain only a modest part of it. Second, within schools, the composition of spending is informative beyond its level: personnel spending, through classroom and instructional support teachers, and infrastructure are associated with higher test-score value added; operations and infrastructure with higher attendance and lower chronic absenteeism; and personnel with lower dropout. Of the two categories that policy earmarks favor, quality programs are associated with test-score value added in math and in public schools, and student well-being with no value-added measure, although it is associated with how students and parents report experiencing the school. Third, the associations are outcome-specific and, for dropout, sensitive to how value added is constructed, so that no category improves every margin and single-outcome evaluations mischaracterize the productivity of specific expenditures. Fourth, the associations differ by sector, with several coefficients of opposite sign in public and private voucher schools, consistent with the different rules under which the two sectors hire staff and allocate discretionary funds, and with the population served: quality programs and student well-being are associated with test scores only in the most disadvantaged tercile of schools, where the targeted equity subsidy concentrates them.

These findings carry two implications. The first is methodological: single-outcome analyses of school spending, which dominate the literature, risk mischaracterizing the re-

turns to specific expenditure categories. A spending category that appears unproductive in terms of test-score gains may nonetheless support student engagement and retention. Evaluating school spending on several outcomes is therefore necessary for a complete accounting of how resources translate into educational outcomes.

The second implication is for policy. Basic operations and infrastructure, which the targeted equity subsidy does not prioritize, are the categories most consistently associated with attendance and, for infrastructure, with learning, whereas student well-being, which the subsidy favors, is associated with school climate and motivation but with no value-added measure, and quality programs with test scores in math and in public schools only. Our estimates are not causal and their magnitudes are small, so they do not establish that earmarks are misdirected; but they suggest that evaluations of earmarking rules should look at attendance and retention margins, at questionnaire-based indicators, and at each sector separately, rather than at test scores alone. The expense records by funding source add a qualification: the SEP-financed parts of personnel and well-being spending are the ones associated with attendance and lower absenteeism, whereas the associations with learning and retention run through dollars the school allocates at its discretion.

Because our estimates are not causal, they should be interpreted as patterns that inform rather than substitute for causal identification. Future work will exploit quasi-experimental variation from Chile's centralized admissions system, which assigns students through tie-breaking lotteries, to estimate the causal effects of spending composition on multidimensional school value added. Additional extensions include examining heterogeneous effects across school types, studying the dynamic returns to sustained investments in instructional quality, and testing whether the spending–effectiveness associations documented here extend to long-run outcomes such as educational attainment and labor market participation.

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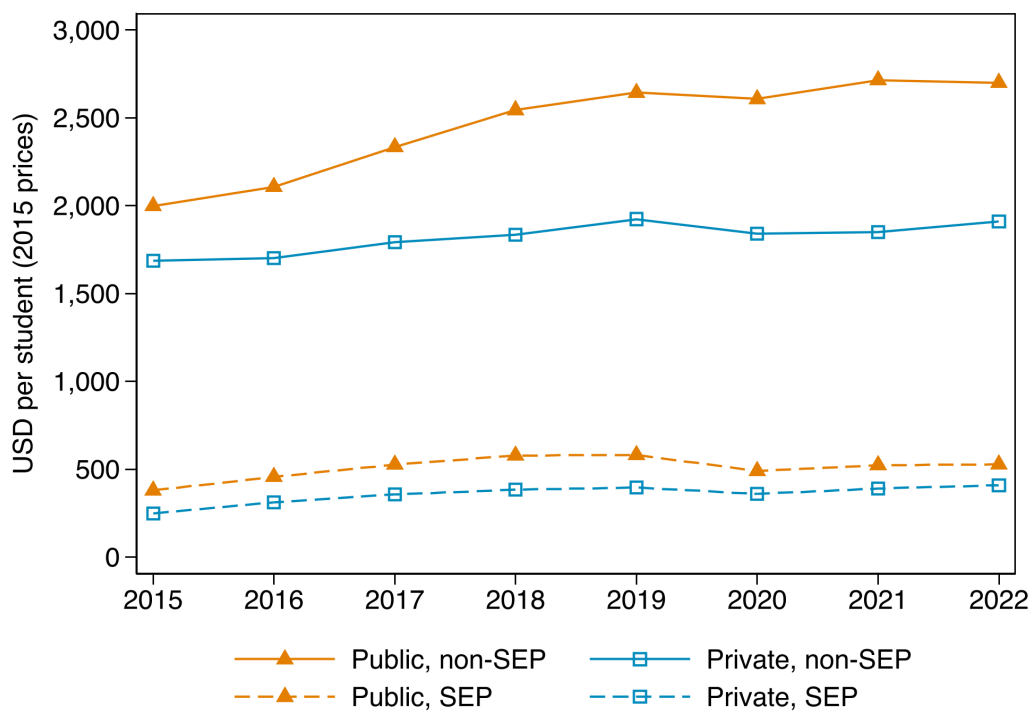
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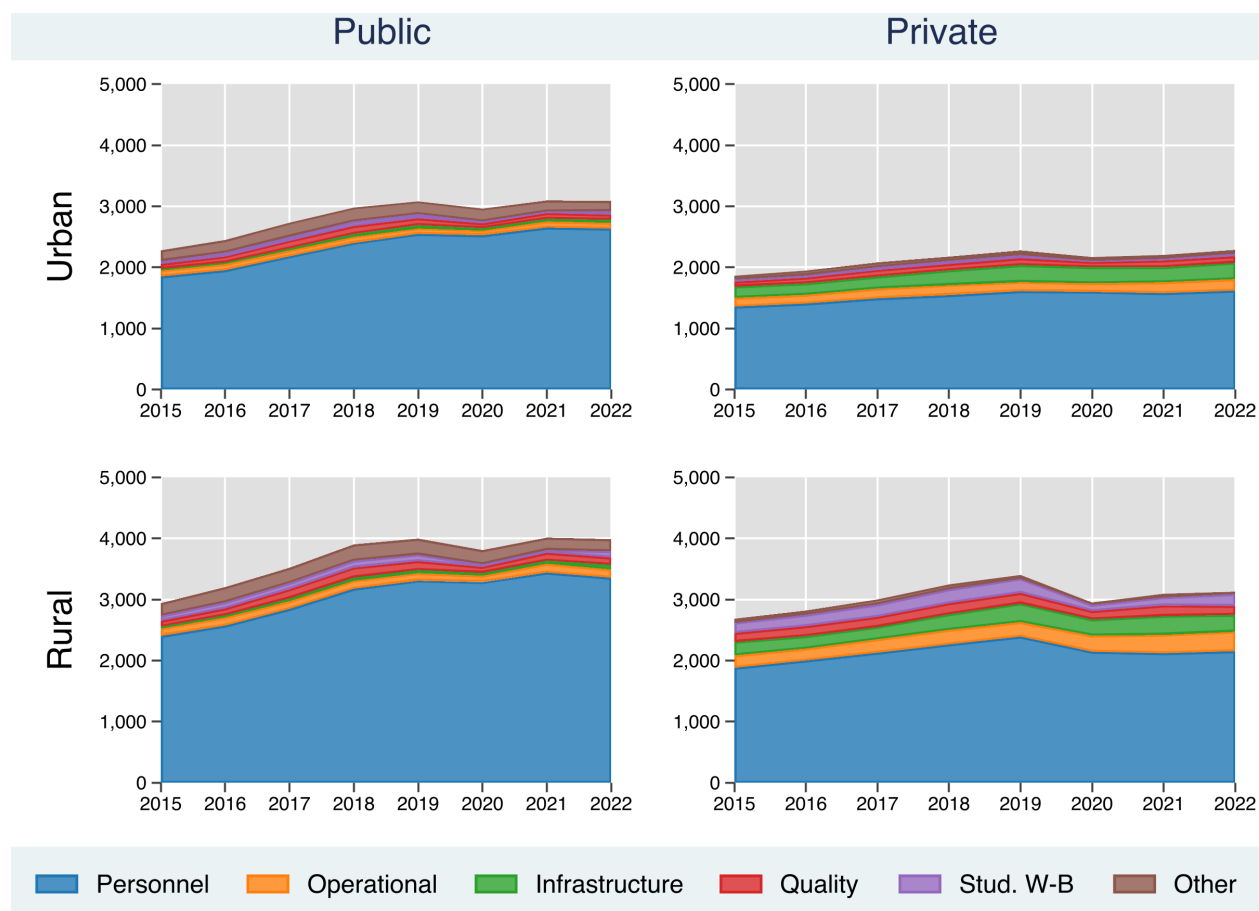
Figures

Figure 1: Evolution of Per-Student Expenditure



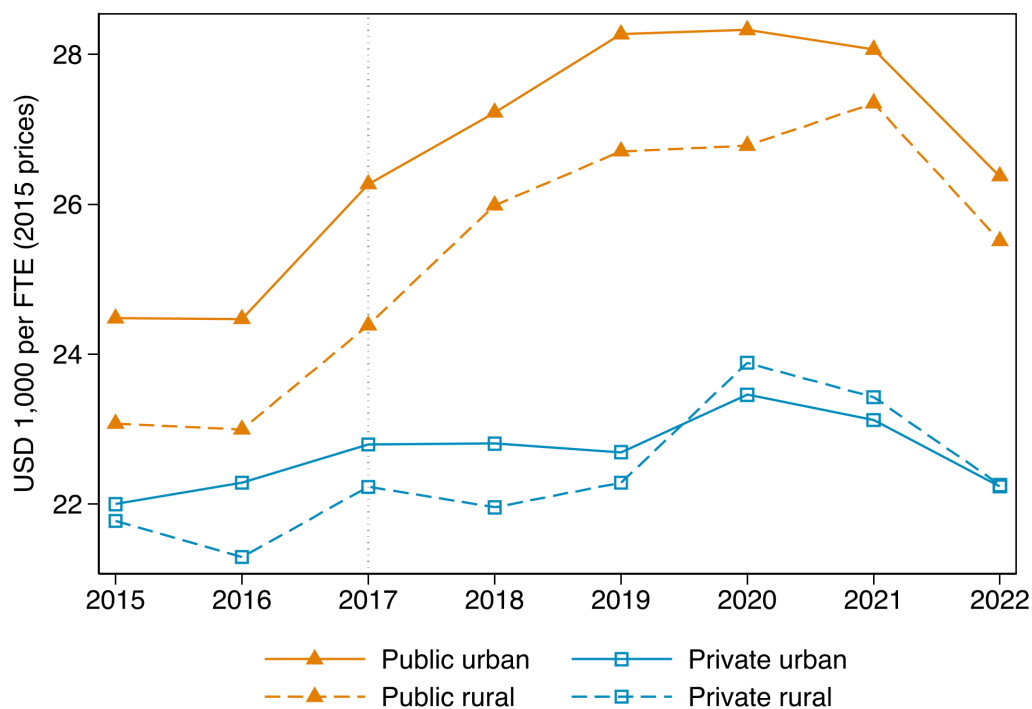
Notes: Balanced 2015–2022 panel (Table 1). Each series is total spending of the group divided by its total enrollment, in USD at 2015 prices. Targeted equity funding refers to expenditures financed by the Subvención Escolar Preferencial (SEP); discretionary funding covers all other expenditures from the regular per-student voucher. “Public” corresponds to municipal schools; “Private” corresponds to privately managed voucher schools.

Figure 2: Evolution of Per-Student Expenditure by Category



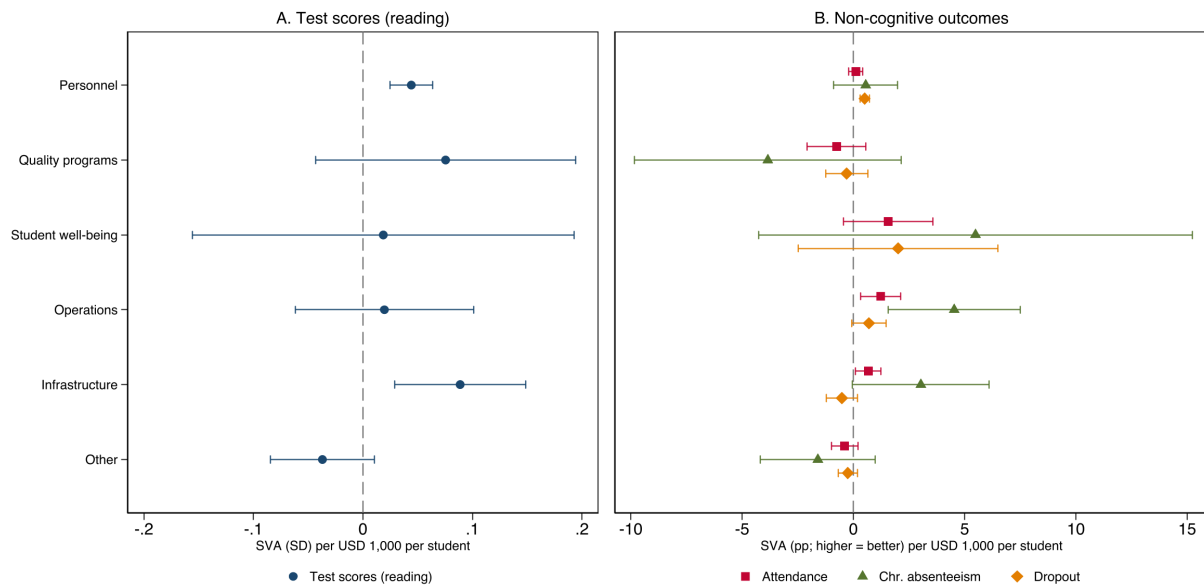
Notes: Spending in the six expenditure categories, in USD per student (2015 prices): total spending in the category divided by total enrollment in the group, by sector and area. Appendix Figure A.3 reports the same series as shares of total spending. “Public” corresponds to municipal schools; “Private” corresponds to privately managed voucher schools.

Figure 3: Remuneration per Classroom-Teacher FTE by Sector, 2015–2022



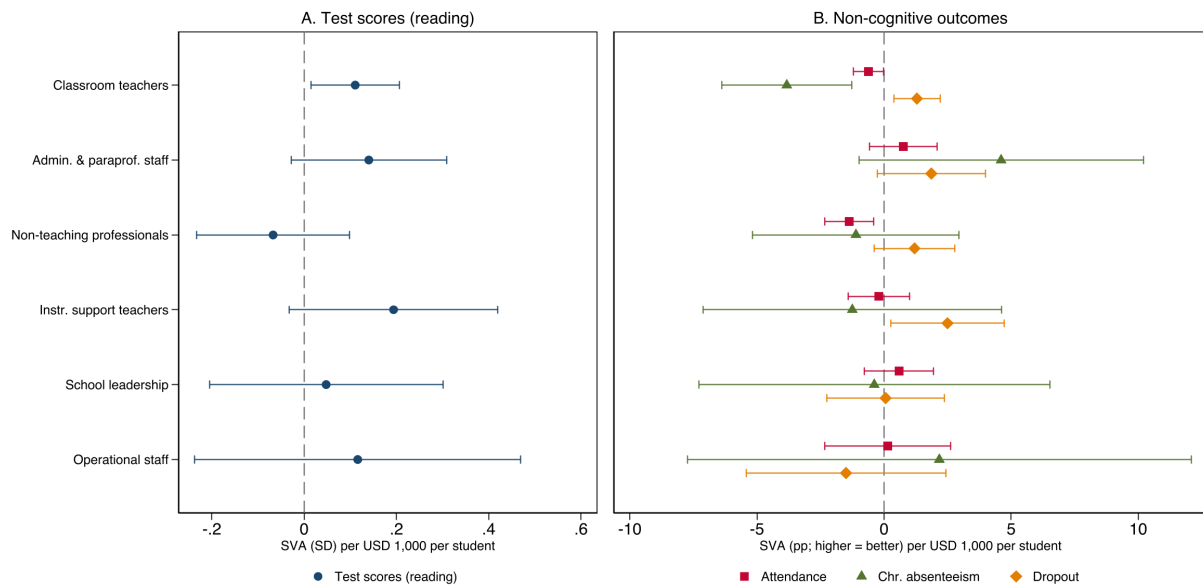
Notes: Classroom-teacher remunerations from the audited school accounts divided by classroom-teacher full-time equivalents (contract hours divided by 44) from the Ministry of Education's teacher records, aggregated by group and year; USD 1,000 at 2015 prices. The dotted line marks 2017, when municipal teachers entered the Teacher Career Law (Ley 20.903) in July; private voucher schools entered through voluntary annual cohorts from July 2019, and all must be incorporated by 2026.

Figure 4: Spending Composition and School Value-Added: Broad Categories



Notes: The figure plots coefficient estimates from school fixed-effects regressions of SVA on per-student spending in the six expenditure categories entered jointly, without a total-spending control. Panel A reports test-score SVA (reading, in standard deviations); Panel B reports attendance, chronic absenteeism, and dropout SVA (in percentage points, higher = better). All specifications include school and year fixed effects and control for enrollment and the number and share of low-SES students. Spending is measured per student, in USD 1,000 at 2015 prices. The 95% confidence intervals reflect standard errors clustered at the school level.

Figure 5: Spending Composition and School Value-Added: Personnel Types



Notes: The figure plots coefficient estimates from school fixed-effects regressions of SVA on per-student remunerations of the six personnel types entered jointly, controlling for total spending per student. Panel A reports test-score SVA (reading, in standard deviations); Panel B reports attendance, chronic absenteeism, and dropout SVA (in percentage points, higher = better). All specifications include school and year fixed effects and control for enrollment and the number and share of low-SES students. Spending is measured per student, in USD 1,000 at 2015 prices. The 95% confidence intervals reflect standard errors clustered at the school level.

Tables

Table 1: Summary Statistics by SVA: School-Year Level (2015–2022)

	Mean	SD	P25	P75
A. School Value Added				
Reading (SD)	-0.026	0.143	-0.116	0.065
Math (SD)	-0.038	0.153	-0.142	0.051
B. Expenditures (2015 USD per student)				
Total expenditure	3,071	1,171	2,180	3,702
Personnel	2,431	1,032	1,631	3,004
Operations	149	91	90	180
Infrastructure	136	147	34	197
Quality programs	114	76	63	151
Student well-being	86	112	24	102
C. Shares of Total Expenditure				
Personnel	0.783	0.092	0.724	0.854
Operations	0.052	0.032	0.030	0.066
Infrastructure	0.053	0.059	0.010	0.086
Quality programs	0.039	0.025	0.022	0.051
Student well-being	0.026	0.027	0.009	0.031
D. School Characteristics				
Rural	0.296	0.454	0.000	1.000
PIE program	0.748	0.406	0.625	1.000
Enrollment	449	424	149	612
Prop. female students	0.481	0.102	0.447	0.507
Prop. low SES students	0.411	0.070	0.385	0.459
E. Regression Sample: Urban Schools				
Total expenditure (2015 USD per student)	2,609	951	1,973	3,061
Personnel	2,070	902	1,462	2,496
Operations	133	117	69	165
Infrastructure	140	178	24	213
Quality programs	100	91	32	141
Student well-being	54	72	10	70
Enrollment	579	435	284	759
Prop. priority students	0.509	0.234	0.397	0.681
PIE program	0.718	0.450	0.000	1.000
Public (municipal)	0.439	0.496	0.000	1.000

Notes: Balanced 2015–2022 panel of publicly funded schools offering basic or secondary education, with at least ten students and per-student spending between USD 100 and 10,000 (school-year observations; rural schools included). SVA measures are empirical Bayes estimates in standard deviations (test scores) or in proportions (attendance, chronic absenteeism, dropout), centered within year or transition. Spending in 2015 USD per student; shares are of total spending. Panel E reports the same statistics for the urban schools of the panel, which form the regression sample (4,317 schools; 34,199 school-years).

Table 2: Personnel Spending by Staff Type: Headcounts versus Pay (2015–2022 Averages)

	Public urban			Private urban			Public rural			Private rural		
	FTE	Pay	USD	FTE	Pay	USD	FTE	Pay	USD	FTE	Pay	USD
Classroom teachers	5.52	26.7	1,478	3.76	22.7	852	7.84	25.3	1,994	5.38	22.4	1,205
School leadership	0.47	30.3	144	0.35	43.1	150	0.82	30.0	245	0.81	35.0	284
Instr. support teachers	0.37	32.6	121	0.27	33.0	88	0.40	46.0	184	0.34	44.8	151
Non-teaching professionals	1.07	21.5	229	0.58	28.9	167	1.31	22.0	287	0.87	27.3	236
Admin. & paraprof. staff	2.94	10.6	312	1.76	10.4	184	3.56	9.6	343	2.98	9.3	279
Operational staff	1.37	10.9	150	0.94	9.5	90	1.74	10.4	181	1.73	9.4	162

<i>Decomposition of the urban public–private gap in remuneration per student (log points)</i>			
	Total gap	Due to FTE per student	Due to pay per FTE
Classroom teachers	0.55	0.39	0.16
School leadership	-0.05	0.31	-0.35
Instr. support teachers	0.32	0.33	-0.01
Non-teaching professionals	0.31	0.61	-0.30
Admin. & paraprof. staff	0.53	0.52	0.01
Operational staff	0.52	0.38	0.14

Notes: FTE = full-time-equivalent staff per 100 students (contract hours divided by 44); Pay = annual remuneration per FTE in thousands of USD (2015 prices); USD = remuneration per student. Staff counts come from the Ministry of Education’s teacher (*Dotación Docente*) and education-assistant records; remunerations from the audited school accounts. Teacher types: classroom teachers; school leadership (directors, deputy directors, inspectors general, other management staff, and teachers in charge); instructional support (technical-pedagogical unit staff and counselors). Assistant types by self-declared category: non-teaching professionals; administrative and paraprofessional staff (paraprofessionals, administrative and technical staff); operational staff. Group figures are ratios of sums over the balanced 2015–2022 panel, restricted for each type to school-years with both a positive remuneration entry and staff records. The decomposition writes the log of the public–private ratio of remuneration per student as the sum of the log ratios of FTE per student and of pay per FTE.

Table 3: How Much of the Variation in Spending Composition Do Funding Rules Explain?

	SD (pp)	R^2 of budget share on:				Share of variance		
		Sector×area groups	+ funding drivers	School FE	Within-school: funding drivers	Between groups	Between schools within groups	Within schools
Personnel	13.3	0.16	0.20	0.55	0.02	0.16	0.39	0.45
Quality programs	3.9	0.02	0.12	0.43	0.02	0.02	0.42	0.57
Student well-being	3.6	0.15	0.26	0.57	0.01	0.15	0.42	0.43
Operations	8.8	0.07	0.09	0.37	0.00	0.07	0.30	0.63
Infrastructure	6.8	0.36	0.39	0.71	0.01	0.36	0.35	0.29
Other	7.0	0.09	0.10	0.50	0.00	0.09	0.42	0.50
Share financed by SEP	10.8	0.06	0.16	0.43	0.01	0.06	0.39	0.55

Notes: Balanced 2015–2022 panel of schools (48,680 school-years). Each row is the share of total spending devoted to the category, in percentage points. Columns 3–5 report the R^2 of a regression of the share on: sector-by-area group indicators (public/private × urban/rural); those indicators plus the mechanical funding drivers (share of priority students, share of SEP beneficiaries, log enrollment) with region and year fixed effects; and school fixed effects. Column 6 reports the within-school R^2 of the funding drivers with school and year fixed effects. Columns 7–9 split the total variance of the share into its between-group, between-school-within-group, and within-school components. The last row is the share of total spending financed by the targeted equity subsidy (SEP).

Table 4: Spending Composition and School Value-Added: Broad Categories

	Test scores (SD) (SD)	Attendance (pp)	Chr. absenteeism (pp; higher = better) (pp)	Dropout (pp)
<i>Panel A: Regression coefficients (per USD 1,000 per student)</i>				
Personnel	0.044*** (0.010)	0.109 (0.163)	0.551 (0.731)	0.504*** (0.108)
Quality programs	0.075 (0.061)	-0.756 (0.675)	-3.846 (3.062)	-0.301 (0.482)
Student well-being	0.019 (0.089)	1.565 (1.025)	5.486 (4.971)	2.013 (2.288)
Operations	0.020 (0.042)	1.226*** (0.459)	4.531*** (1.515)	0.697* (0.393)
Infrastructure	0.089*** (0.031)	0.672** (0.294)	3.032* (1.568)	-0.518 (0.359)
Other	-0.037 (0.024)	-0.393 (0.305)	-1.599 (1.320)	-0.249 (0.221)
Observations	15,492	17,080	17,080	17,023
Schools	4,215	4,270	4,270	4,271
<i>Panel B: Spending per student, mean (SD), USD 2015</i>				
Personnel	1,808 (686)			
Quality programs	96 (74)			
Student well-being	54 (65)			
Operations	128 (115)			
Infrastructure	111 (141)			
Other	117 (174)			

Notes: Each column is a single regression including the six spending categories jointly, without a total-spending control, so each coefficient is the association with an additional USD 1,000 per student in the category holding spending in the other categories fixed; differences between coefficients correspond to reallocations. Urban schools only. Spending variables are category spending per student, averaged over the same window as the outcome (three years ending in the endline year for test scores; the three preceding years for attendance and chronic absenteeism; the outcome year and two preceding years for dropout), in units of USD 1,000 per student at 2015 prices; all regressions control for enrollment, the number of priority and preferential students, and the share of priority students, and include school and year fixed effects (plus transition fixed effects for test scores). Test-score SVA (reading) is in standard deviations of the endline test; attendance, chronic absenteeism, and dropout SVA are in percentage points, with higher values indicating better outcomes. Panel B reports the mean and standard deviation of per-student spending in the attendance estimation sample. Standard errors clustered at the school level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Staff Spending and School Value-Added: Remuneration Types

	Test scores (SD) (SD)	Attendance (pp)	Chr. absenteeism (pp; higher = better) (pp)	Dropout (pp)
<i>Panel A: Regression coefficients (per USD 1,000 per student)</i>				
Classroom teachers	0.111** (0.049)	-0.610** (0.303)	-3.827*** (1.308)	1.295*** (0.466)
Admin. & paraprof. staff	0.140 (0.086)	0.760 (0.681)	4.605 (2.854)	1.858* (1.087)
Non-teaching professionals	-0.067 (0.085)	-1.372*** (0.489)	-1.110 (2.072)	1.200 (0.810)
Instr. support teachers	0.194* (0.115)	-0.210 (0.616)	-1.251 (2.996)	2.496** (1.136)
School leadership	0.048 (0.129)	0.590 (0.694)	-0.382 (3.519)	0.062 (1.184)
Operational staff	0.116 (0.180)	0.150 (1.263)	2.178 (5.055)	-1.497 (2.005)
Observations	4,517	10,331	10,331	4,999
Schools	1,312	2,947	2,947	1,502
<i>Panel B: Spending per student, mean (SD), USD 2015</i>				
Classroom teachers	1,065 (446)			
Admin. & paraprof. staff	221 (150)			
Non-teaching professionals	180 (144)			
Instr. support teachers	103 (105)			
School leadership	155 (101)			
Operational staff	113 (76)			

Notes: Each column is a single regression including remunerations of the six staff types jointly and controlling for total spending per student, so each coefficient is the association with reallocating USD 1,000 per student from non-personnel spending to the staff type. Urban schools only. Spending variables are category spending per student, averaged over the same window as the outcome (three years ending in the endline year for test scores; the three preceding years for attendance and chronic absenteeism; the outcome year and two preceding years for dropout), in units of USD 1,000 per student at 2015 prices; all regressions control for enrollment, the number of priority and preferential students, and the share of priority students, and include school and year fixed effects (plus transition fixed effects for test scores). Test-score SVA (reading) is in standard deviations of the endline test; attendance, chronic absenteeism, and dropout SVA are in percentage points, with higher values indicating better outcomes. Panel B reports the mean and standard deviation of per-student spending in the attendance estimation sample. Standard errors clustered at the school level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Public vs. Private: Spending Categories and School Value-Added

	Test scores (SD)		Attendance (pp)		Chr. absenteeism (pp) (higher = better)		Dropout (pp)	
	Public	Private	Public	Private	Public	Private	Public	Private
Personnel	0.031** (0.013)	0.059*** (0.022)	0.423** (0.196)	0.904** (0.456)	0.755 (0.955)	6.014*** (1.268)	0.123 (0.141)	0.241 (0.253)
Quality programs	0.191** (0.090)	0.094 (0.084)	-0.667 (1.059)	0.464 (0.731)	-3.557 (4.861)	0.389 (3.332)	-0.074 (0.683)	-0.230 (0.636)
Student well-being	0.302*** (0.115)	-0.173 (0.132)	0.896 (1.516)	2.515* (1.313)	-4.832 (7.798)	14.800*** (5.496)	1.021 (1.006)	3.955 (4.682)
Operations	-0.151*** (0.046)	0.115* (0.064)	1.947*** (0.575)	-0.612 (0.546)	5.393*** (1.956)	0.682 (1.763)	1.785*** (0.552)	-0.053 (0.514)
Infrastructure	-0.103 (0.113)	0.109*** (0.032)	-3.269** (1.525)	0.349 (0.248)	-8.872 (7.239)	1.447 (1.334)	-1.015 (0.848)	0.240 (0.394)
Other	-0.032 (0.027)	-0.021 (0.048)	0.068 (0.342)	-1.394*** (0.505)	0.650 (1.485)	-8.178*** (2.547)	-0.362 (0.246)	0.381 (0.403)
Observations	6,166	9,326	7,500	9,580	7,500	9,580	7,500	9,523
Schools	1,871	2,344	1,875	2,395	1,875	2,395	1,875	2,396

Notes: Each column is a single regression including the six spending categories jointly, without a total-spending control. Separate regressions for public (municipal) and private voucher schools; urban schools only. Spending in USD 1,000 per student (2015 prices), averaged over the outcome window; all regressions control for enrollment, the number of priority and preferential students, and the share of priority students, with school and year fixed effects (plus transition fixed effects for test scores). Test-score SVA (reading) in standard deviations; attendance, chronic absenteeism, and dropout SVA in percentage points, higher = better. Standard errors clustered at the school level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Spending Composition and School Value-Added by School Socioeconomic Composition

	Test scores (SD)	Attendance	Chr. absenteeism (pp; higher = better)	Dropout
<i>Panel A: Low tercile of the share of priority students</i>				
Personnel	0.089*** (0.023)	-0.075 (0.469)	0.632 (1.488)	2.165*** (0.322)
Quality programs	0.091 (0.134)	-2.102 (1.885)	-15.543** (7.215)	2.250* (1.312)
Student well-being	-0.150 (0.305)	-6.317** (3.082)	-11.210 (12.023)	0.258 (1.976)
Operations	0.013 (0.066)	-0.548 (0.977)	0.908 (2.703)	-0.784 (0.534)
Infrastructure	0.080** (0.040)	0.479 (0.426)	2.418 (2.222)	-0.706*** (0.252)
Other	-0.017 (0.042)	0.316 (0.564)	-2.967 (2.862)	0.959* (0.523)
Observations	5,757	5,692	5,692	5,685
<i>Panel B: Middle tercile</i>				
Personnel	0.020 (0.017)	-0.373 (0.319)	-3.139* (1.616)	0.642** (0.280)
Quality programs	-0.074 (0.098)	-1.031 (1.125)	-4.510 (4.926)	-2.127** (0.904)
Student well-being	0.040 (0.136)	-0.354 (1.558)	-4.188 (8.428)	5.563 (6.259)
Operations	-0.009 (0.102)	1.206 (1.026)	6.235* (3.385)	1.522 (0.997)
Infrastructure	0.129** (0.054)	0.980* (0.532)	3.753 (2.578)	-0.042 (0.974)
Other	-0.041 (0.040)	-0.777 (0.549)	-2.385 (2.616)	-1.244*** (0.469)
Observations	5,186	5,696	5,696	5,679
<i>Panel C: High tercile</i>				
Personnel	0.025 (0.017)	0.342 (0.208)	1.002 (1.060)	0.136 (0.106)
Quality programs	0.211** (0.092)	-0.503 (0.936)	-3.135 (4.546)	-0.000 (0.588)
Student well-being	0.256** (0.122)	4.045*** (1.346)	9.886 (6.771)	-0.439 (0.772)
Operations	-0.030 (0.052)	2.384*** (0.516)	6.275*** (2.100)	0.986** (0.409)
Infrastructure	-0.064 (0.080)	0.767 (0.860)	2.308 (4.168)	-0.532 (0.471)
Other	-0.039 (0.042)	-0.504 (0.428)	-0.933 (1.833)	-0.328 (0.260)
Observations	4,549	5,692	5,692	5,659
<i>Panel D: High minus low tercile</i>				
Personnel	-0.063** (0.029)	0.417 (0.513)	0.370 (1.827)	-2.029*** (0.340)
Quality programs	0.121 (0.162)	1.599 (2.104)	12.408 (8.528)	-2.250 (1.438)
Student well-being	0.407 (0.329)	10.362*** (3.363)	21.096 (13.798)	-0.697 (2.122)
Operations	-0.043 (0.084)	2.932*** (1.105)	5.367 (3.423)	1.770*** (0.673)
Infrastructure	-0.144 (0.089)	0.288 (0.960)	-0.110 (4.724)	0.175 (0.534)
Other	-0.023 (0.059)	-0.820 (0.708)	2.034 (3.399)	-1.287** (0.584)

Notes: Six spending categories entered jointly, without a total-spending control, as in Table 4. Terciles are defined among the urban schools of the balanced panel using 2015 values. Each panel reports the coefficients of a fully interacted model in which all spending variables, controls, and year (and transition) fixed effects are interacted with the tercile indicator, with school fixed effects; the estimates equal those of separate regressions by tercile, and Panel D reports the difference between the high and the low tercile with its standard error. Same samples, controls, units, and fixed effects as Table 4: urban schools; USD 1,000 per student; test-score SVA (reading) in standard deviations, the other three in percentage points, higher = better. Standard errors clustered at the school level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Summary of Spending–Effectiveness Associations

	Test scores (SD)	Attendance (pp; higher = better)	Chr. absent. (pp; higher = better)	Dropout
<i>Panel A: Broad spending categories (entered jointly)</i>				
Personnel	++	○	○	++
Quality programs	○	○	○	○
Student well-being	○	○	○	○
Operations	○	++	++	+
Infrastructure	++	++	+	○
Other	○	○	○	○
<i>Panel B: Personnel subcategories (entered jointly)</i>				
Classroom teachers	++	--	--	++
Admin. & paraprof. staff	○	○	○	+
Non-teaching professionals	○	--	○	○
Instr. support teachers	+	○	○	++
School leadership	○	○	○	○
Operational staff	○	○	○	○
<i>Panel C: Quality and well-being subcategories (joint within domain)</i>				
Learning Resources	○	○	○	○
Staff Prof. Development	○	—	--	○
Educ. Tech. Assist. (ATE)	○	○	○	++
School Meals	○	○	○	—
Uniforms & Clothing	○	○	○	○
Transportation	○	○	○	+
Medical Appointments	○	++	+	○
School Supplies	○	++	++	○
<i>Panel D: Public / private (broad categories and staff types entered jointly)</i>				
Personnel	++ / ++	++ / ++	○ / ++	○ / ○
Quality programs	++ / ○	○ / ○	○ / ○	○ / ○
Student well-being	++ / ○	○ / +	○ / ++	○ / ○
Operations	-- / +	++ / ○	++ / ○	++ / ○
Infrastructure	○ / ++	-- / ○	○ / ○	○ / ○
Other	○ / ○	○ / --	○ / --	○ / ○
Classroom teachers	○ / ○	○ / ○	○ / ○	○ / ○
Admin. & paraprof. staff	○ / ○	++ / ○	++ / ○	○ / ○
Non-teaching professionals	○ / ○	— / ○	○ / ++	○ / ○
Instr. support teachers	○ / ○	○ / ○	○ / ○	○ / ○
School leadership	○ / ○	○ / ++	○ / ○	○ / ○
Operational staff	○ / ○	○ / ○	○ / ○	○ / ○

Notes: Symbols: ++/-- significant at 5 percent or better; +/- significant at 10 percent; ○ not significant. Panel D reports public / private. All estimates from the school fixed-effects regressions of Tables 4, 5, A.8, A.9, 6, and A.11 (urban schools; spending per student; higher SVA = better outcome).

Table 9: What the Disaggregated Accounts Add: Equality Tests, Decomposition of the Aggregate Coefficient, and Explained Variance

	Test scores (SD)	Attendance	Chr. absenteeism (pp; higher = better)	Dropout
<i>Panel A: Aggregate spending and the test that all dollars are equal</i>				
Total spending per student (δ)	0.039*** (0.009)	0.101 (0.122)	0.442 (0.551)	0.353*** (0.097)
<i>F</i> -test, equal category coefficients	2.72	3.21	3.38	4.92
<i>p</i> -value	0.018	0.007	0.005	0.000
<i>p</i> -value, equal staff-type coefficients (staff sample)	0.190	0.024	0.188	0.478
<i>Panel B: Decomposition of δ into category contributions, $\theta_k \Gamma_k$</i>				
Personnel	0.034	0.072	0.362	0.371
share of the marginal dollar, Γ_k	0.76	0.66	0.66	0.74
Quality programs	0.001	-0.024	-0.121	-0.008
share of the marginal dollar, Γ_k	0.02	0.03	0.03	0.03
Student well-being	0.000	0.033	0.115	0.026
share of the marginal dollar, Γ_k	0.01	0.02	0.02	0.01
Operations	0.001	0.047	0.173	0.026
share of the marginal dollar, Γ_k	0.04	0.04	0.04	0.04
Infrastructure	0.006	0.046	0.207	-0.029
share of the marginal dollar, Γ_k	0.07	0.07	0.07	0.06
Other	-0.004	-0.072	-0.294	-0.033
share of the marginal dollar, Γ_k	0.10	0.18	0.18	0.13
Sum of contributions (= δ)	0.039	0.101	0.442	0.353
<i>Panel C: Within-school R^2 ($\times 100$) of nested models</i>				
Controls only	0.37	0.71	0.67	1.71
+ total spending	0.53	0.72	0.68	1.97
Six categories	0.64	0.93	0.84	2.31
Observations	15,492	17,080	17,080	17,023
<i>Subcategory sample</i>				
Total spending	0.83	0.85	0.85	2.57
Six categories	0.95	1.10	0.97	3.14
+ quality and well-being subcategories	1.04	1.25	1.10	4.39
Observations	10,217	14,359	14,359	11,775
<i>Staff-pay sample</i>				
Total spending	0.65	0.60	0.66	2.43
Six categories	1.11	0.68	0.71	3.52
+ six staff types	1.27	0.87	0.83	3.87
Observations	4,517	10,331	10,331	4,999

Notes: Same samples, controls, fixed effects, and units as Table 4 (urban schools; USD 1,000 per student; test-score SVA for reading in standard deviations, the other three in percentage points, higher = better). Panel A: δ is the coefficient of total spending per student entered alone; the *F*-test is the joint test that the six category coefficients of Table 4 are equal, which is the restriction under which the joint specification collapses to the aggregate one; the last row repeats the test for the six staff types of Table 5. Panel B: following Gelbach (2016), $\delta = \sum_k \theta_k \Gamma_k$ exactly, where θ_k is the category coefficient and Γ_k the coefficient of category k on total spending in an auxiliary regression with the same controls and fixed effects, i.e., the share of a marginal within-school dollar that goes to category k . Panel C: within-school R^2 of nested specifications; the subcategory and staff-pay rows use the subsamples with non-missing subcategory and staff-type spending and re-estimate the aggregate and six-category models on them. Standard errors clustered at the school level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 10: Balance Test: Within-School Changes in Student Composition and Spending Composition (Test-Score Sample)

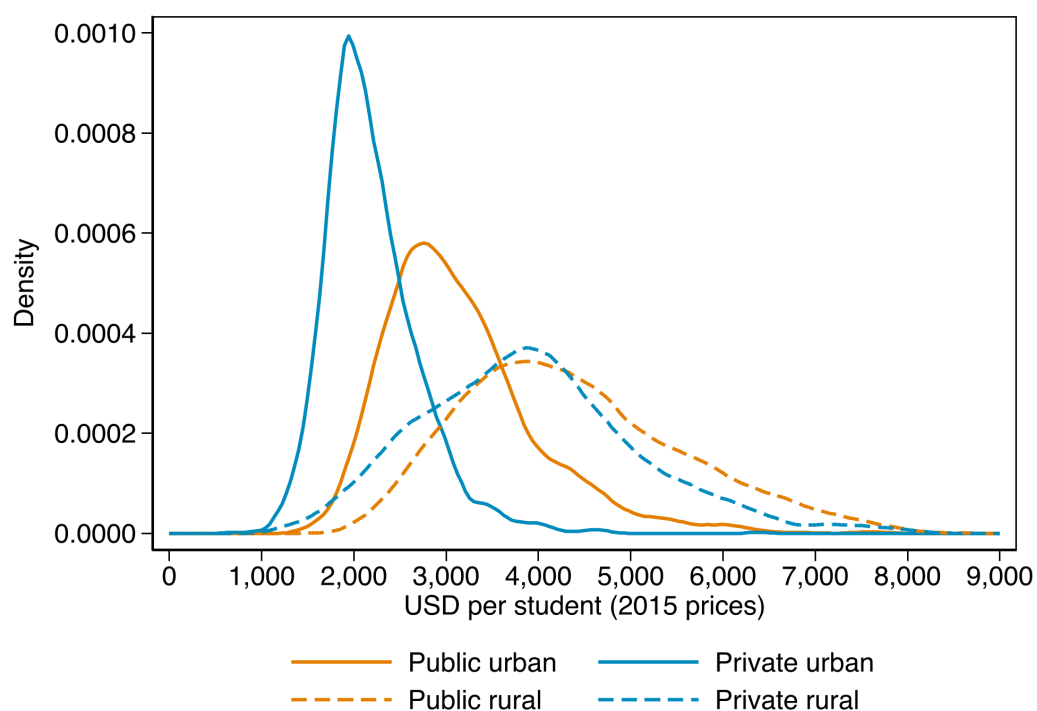
	Share priority (pp)	Share preferential (pp)	Share female (pp)	Log enrollment ($\times 100$)	Baseline reading (SD)	Baseline math (SD)
<i>Panel A: No controls</i>						
Total spending	1.937*** (0.235)	0.318* (0.170)	-0.066 (0.109)	-9.560*** (0.790)	0.030*** (0.011)	0.046*** (0.013)
Personnel	2.053*** (0.235)	-0.341* (0.182)	-0.107 (0.131)	-14.101*** (0.699)	0.041*** (0.014)	0.058*** (0.014)
Quality programs	2.173*** (0.194)	0.278* (0.148)	-0.010 (0.059)	0.006 (0.320)	0.004 (0.006)	0.004 (0.008)
Student well-being	0.976*** (0.176)	0.553*** (0.139)	-0.086 (0.078)	-0.291 (0.673)	-0.011 (0.009)	-0.010 (0.011)
Operations	0.475*** (0.142)	0.876*** (0.136)	0.036 (0.052)	-0.437 (0.272)	-0.002 (0.006)	0.001 (0.006)
Infrastructure	0.328 (0.225)	0.755*** (0.204)	0.089 (0.064)	0.418 (0.364)	-0.005 (0.006)	0.005 (0.007)
Other	-0.133 (0.147)	0.111 (0.120)	-0.002 (0.077)	0.523* (0.310)	-0.007 (0.007)	-0.002 (0.009)
Joint p -value (6 categories)	0.000	0.000	0.621	0.000	0.039	0.003
Mean of dependent variable	47.5	14.2	49.2	622.0	-0.1	-0.1
Observations	15,492	15,492	15,492	15,492	13,820	10,079
Schools	4,215	4,215	4,215	4,215	3,796	3,634
<i>Panel B: With main-specification controls</i>						
Total spending			-0.038 (0.110)		0.029** (0.012)	0.049*** (0.013)
Personnel			-0.068 (0.134)		0.039*** (0.014)	0.060*** (0.015)
Quality programs			0.002 (0.061)		0.007 (0.006)	0.011 (0.008)
Student well-being			-0.074 (0.078)		-0.009 (0.009)	-0.005 (0.011)
Operations			0.043 (0.053)		-0.001 (0.006)	0.004 (0.006)
Infrastructure			0.091 (0.064)		-0.004 (0.006)	0.006 (0.007)
Other			-0.004 (0.078)		-0.006 (0.007)	-0.002 (0.009)
Joint p -value (6 categories)			0.695		0.091	0.003
Mean of dependent variable			49.2		-0.1	-0.1
Observations			15,492		13,820	10,079
Schools			4,215		3,796	3,634

Notes: Sample and fixed effects (school, year, and cohort transition) as in the test-score SVA regressions; one observation per school and transition. Baseline scores are the mean standardized SIMCE score of the incoming cohort in the baseline grade and year of each transition (math is not tested in 2nd grade, so the 2-to-4 transition is excluded from the math column). The first row is a regression of the column variable on total spending per student alone; the remaining rows come from a single regression per column on the six spending categories entered jointly, as in the main specification, with the same samples, fixed effects, and clustering as the main SVA regressions (urban schools; balanced 2015–2022 panel). Spending regressors are per student and standardized to mean zero and unit standard deviation within each estimation sample, so coefficients measure the within-school change in the composition variable associated with a one-standard-deviation increase in the category, holding the other categories fixed. Shares are in percentage points; log enrollment is multiplied by 100 so coefficients read as percent changes. Panel B adds the controls of the main specification (enrollment, number of priority and preferential students, and share of priority students) and is therefore reported only for composition variables that are not themselves controls. The joint p -value tests that the six category coefficients are jointly zero. Standard errors clustered at the school level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

APPENDIX

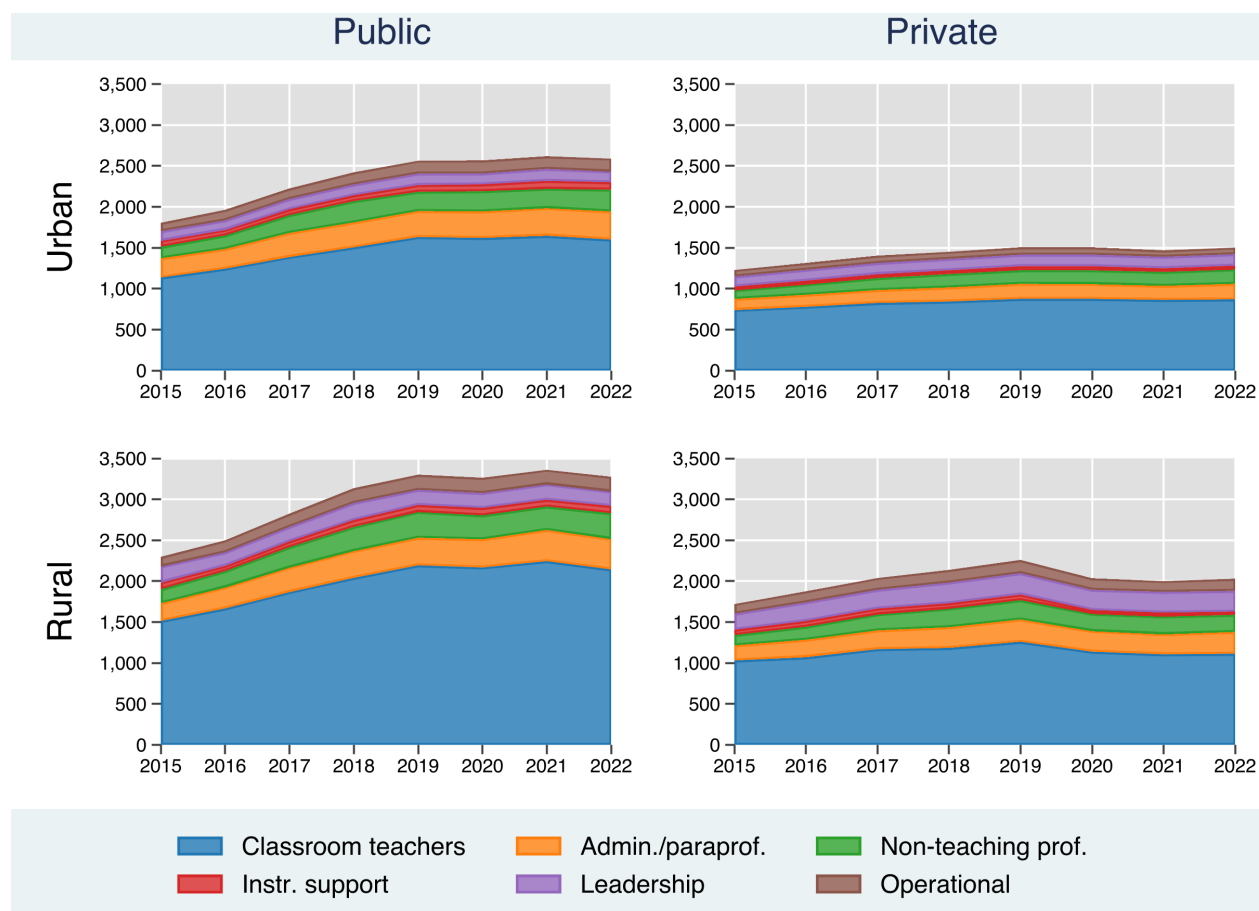
Appendix Figures

Figure A.1: Average (2015–2022) Per-Student Expenditure Distribution



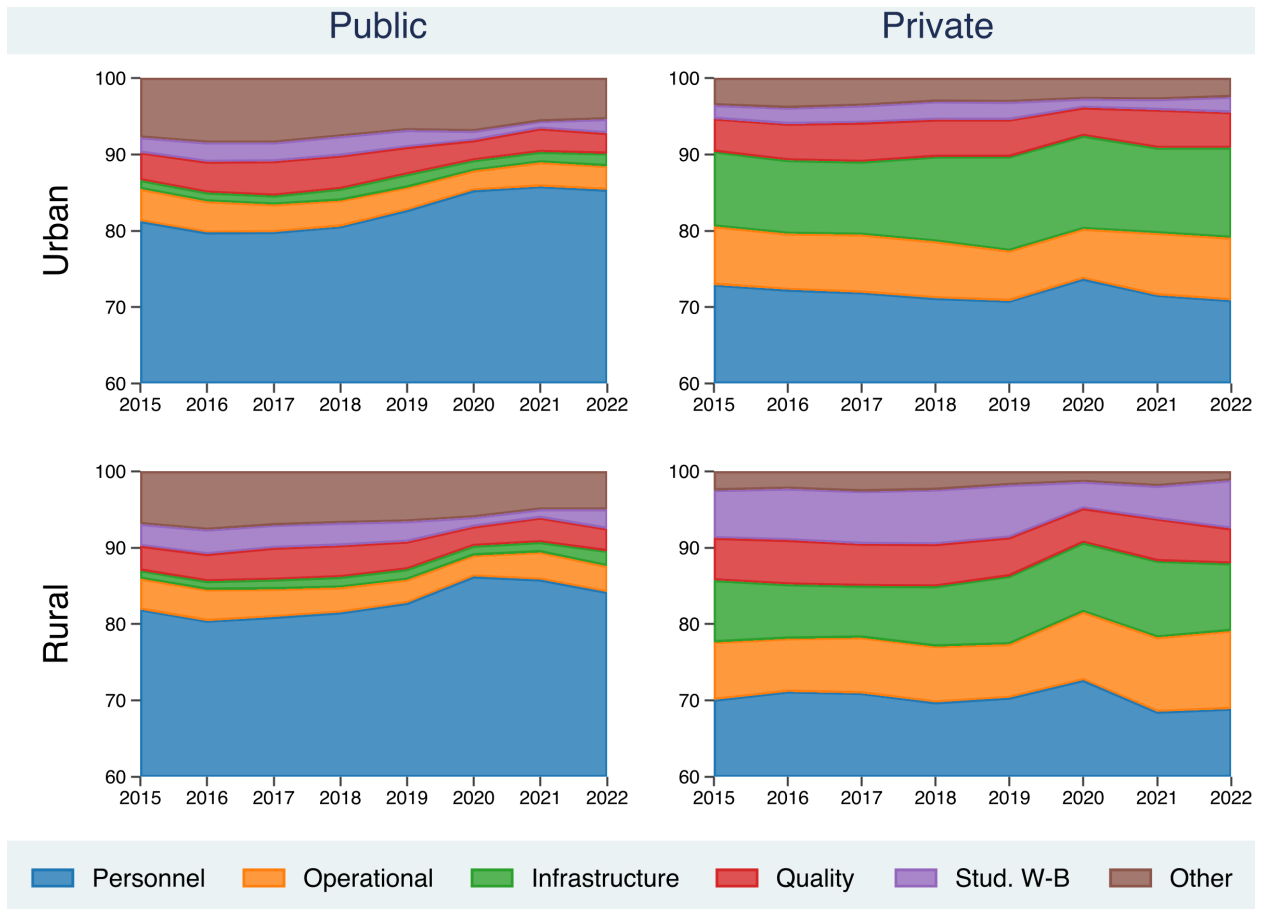
Notes: Kernel densities of the school-level average of per-student spending over 2015–2022 (USD at 2015 prices), balanced panel of Table 1; schools are classified by their 2015 sector and area. “Public” corresponds to municipal schools; “Private” corresponds to privately managed voucher schools.

Figure A.2: Evolution of Per-Student Personnel Expenditure by Staff Type



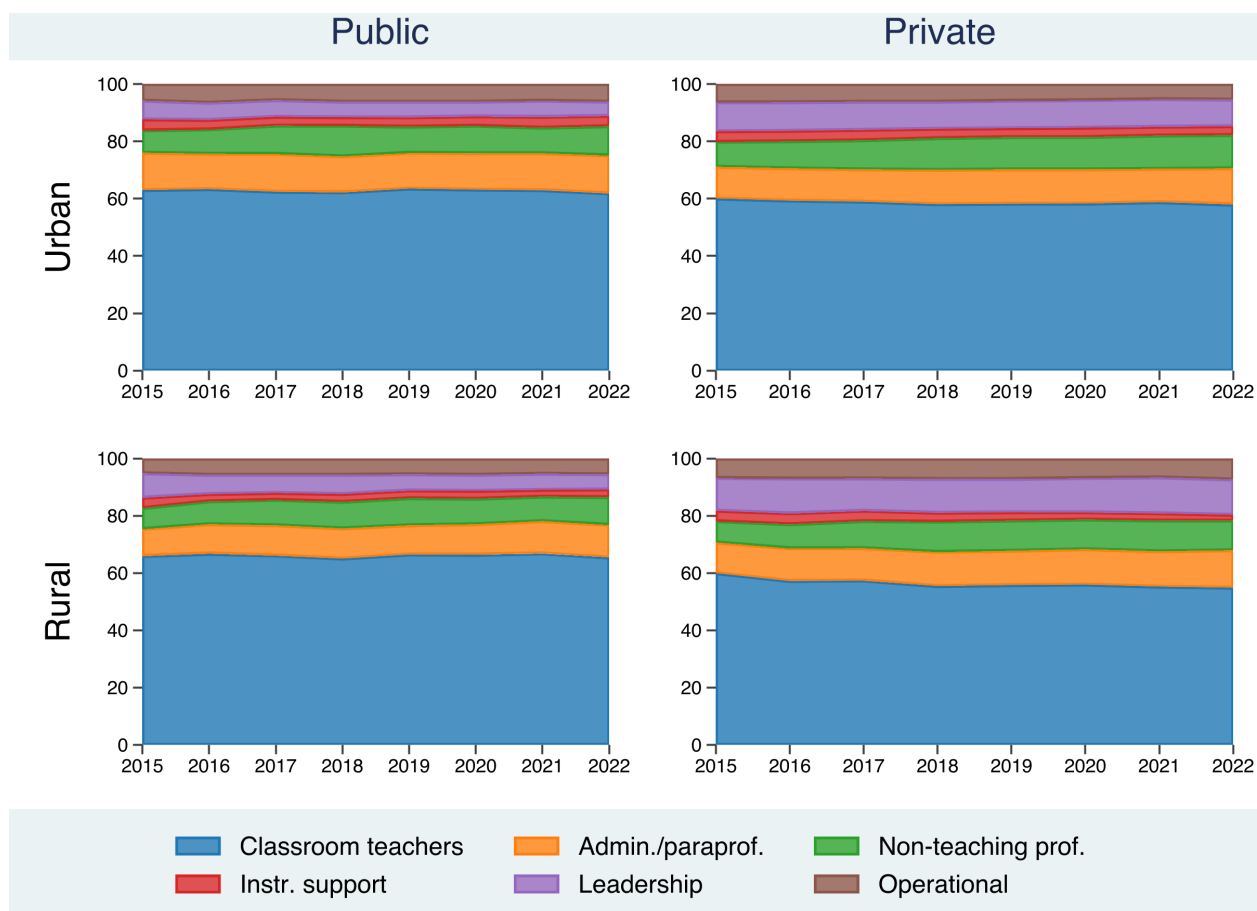
Notes: Remunerations of the six staff types, in USD per student (2015 prices): total remunerations of the staff type divided by total enrollment in the group, by sector and area. Appendix Figure A.4 reports the same series as shares of personnel spending. “Public” corresponds to municipal schools; “Private” corresponds to privately managed voucher schools. Personnel categories follow the Chilean Superintendencia de Educación’s classification: Classroom teachers, School leadership (principals, vice-principals, instructional leaders), Instructional support teachers (pedagogical specialists), Non-teaching professionals (psychologists, social workers), Administrative and Paraprofessional staff (management support, assistants, monitors), and Operational staff (janitorial and maintenance).

Figure A.3: Evolution of Expenditure Composition



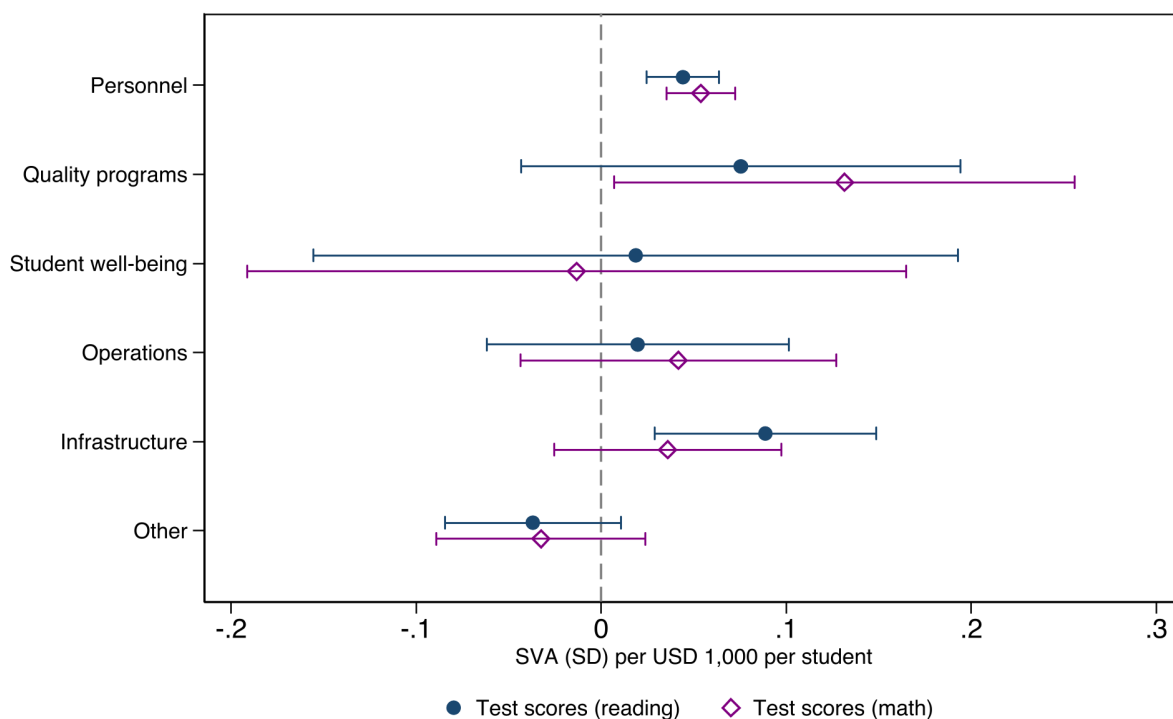
Notes: Same categories and groups as Figure 2, as percent of total spending in the group (vertical axis starts at 60 percent). “Public” corresponds to municipal schools; “Private” corresponds to privately managed voucher schools.

Figure A.4: Evolution of Personnel Expenditure Composition



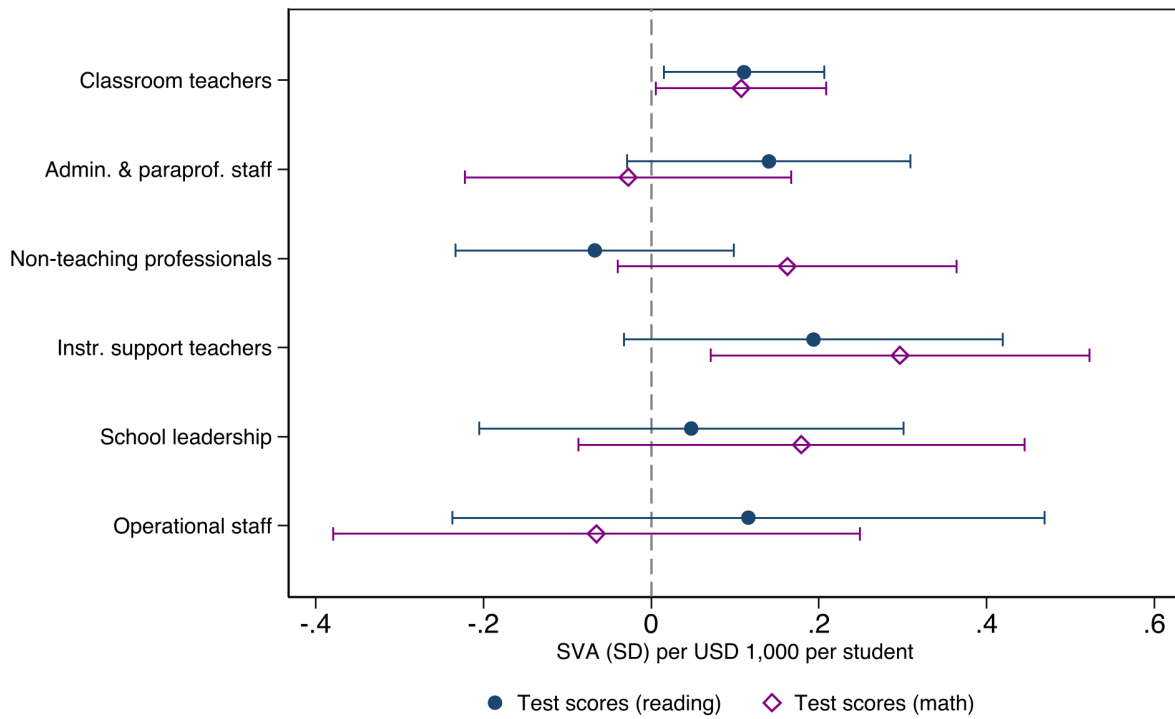
Notes: Same staff types and groups as Appendix Figure A.2, as percent of total personnel spending in the group. “Public” corresponds to municipal schools; “Private” corresponds to privately managed voucher schools. Personnel categories follow the Chilean Superintendencia de Educación’s classification: Classroom teachers, School leadership (principals, vice-principals, instructional leaders), Instructional support teachers (pedagogical specialists), Non-teaching professionals (psychologists, social workers), Administrative and Paraprofessional staff (management support, assistants, monitors), and Operational staff (janitorial and maintenance).

Figure A.5: Test-Score SVA and Broad Spending Categories (Reading vs. Math)



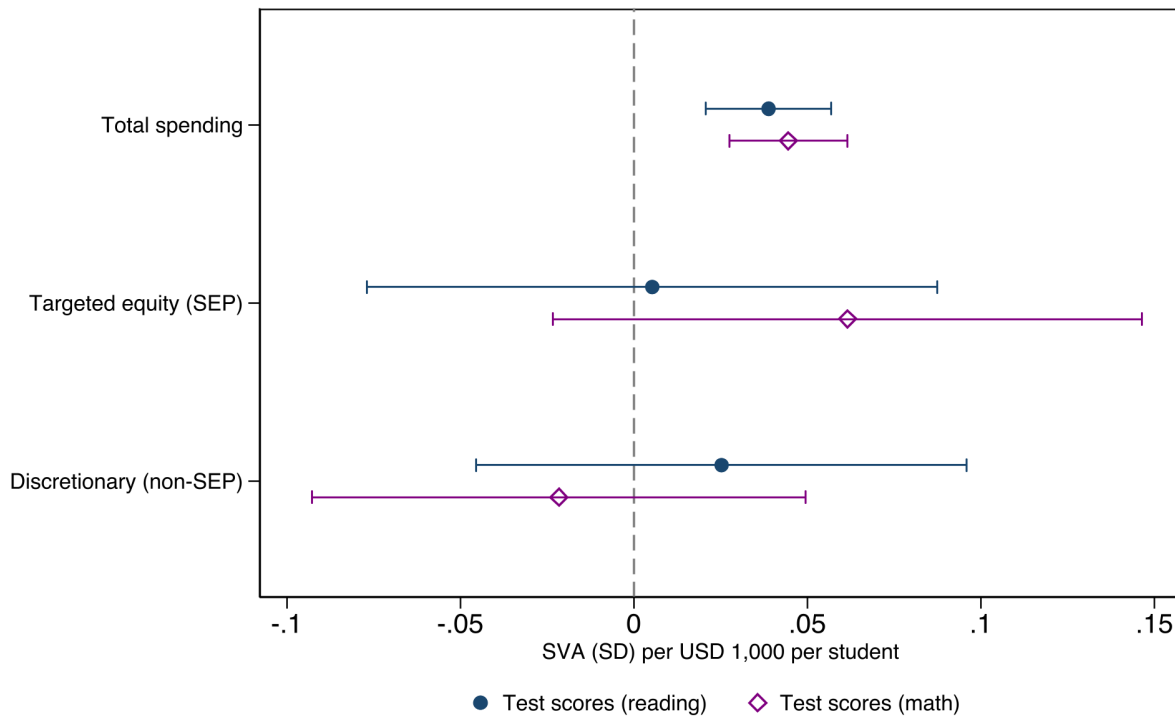
Notes: Filled circles = Reading SVA; hollow diamonds = Math SVA. Six categories entered jointly, no total-spending control. School, year, and transition FE; controls for enrollment and student composition. Spending in USD 1,000 per student (2015 prices). 95% CI with school-clustered SE.

Figure A.6: Test-Score SVA and Personnel Types



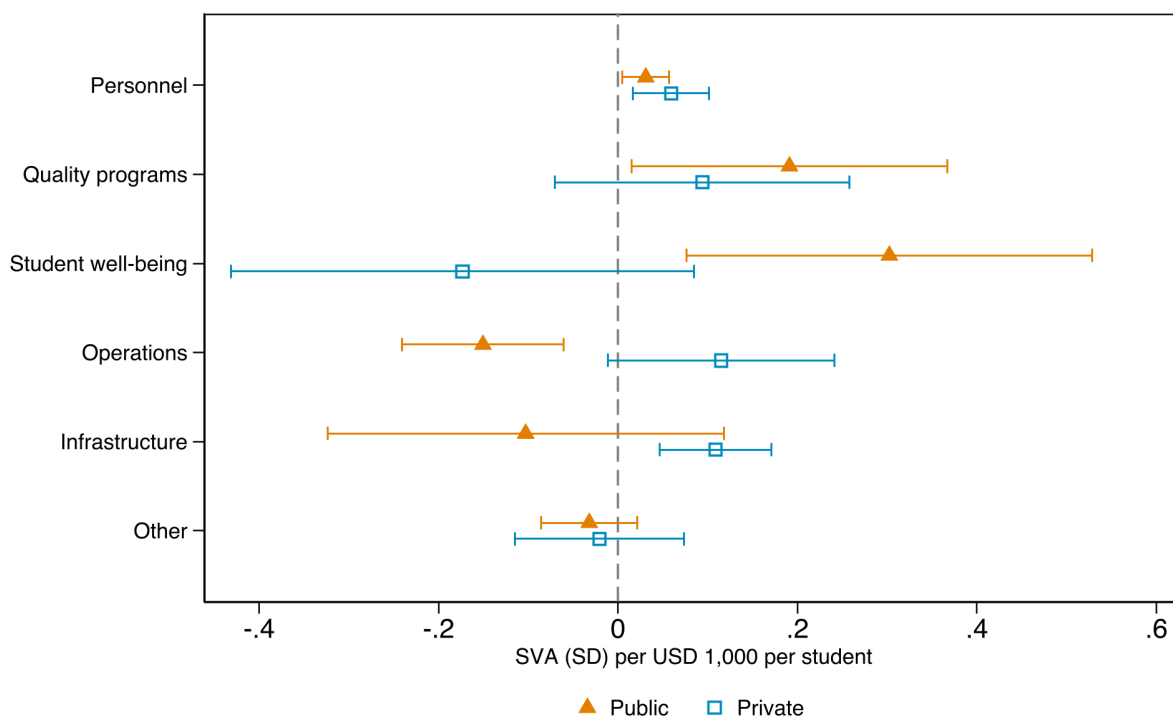
Notes: Filled circles = Reading SVA; hollow diamonds = Math SVA. Six personnel types entered jointly, controlling for total spending per student. School, year, and transition FE; controls for enrollment and student composition. Spending in USD 1,000 per student (2015 prices). 95% CI with school-clustered SE.

Figure A.7: School-Level Fixed-Effects Estimates: Aggregate Expenditure Types



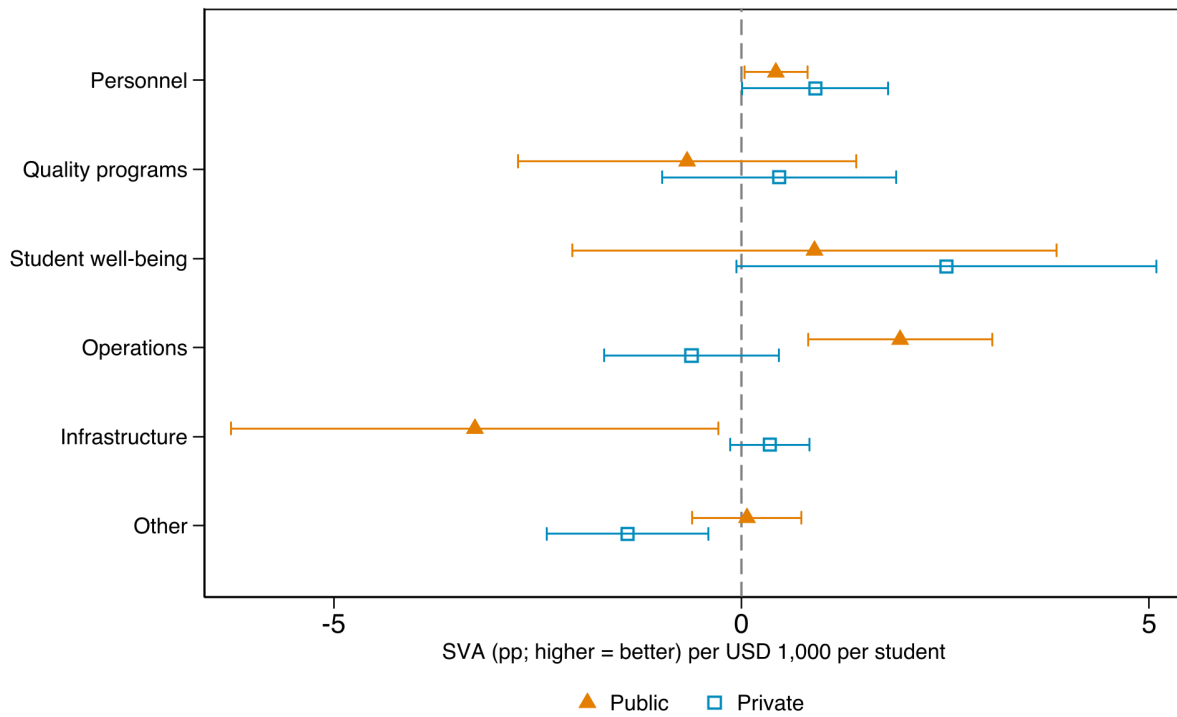
Notes: The figure plots coefficient estimates for total, targeted equity (SEP), and discretionary (non-SEP) expenditures per student. Filled circles = Reading SVA; hollow diamonds = Math SVA. Total spending enters alone; SEP and non-SEP spending each enter with total spending as a control. All specifications include school and year fixed effects and control for enrollment and student composition. Spending in USD 1,000 per student (2015 prices). 95% CI with school-clustered standard errors.

Figure A.8: Broad Spending Categories and SVA: Public vs. Private Schools (Test Scores)



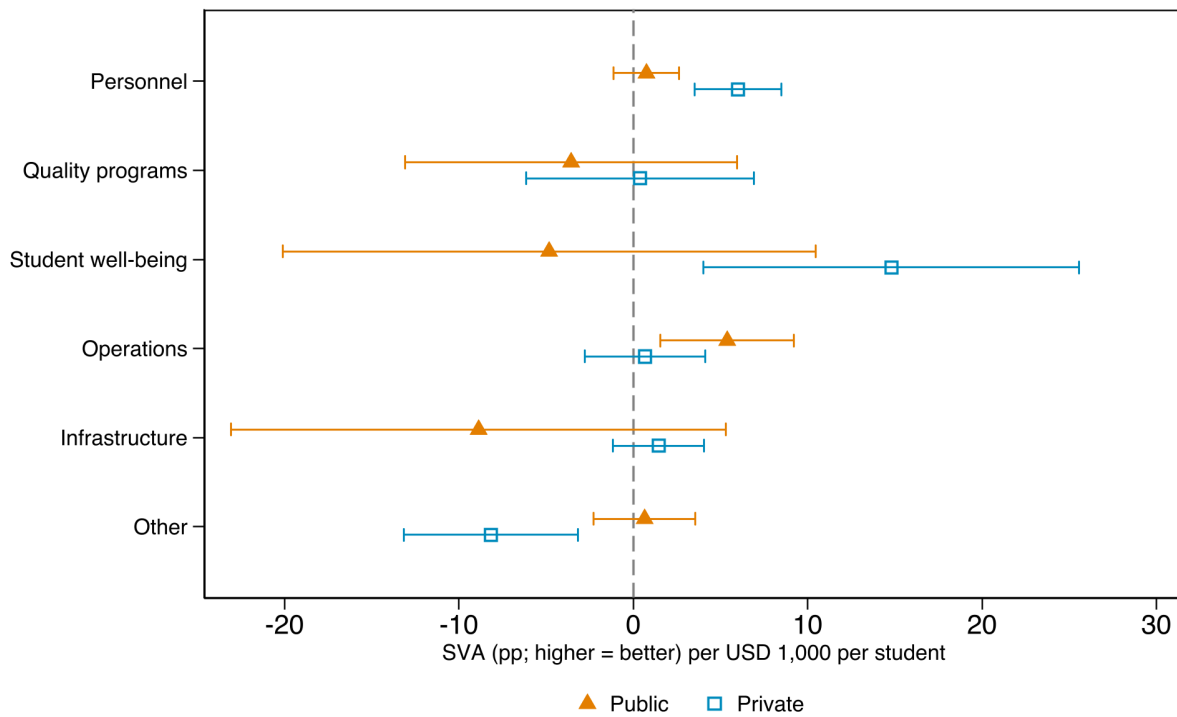
Notes: The figure plots coefficient estimates from separate school fixed-effects regressions for public and private subsidized schools, with the six spending categories entered jointly and no total-spending control. All specifications include school and year fixed effects and control for enrollment and student composition. Spending in USD 1,000 per student (2015 prices). 95% confidence intervals reflect standard errors clustered at the school level.

Figure A.9: Broad Spending Categories and SVA: Public vs. Private Schools (Attendance)



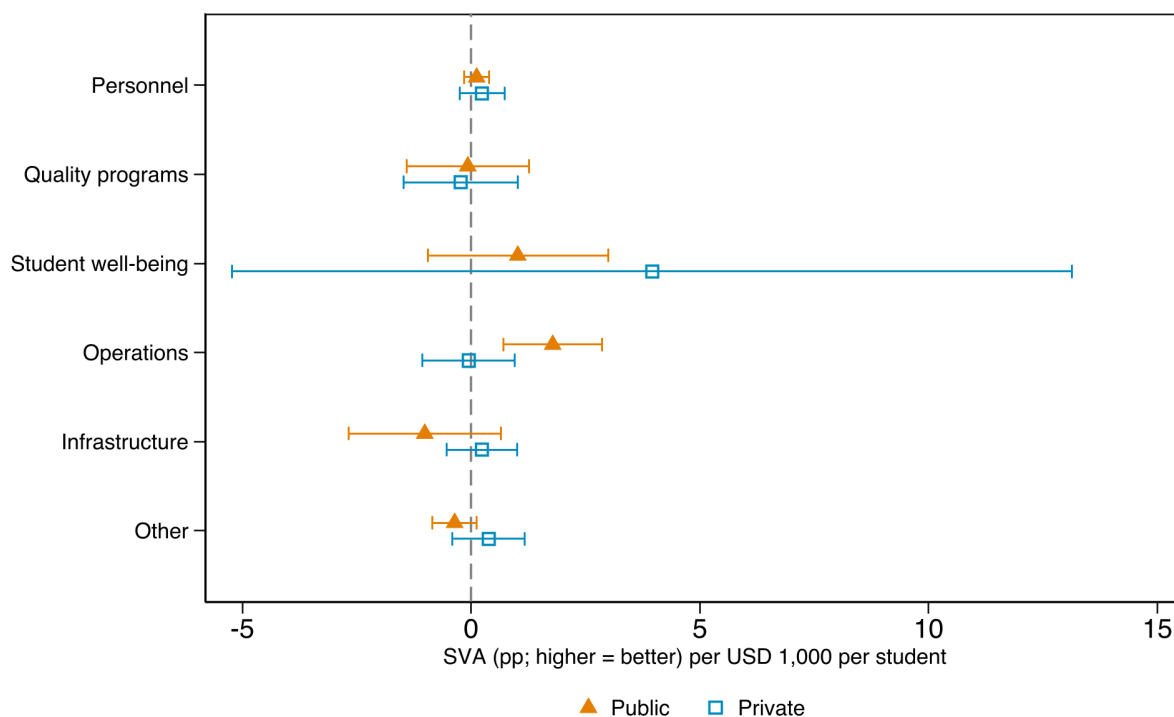
Notes: Separate school FE regressions for public and private subsidized schools. Controls for total expenditure, enrollment, and student composition. Spending in USD 1,000 per student (2015 prices). 95% CI with school-clustered SE.

Figure A.10: Broad Spending Categories and SVA: Public vs. Private Schools (Chronic Absenteeism)



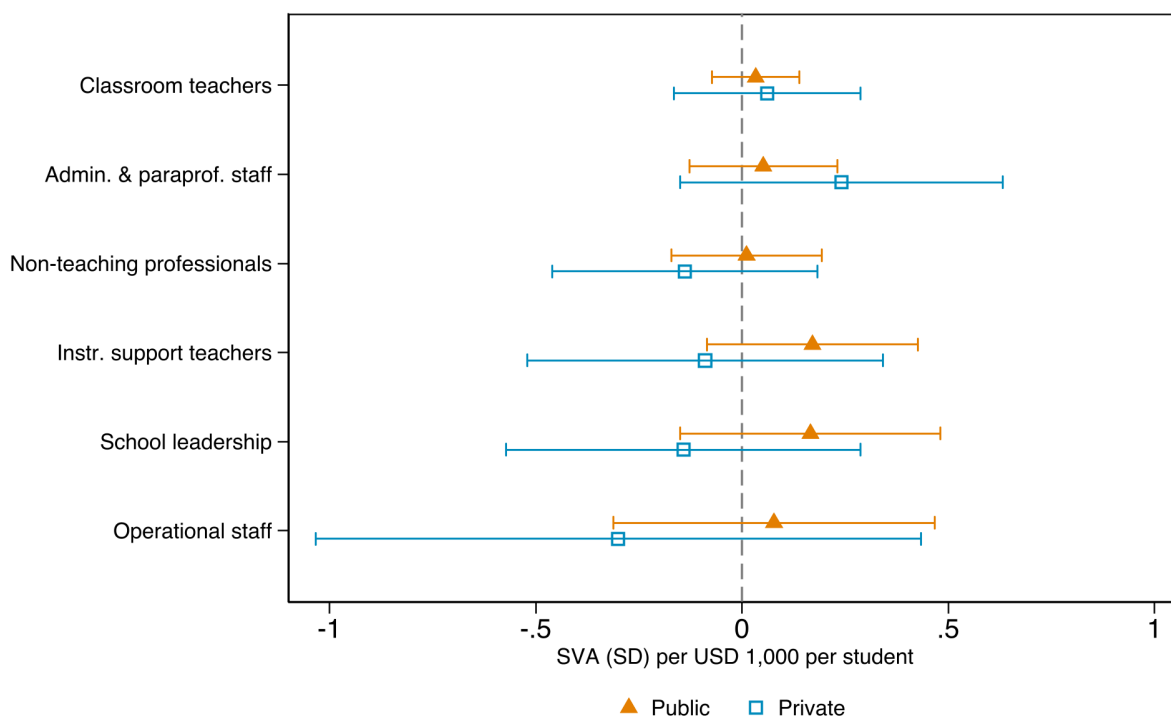
Notes: Separate school FE regressions for public and private subsidized schools. Controls for total expenditure, enrollment, and student composition. Spending in USD 1,000 per student (2015 prices). 95% CI with school-clustered SE.

Figure A.11: Broad Spending Categories and SVA: Public vs. Private Schools (Dropout)



Notes: Separate school FE regressions for public and private subsidized schools. Controls for total expenditure, enrollment, and student composition. Spending in USD 1,000 per student (2015 prices). 95% CI with school-clustered SE.

Figure A.12: Personnel Subcategories and SVA: Public vs. Private Schools (Test Scores)



Notes: The figure plots coefficient estimates from separate school fixed-effects regressions for public and private subsidized schools. All six personnel types are entered jointly. Specifications include school and year fixed effects and control for total expenditure, enrollment, and student composition. Spending in USD 1,000 per student (2015 prices). 95% confidence intervals reflect standard errors clustered at the school level.

Appendix Tables

Table A.1: Expenditure Accounts and Spending Categories

Code	Account group	USD per student	Share (%)
1	Personnel	1,915.3	77.06
1.1	Salaries, statutory bonuses, and allowances	1,670.2	67.19
1.2	Equity increments (zone and hardship)	102.9	4.14
1.3	Performance increments (SNED, AEP)	37.2	1.50
1.4	Social security contributions	68.9	2.77
1.5	Other personnel expenses	36.1	1.45
2	Quality programs	102.1	4.11
2.1	Educational technical assistance (ATE)	12.1	0.49
2.2	Staff professional development	3.7	0.15
2.3	Courses and training outside ATE	2.8	0.11
2.4	Learning resources	52.0	2.09
2.5	Pedagogical support equipment	31.5	1.27
3	Student well-being	52.2	2.10
3.1	Uniforms and clothing	7.4	0.30
3.2	Other student well-being	8.9	0.36
3.3	Sports workshops	3.2	0.13
3.4	Medical appointments	1.8	0.07
3.5	Student support	0.4	0.01
3.6	School supplies	4.8	0.19
3.7	School transportation	16.4	0.66
3.8	Meals	9.3	0.37
4	Operations	137.0	5.51
4.1	Operating expenses	69.7	2.80
4.2	Security services	4.5	0.18
4.3	Advertising	0.6	0.02
4.4	Utilities	34.8	1.40
4.5	General services	27.4	1.10
5	Infrastructure	157.6	6.34
5.1	Building rentals	81.9	3.29
5.2	Equipment rentals	2.6	0.11
5.3	Construction and maintenance of infrastructure	55.7	2.24
5.4	Maintenance and repair of equipment	5.4	0.22
5.5	Acquisition of buildings and equipment	12.0	0.48
6–9	Other (residual category)	121.4	4.88
6	Transfers to the school owner	101.9	4.10
7	Withdrawals	0.0	0.00
8.1	Fines and interest	0.7	0.03
8.2	Refunds to the Ministry	0.6	0.02
8.3	Loan payments and bank charges	13.4	0.54
8.4	FAEP reimbursements	0.0	0.00
8.5	Municipal charges and taxes	3.3	0.13
8.6	Insurance	1.5	0.06
9	FAEP pension-arrears payments	0.0	0.00
Total		2,485.6	100.00

Notes: Expenditure accounts of the audited school accounts (Rendición de Cuentas) grouped into the six categories used in the paper; the first five follow the Superintendencia de Educación's major account groups and the residual category pools groups 6 to 9. Amounts are pooled 2015–2022 totals of the balanced panel of Table 1 (6085 schools, rural included; 48680 school-years) divided by total enrollment, in USD at 2015 prices; shares are of total spending. Operating expenses (4.1) pool office and IT supplies, copying, fuel, cleaning materials, travel, and other operating items; general services (4.5) pool cleaning, gardening, and other external services; other personnel expenses (1.5) include voluntary retirement bonuses. The account codes behind each row are listed in the replication files. Group 9 and FAEP reimbursements are recorded at the school-owner level and are zero in school accounts. Personnel subcategories 1.1–1.5 are the ones reported in Table 5' Panel B by staff type; quality and well-being subcategories are those of Tables A.8 and A.9.

Table A.2: School Income by Source: Per-Student Levels and Shares (2015–2022 Averages)

	Public urban		Private urban		Public rural		Private rural	
	USD	%	USD	%	USD	%	USD	%
Base per-student subsidy	1,095	38.3	1,112	50.3	1,099	30.1	1,190	37.2
Voucher increments (PIE, zone, rurality, other)	587	20.5	356	16.1	1,026	28.1	949	29.7
Targeted equity subsidy (SEP)	318	11.1	253	11.4	417	11.4	407	12.7
Gratuity contribution	127	4.4	70	3.2	133	3.6	110	3.4
Other special subsidies	240	8.4	130	5.9	278	7.6	297	9.3
Remuneration increments and bonuses	398	13.9	145	6.6	563	15.4	283	8.8
Other fiscal income (incl. FAEP)	17	0.6	4	0.2	23	0.6	8	0.2
Municipal contribution	124	4.4	0	0.0	130	3.6	0	0.0
Copayment (FICOM)	0	0.0	199	9.0	0	0.0	21	0.7
Other own income	0	0.0	15	0.7	0	0.0	11	0.4
Donations	0	0.0	9	0.4	1	0.0	5	0.1
Other income	121	4.2	9	0.4	163	4.5	7	0.2
Total income	2,855	100.0	2,211	100.0	3,657	100.0	3,201	100.0
Total expenditure	2,833		2,127		3,679		3,042	

Notes: Income accounts of the audited school reports (*Rendición de Cuentas*), aggregated by group and year over the balanced 2015–2022 panel and expressed per student in 2015 USD (same deflator as expenditures); shares are of total income. Remuneration increments and bonuses are fiscal transfers earmarked for statutory pay items that pass through the school accounts. Copayment revenue (*financiamiento compartido*) and other own income are reported by the school; municipal contributions apply to public schools only. Total expenditure is shown for comparison. corresponds to municipal schools; to privately managed voucher schools.

Table A.3: Robustness to Funding Coverage: Public Schools and Private Schools With and Without Copayment

	Test scores (R)	Attendance	Chr. absenteeism	Dropout
<i>Public</i>				
Personnel	0.031** (0.013)	0.423** (0.196)	0.755 (0.955)	0.123 (0.141)
Quality programs	0.191** (0.090)	-0.667 (1.059)	-3.557 (4.861)	-0.074 (0.683)
Student well-being	0.302*** (0.115)	0.896 (1.516)	-4.832 (7.798)	1.021 (1.006)
Operations	-0.151*** (0.046)	1.947*** (0.575)	5.393*** (1.956)	1.785*** (0.552)
Infrastructure	-0.103 (0.113)	-3.269** (1.525)	-8.872 (7.239)	-1.015 (0.848)
Other	-0.032 (0.027)	0.068 (0.342)	0.650 (1.485)	-0.362 (0.246)
Observations	6,166	7,500	7,500	7,500
Schools	1,871	1,875	1,875	1,875
<i>Private, no copayment</i>				
Personnel	-0.016 (0.029)	0.269 (0.556)	2.570* (1.347)	0.086 (0.365)
Quality programs	0.128 (0.100)	-0.559 (0.867)	-4.617 (3.708)	-0.650 (0.839)
Student well-being	-0.170 (0.139)	0.963 (1.530)	7.856 (6.327)	4.284 (5.272)
Operations	0.005 (0.102)	-2.499** (0.971)	-4.064 (2.903)	0.479 (0.918)
Infrastructure	0.031 (0.049)	0.384 (0.407)	1.862 (1.873)	1.080 (0.902)
Other	0.179** (0.076)	-0.728 (0.504)	-3.331 (2.228)	0.232 (0.654)
Observations	4,022	4,648	4,648	4,599
Schools	1,118	1,162	1,162	1,162
<i>Private, copayment</i>				
Personnel	0.053 (0.035)	1.239** (0.480)	7.981*** (2.424)	0.636* (0.366)
Quality programs	0.050 (0.134)	0.686 (1.139)	0.623 (6.330)	0.539 (0.920)
Student well-being	0.097 (0.293)	3.120 (2.248)	11.483 (12.163)	0.377 (1.827)
Operations	0.106 (0.073)	0.251 (0.354)	1.755 (2.520)	-0.456 (0.364)
Infrastructure	0.093** (0.039)	0.159 (0.291)	0.192 (1.645)	-0.303 (0.206)
Other	-0.159** (0.062)	-2.367** (0.921)	-15.194*** (4.837)	0.510 (0.373)
Observations	5,303	4,932	4,932	4,924
Schools	1,226	1,233	1,233	1,234

Notes: Each column is a single regression of SVA on the six broad categories entered jointly without a total-spending control, controlling for enrollment, the number of priority and preferential students, and the share of priority students, with school and year (and transition, for test scores) fixed effects, as in the main specification; urban schools. Private schools are split by whether they reported any copayment revenue in 2016–2022. Spending in USD 1,000 per student (2015 prices). Standard errors clustered at the school level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.4: Feasible Baseline–Endline Pairs for SVA Estimation (2015–2024)

VA Type	Baseline			Endline		
	Grade	Year	Test	Grade	Year	Test
Primary 2→4	2	2015	SIMCE	4	2017	SIMCE
Primary 4→6	4	2016	SIMCE	6	2018	SIMCE
	4	2022	SIMCE	6	2024	SIMCE
Primary 4→8	4	2015	SIMCE	8	2019	SIMCE
Primary 6→8	6	2015	SIMCE	8	2017	SIMCE
Secondary 6→10	6	2018	SIMCE	10	2022	SIMCE
Secondary 8→10	8	2015	SIMCE	10	2017	SIMCE
Secondary 10→12	10	2015	SIMCE	12	2017	PSU
	10	2016	SIMCE	12	2018	PSU
	10	2017	SIMCE	12	2019	PSU
	10	2018	SIMCE	12	2020	PDT
	10	2022	SIMCE	12	2024	PAES
Secondary 8→12	8	2017	SIMCE	12	2021	PDT
	8	2019	SIMCE	12	2023	PAES

Notes: Each row lists a feasible baseline–endline pair for constructing school value added. SIMCE is Chile’s national standardized assessment; PSU is the former university entrance exam; PDT and PAES are its successive replacements. Primary pairs use within-basic-education transitions; secondary pairs link basic education to the exit exam.

Table A.5: Spending Composition by Sector and Area: Per-Student Levels and Budget Shares (2015–2022 Averages)

	Public urban		Private urban		Public rural		Private rural	
	USD	%	USD	%	USD	%	USD	%
<i>Panel A: Expenditure categories (share of total spending)</i>								
Personnel	2,344	82.8	1,529	71.9	3,059	83.1	2,137	70.3
Operations	95	3.3	158	7.4	127	3.4	248	8.2
Infrastructure	40	1.4	234	11.0	50	1.4	254	8.4
Quality programs	100	3.5	99	4.6	125	3.4	159	5.2
Student well-being	55	1.9	41	1.9	88	2.4	183	6.0
Other	199	7.0	66	3.1	231	6.3	60	2.0
Total	2,833	100	2,127	100	3,679	100	3,042	100
<i>Panel B: Personnel types (share of personnel remunerations)</i>								
Classroom teachers	1,473	62.8	836	58.7	1,986	66.1	1,135	56.4
Admin. & paraprof. staff	300	12.8	168	11.8	319	10.6	240	11.9
Non-teaching professionals	221	9.4	152	10.7	266	8.9	197	9.8
Instr. support teachers	80	3.4	47	3.3	81	2.7	60	3.0
School leadership	130	5.6	137	9.6	186	6.2	240	11.9
Operational staff	142	6.0	84	5.9	167	5.6	141	7.0
Total personnel remunerations	2,345	100	1,424	100	3,005	100	2,013	100

Notes: Group-year aggregates averaged over 2015–2022: per-student USD (2015 prices) is total spending in the category divided by total enrollment in the group; shares are the category's spending divided by total spending (Panel A) or by total personnel remunerations (Panel B). Panel A uses the balanced panel of basic and secondary schools with at least ten students and per-student spending between USD 100 and 10,000; Panel B additionally restricts to schools with at least one test-score SVA, as in Figure A.4. corresponds to municipal schools; to privately managed voucher schools.

Table A.6: Spending Categories by Funding Source

	USD per	Share of the category financed by (%)				Composition of each source (%)		
	student	General	SEP	PIE	Other earmarked	General	SEP	PIE
<i>Panel A: All urban schools</i>								
Personnel	1,816	79.1	11.5	9.2	0.3	80.9	53.1	92.5
Quality programs	100	9.9	80.7	7.4	2.0	0.6	20.6	4.1
Student well-being (3.1–3.6)	25	9.3	62.9	4.6	23.2	0.1	3.9	0.6
Infrastructure	159	79.9	9.6	0.3	10.2	7.2	3.9	0.3
Operations and other	280	71.3	26.0	1.6	1.1	11.2	18.5	2.5
Total	2,380	74.6	16.5	7.6	1.4	100.0	100.0	100.0
<i>Panel B: Public schools</i>								
Personnel	2,302	76.1	11.5	12.1	0.3	88.5	54.7	94.7
Quality programs	102	2.9	85.5	8.6	3.0	0.1	18.1	3.0
Student well-being (3.1–3.6)	32	3.1	63.1	4.4	29.5	0.1	4.2	0.5
Infrastructure	38	29.3	28.3	1.2	41.2	0.6	2.2	0.2
Operations and other	322	65.9	31.0	1.5	1.5	10.7	20.7	1.7
Total	2,796	70.8	17.2	10.6	1.5	100.0	100.0	100.0
<i>Panel C: Private voucher schools</i>								
Personnel	1,529	81.7	11.5	6.6	0.3	75.5	51.7	89.2
Quality programs	99	14.2	77.8	6.6	1.4	0.8	22.6	5.8
Student well-being (3.1–3.6)	20	15.2	62.7	4.8	17.2	0.2	3.7	0.9
Infrastructure	231	84.9	7.7	0.3	7.2	11.9	5.3	0.5
Operations and other	254	75.4	22.2	1.6	0.8	11.6	16.7	3.7
Total	2,133	77.6	15.9	5.3	1.3	100.0	100.0	100.0

Notes: Expense records by funding source from the audited school accounts, 2015–2021, for the urban schools of the balanced panel; amounts pooled over the period and converted to 2015 USD. Sources: the regular voucher and other unrestricted income (General), the targeted equity subsidy (SEP), the special education program (PIE), and the smaller earmarked subsidies (maintenance, pro-retention, reinforcement, boarding, FAEP). The source breakdown is available at the level of parent accounts, which map to the paper’s categories except that transport and meals (3.7, 3.8) and the residual 8.x accounts are recorded with operations; student well-being here covers subcategories 3.1–3.6. Columns 3–6 give the share of each category’s spending financed by each source; columns 7–9 give how each source’s spending is distributed across categories.

Table A.7: Spending Differences Between High- and Low-SVA Schools

	Reading	Math	Attendance	Chr. absenteeism	Dropout
<i>Panel A: Raw difference, USD per student</i>					
Total spending	-454*** (28)	-513*** (27)	-332*** (28)	-154*** (28)	-415*** (29)
Personnel	-471*** (27)	-544*** (26)	-458*** (27)	-283*** (27)	-445*** (28)
Quality programs	-9*** (2)	-6*** (2)	15*** (2)	15*** (2)	2 (2)
Student well-being	-25*** (2)	-27*** (2)	13*** (2)	25*** (2)	-23*** (2)
Operations	10*** (3)	12*** (3)	33*** (3)	31*** (3)	13*** (3)
Infrastructure	72*** (5)	87*** (5)	94*** (5)	88*** (5)	38*** (5)
Other	-32*** (5)	-35*** (5)	-30*** (5)	-30*** (5)	1 (5)
<i>Panel B: Adjusted difference, USD per student</i>					
Total spending	-6 (22)	22 (21)	-23 (21)	25 (20)	-0 (20)
Personnel	-17 (20)	4 (19)	-88*** (19)	-47** (19)	2 (19)
Quality programs	16*** (2)	17*** (2)	13*** (2)	9*** (2)	10*** (2)
Student well-being	-7*** (2)	-8*** (2)	10*** (2)	17*** (2)	-14*** (2)
Operations	-1 (3)	-3 (3)	5* (3)	4 (3)	4 (3)
Infrastructure	-5 (4)	-0 (4)	8* (4)	21*** (4)	-22*** (4)
Other	8 (5)	12** (5)	29*** (5)	22*** (5)	20*** (5)
<i>Panel C: Adjusted difference, share of total spending (pp)</i>					
Personnel	-0.37 (0.29)	-0.53* (0.29)	-1.93*** (0.29)	-2.06*** (0.29)	-0.16 (0.29)
Quality programs	0.65*** (0.10)	0.70*** (0.10)	0.44*** (0.10)	0.25** (0.10)	0.41*** (0.10)
Student well-being	-0.22*** (0.07)	-0.29*** (0.07)	0.35*** (0.07)	0.58*** (0.07)	-0.45*** (0.07)
Operations	-0.04 (0.11)	-0.13 (0.11)	0.10 (0.11)	-0.07 (0.11)	0.26** (0.11)
Infrastructure	-0.37** (0.18)	-0.21 (0.18)	0.11 (0.18)	0.64*** (0.18)	-0.88*** (0.17)
Other	0.34** (0.17)	0.46*** (0.17)	0.93*** (0.18)	0.66*** (0.17)	0.82*** (0.17)
Schools	4,292	4,263	4,316	4,316	4,317

Notes: Urban schools of the balanced 2015–2022 panel. For each outcome, schools are classified into terciles of their mean SVA over the period, and each cell is the difference between the high and the low tercile in the school's 2015–2022 mean spending per student (Panels A and B) or budget share (Panel C), from a school-level regression of the spending variable on tercile indicators. Adjusted differences condition on sector, PIE participation, log enrollment, the number and share of priority students, and region fixed effects. Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.8: Quality Program Spending and School Value-Added: Subcategories

	Test scores (SD) (SD)	Attendance (pp)	Chr. absenteeism (pp; higher = better) (pp)	Dropout (pp)
<i>Panel A: Regression coefficients (per USD 1,000 per student)</i>				
Educ. Tech. Assist. (ATE)	0.189 (0.164)	0.769 (1.566)	3.418 (7.009)	3.073*** (1.073)
Staff Prof. Development	0.370 (0.416)	-6.503* (3.878)	-37.230** (16.184)	3.738 (2.779)
Courses and training (non-ATE)	0.322 (0.287)	5.398 (8.679)	33.641 (36.900)	-3.288 (4.004)
Learning Resources	0.150 (0.100)	-1.258 (0.957)	-5.716 (4.558)	0.197 (0.676)
Pedagogical Support Equip.	-0.034 (0.124)	-1.242 (1.422)	-3.748 (6.215)	-2.553** (1.026)
Observations	12,703	14,957	14,957	14,837
Schools	3,586	3,801	3,801	3,790
<i>Panel B: Spending per student, mean (SD), USD 2015</i>				
Educ. Tech. Assist. (ATE)		17 (34)		
Staff Prof. Development		4 (10)		
Courses and training (non-ATE)		0 (3)		
Learning Resources		57 (46)		
Pedagogical Support Equip.		28 (29)		

Notes: Each column is a single regression including all quality subcategories jointly and controlling for total spending per student. Urban schools only. Spending variables are category spending per student, averaged over the same window as the outcome (three years ending in the endline year for test scores; the three preceding years for attendance and chronic absenteeism; the outcome year and two preceding years for dropout), in units of USD 1,000 per student at 2015 prices; all regressions control for enrollment, the number of priority and preferential students, and the share of priority students, and include school and year fixed effects (plus transition fixed effects for test scores). Test-score SVA (reading) is in standard deviations of the endline test; attendance, chronic absenteeism, and dropout SVA are in percentage points, with higher values indicating better outcomes. Panel B reports the mean and standard deviation of per-student spending in the attendance estimation sample. Standard errors clustered at the school level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.9: Student Well-Being Spending and School Value-Added: Subcategories

	Test scores (SD) (SD)	Attendance (pp)	Chr. absenteeism (pp; higher = better) (pp)	Dropout (pp)
<i>Panel A: Regression coefficients (per USD 1,000 per student)</i>				
Uniforms & Clothing	-0.257 (0.314)	-2.303 (3.351)	-24.798 (16.779)	2.235 (2.806)
Other Student Well-Being	0.348* (0.193)	-2.463 (2.025)	-0.605 (9.611)	12.471 (8.934)
Sports Programs	0.314 (0.565)	12.814** (6.483)	25.773 (30.969)	-9.007** (4.568)
Medical Appointments	-0.367 (0.948)	40.212** (16.942)	137.118* (74.229)	-9.446 (6.060)
Student Support	0.715 (1.577)	-8.075 (28.628)	-20.867 (134.985)	21.166 (18.676)
School Supplies	-0.174 (0.392)	8.132** (3.599)	36.702** (18.434)	-1.006 (2.906)
Transportation	0.112 (0.154)	1.406 (1.378)	1.601 (6.364)	2.238* (1.252)
School Meals	0.036 (0.259)	2.614 (3.636)	4.640 (16.182)	-5.616* (2.891)
Observations	11,263	16,244	16,244	12,488
Schools	3,121	4,270	4,270	3,209
<i>Panel B: Spending per student, mean (SD), USD 2015</i>				
Uniforms & Clothing			9 (16)	
Other Student Well-Being			10 (19)	
Sports Programs			1 (4)	
Medical Appointments			1 (2)	
Student Support			0 (1)	
School Supplies			3 (8)	
Transportation			21 (43)	
School Meals			10 (21)	

Notes: Each column is a single regression including all well-being subcategories jointly and controlling for total spending per student. Urban schools only. Spending variables are category spending per student, averaged over the same window as the outcome (three years ending in the endline year for test scores; the three preceding years for attendance and chronic absenteeism; the outcome year and two preceding years for dropout), in units of USD 1,000 per student at 2015 prices; all regressions control for enrollment, the number of priority and preferential students, and the share of priority students, and include school and year fixed effects (plus transition fixed effects for test scores). Test-score SVA (reading) is in standard deviations of the endline test; attendance, chronic absenteeism, and dropout SVA are in percentage points, with higher values indicating better outcomes. Panel B reports the mean and standard deviation of per-student spending in the attendance estimation sample. Standard errors clustered at the school level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.10: Quality Subcategories by School Sector

	Test scores (SD)		Attendance (pp)		Chr. absenteeism (pp) (higher = better)		Dropout (pp)	
	Public	Private	Public	Private	Public	Private	Public	Private
Educ. Tech. Assist. (ATE)	0.292 (0.270)	0.093 (0.198)	-0.015 (3.378)	0.751 (1.288)	1.326 (14.900)	2.819 (6.326)	4.213** (1.668)	2.657* (1.360)
Staff Prof. Development	0.759 (0.621)	0.188 (0.526)	-9.135 (7.630)	-4.452 (3.372)	-44.579 (31.621)	-31.452** (15.323)	12.230*** (4.417)	0.119 (3.497)
Courses and training (non-ATE)	-0.965* (0.577)	0.701** (0.324)	4.128 (11.565)	6.157 (12.480)	17.791 (55.848)	48.855 (43.558)	-13.758** (5.803)	3.338 (5.091)
Learning Resources	0.307** (0.144)	0.072 (0.140)	-0.999 (1.742)	-1.360 (0.937)	-3.904 (8.459)	-7.052 (4.457)	0.837 (1.048)	-0.294 (0.900)
Pedagogical Support Equip.	0.041 (0.160)	-0.044 (0.192)	-1.280 (2.199)	0.286 (1.342)	-5.737 (9.378)	3.694 (6.790)	-1.846 (1.453)	-3.103** (1.267)
Observations	6,134	6,569	7,496	7,461	7,496	7,461	7,486	7,351
Schools	1,866	1,720	1,875	1,926	1,875	1,926	1,875	1,915

Notes: All quality subcategories entered jointly, controlling for total spending per student. Separate regressions for public (municipal) and private voucher schools; urban schools only. Spending in USD 1,000 per student (2015 prices), averaged over the outcome window; all regressions control for enrollment, the number of priority and preferential students, and the share of priority students, with school and year fixed effects (plus transition fixed effects for test scores). Test-score SVA (reading) in standard deviations; attendance, chronic absenteeism, and dropout SVA in percentage points, higher = better. Standard errors clustered at the school level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.11: Public vs. Private Schools: Personnel Subcategories and SVA

	Test scores (SD)		Attendance (pp)		Chr. absenteeism (pp) (higher = better)		Dropout (pp)	
	Public	Private	Public	Private	Public	Private	Public	Private
Classroom teachers	0.034 (0.054)	0.061 (0.115)	0.234 (0.362)	0.236 (0.486)	-0.772 (1.532)	0.749 (2.458)	0.333 (0.640)	0.209 (0.616)
Admin. & paraprof. staff	0.052 (0.091)	0.241 (0.199)	1.750** (0.792)	0.596 (1.103)	8.088** (3.305)	2.350 (5.548)	1.243 (1.229)	0.548 (1.222)
Non-teaching professionals	0.011 (0.093)	-0.138 (0.164)	-0.952* (0.547)	1.279 (0.803)	0.352 (2.366)	8.614** (4.167)	1.413 (1.064)	-0.511 (1.050)
Instr. support teachers	0.171 (0.131)	-0.089 (0.220)	-0.256 (0.794)	-0.239 (0.743)	-1.481 (3.848)	-0.828 (3.995)	1.731 (1.526)	0.527 (0.993)
School leadership	0.166 (0.161)	-0.142 (0.219)	-0.574 (0.862)	1.981** (0.940)	-5.133 (4.451)	6.213 (4.453)	0.257 (1.731)	1.523 (1.321)
Operational staff	0.078 (0.198)	-0.300 (0.374)	1.341 (1.548)	0.915 (1.341)	5.583 (6.046)	8.367 (7.408)	-2.098 (2.457)	-0.156 (2.130)
Observations	2,064	2,453	5,058	5,273	5,058	5,273	2,527	2,472
Schools	678	634	1,427	1,520	1,427	1,520	767	735

Notes: All six staff types entered jointly, controlling for total spending per student. Separate regressions for public (municipal) and private voucher schools; urban schools only. Spending in USD 1,000 per student (2015 prices), averaged over the outcome window; all regressions control for enrollment, the number of priority and preferential students, and the share of priority students, with school and year fixed effects (plus transition fixed effects for test scores). Test-score SVA (reading) in standard deviations; attendance, chronic absenteeism, and dropout SVA in percentage points, higher = better. Standard errors clustered at the school level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.12: Student Well-Being Subcategories by School Sector

	Test scores (SD)		Attendance (pp)		Chr. absenteeism (pp) (higher = better)		Dropout (pp)	
	Public	Private	Public	Private	Public	Private	Public	Private
Uniforms & Clothing	0.136 (0.309)	-1.299 (1.040)	0.391 (3.876)	4.270 (4.833)	-21.459 (19.748)	25.473 (18.596)	1.968 (3.296)	1.381 (5.730)
Other Student Well-Being	0.592*** (0.212)	0.071 (0.397)	-2.165 (2.906)	-4.719* (2.622)	-2.558 (14.000)	-5.346 (11.044)	2.345 (1.887)	24.142* (13.718)
Sports Programs	0.770 (0.701)	-0.700 (0.816)	6.800 (12.266)	0.710 (6.460)	-13.360 (59.472)	-2.081 (31.177)	-5.951 (5.279)	-5.910 (7.086)
Medical Appointments	2.465** (1.147)	-1.665 (1.272)	44.580* (24.634)	25.923 (23.792)	173.833 (119.891)	7.503 (75.929)	-7.383 (10.133)	-2.045 (8.141)
Student Support	0.701 (1.885)	-0.825 (2.918)	-21.383 (41.328)	10.916 (34.534)	-88.091 (192.165)	103.460 (154.553)	29.711 (21.516)	11.043 (27.607)
School Supplies	-0.325 (0.474)	0.134 (0.729)	9.464* (5.462)	10.723** (4.330)	18.210 (28.378)	62.858*** (18.605)	-3.862 (3.475)	3.032 (5.330)
Transportation	0.288 (0.197)	-0.273 (0.238)	-3.564 (2.481)	2.655* (1.482)	-19.510 (12.987)	7.898 (6.041)	3.015** (1.524)	1.897 (2.320)
School Meals	-0.034 (0.295)	0.633 (0.545)	6.707 (4.671)	-6.091 (4.683)	21.215 (20.385)	-36.706 (23.192)	-1.624 (3.406)	-10.240** (4.358)
Observations	5,882	5,381	7,467	8,777	7,467	8,777	7,204	5,284
Schools	1,781	1,340	1,875	2,395	1,875	2,395	1,822	1,387

Notes: All well-being subcategories entered jointly, controlling for total spending per student. Separate regressions for public (municipal) and private voucher schools; urban schools only. Spending in USD 1,000 per student (2015 prices), averaged over the outcome window; all regressions control for enrollment, the number of priority and preferential students, and the share of priority students, with school and year fixed effects (plus transition fixed effects for test scores). Test-score SVA (reading) in standard deviations; attendance, chronic absenteeism, and dropout SVA in percentage points, higher = better. Standard errors clustered at the school level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.13: Spending Composition and School Value-Added by Baseline Spending per Student

	Test scores (SD)	Attendance	Chr. absenteeism (pp; higher = better)	Dropout
<i>Panel A: Low tercile of 2015 spending per student</i>				
Personnel	0.022 (0.018)	0.123 (0.249)	0.184 (1.369)	0.679*** (0.190)
Quality programs	0.010 (0.111)	-0.975 (1.351)	-3.667 (5.939)	-1.681* (0.921)
Student well-being	-0.071 (0.240)	-2.960* (1.787)	-13.602 (8.435)	12.182 (9.230)
Operations	0.057 (0.101)	0.045 (0.720)	1.926 (3.523)	-0.909 (0.902)
Infrastructure	-0.000 (0.049)	1.629*** (0.533)	6.722*** (2.594)	-0.001 (0.636)
Other	0.032 (0.070)	-1.737** (0.807)	-11.004** (4.313)	0.050 (0.524)
Observations	5,447	5,692	5,692	5,690
<i>Panel B: Middle tercile</i>				
Personnel	0.072*** (0.020)	0.311 (0.357)	2.380 (1.840)	1.085*** (0.253)
Quality programs	-0.044 (0.110)	-0.860 (1.247)	-6.426 (5.629)	1.027 (0.811)
Student well-being	0.087 (0.145)	3.537* (1.827)	8.521 (9.984)	-0.520 (1.221)
Operations	0.017 (0.063)	1.970** (0.977)	7.221** (3.358)	1.825*** (0.629)
Infrastructure	0.184*** (0.048)	0.950 (0.605)	2.576 (3.017)	0.021 (0.607)
Other	-0.014 (0.050)	-2.754*** (0.884)	-10.153*** (3.343)	0.087 (0.488)
Observations	5,294	5,696	5,696	5,671
<i>Panel C: High tercile</i>				
Personnel	0.037** (0.015)	0.041 (0.260)	0.375 (0.922)	0.007 (0.149)
Quality programs	0.239** (0.098)	-0.282 (0.988)	-1.506 (4.604)	-0.149 (0.763)
Student well-being	0.104 (0.124)	1.924 (1.594)	11.089 (7.109)	-0.061 (0.909)
Operations	0.002 (0.061)	0.945* (0.512)	3.738** (1.536)	0.959** (0.489)
Infrastructure	0.086 (0.070)	-0.021 (0.310)	1.222 (1.780)	-1.028** (0.463)
Other	-0.048 (0.031)	0.425 (0.354)	2.050 (1.554)	-0.334 (0.270)
Observations	4,751	5,692	5,692	5,662
<i>Panel D: High minus low tercile</i>				
Personnel	0.015 (0.024)	-0.082 (0.360)	0.191 (1.650)	-0.672*** (0.242)
Quality programs	0.229 (0.148)	0.694 (1.674)	2.161 (7.514)	1.531 (1.196)
Student well-being	0.175 (0.270)	4.883** (2.395)	24.691** (11.031)	-12.243 (9.275)
Operations	-0.055 (0.118)	0.900 (0.883)	1.813 (3.843)	1.868* (1.026)
Infrastructure	0.086 (0.085)	-1.650*** (0.617)	-5.501* (3.146)	-1.027 (0.786)
Other	-0.079 (0.076)	2.162** (0.881)	13.055*** (4.584)	-0.384 (0.590)

Notes: Six spending categories entered jointly, without a total-spending control, as in Table 4. Terciles are defined among the urban schools of the balanced panel using 2015 values. Each panel reports the coefficients of a fully interacted model in which all spending variables, controls, and year (and transition) fixed effects are interacted with the tercile indicator, with school fixed effects; the estimates equal those of separate regressions by tercile, and Panel D reports the difference between the high and the low tercile with its standard error. Same samples, controls, units, and fixed effects as Table 4: urban schools; USD 1,000 per student; test-score SVA (reading) in standard deviations, the other three in percentage points, higher = better. Standard errors clustered at the school level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.14: Spending Composition and School Value-Added by Funding Source

	Test scores (SD)	Attendance	Chr. absenteeism (pp; higher = better)	Dropout
Personnel, SEP-financed	-0.055 (0.061)	4.017*** (1.549)	24.609*** (6.988)	-0.436 (0.457)
Personnel, other sources	0.012 (0.016)	-1.292*** (0.405)	-4.722*** (1.767)	0.582*** (0.120)
Quality programs, SEP-financed	0.075 (0.096)	2.509 (1.943)	9.203 (8.825)	-0.719 (0.526)
Quality programs, other sources	0.491** (0.236)	-5.069 (4.734)	-42.491** (18.639)	1.268 (1.188)
Student well-being, SEP-financed	-0.135 (0.225)	9.814** (4.551)	42.144* (23.856)	-1.810 (1.141)
Student well-being, other sources	0.268 (0.601)	-10.919 (8.364)	-24.705 (34.824)	18.279 (12.403)
Infrastructure	-0.057 (0.080)	2.708*** (0.894)	11.655*** (4.286)	-0.554* (0.321)
Operations and other	-0.038 (0.034)	-0.686 (0.738)	-2.412 (2.978)	-0.044 (0.180)
<i>p</i> -value, SEP = other: Personnel	0.297	0.001	0.000	0.044
<i>p</i> -value, SEP = other: Quality programs	0.107	0.155	0.016	0.126
<i>p</i> -value, SEP = other: Student well-being	0.525	0.031	0.124	0.121
Observations	13,384	8,540	8,540	17,023

Notes: Same samples, windows, controls, fixed effects, and units as Table 4, with all spending variables built from the expense-by-source records of Appendix Table A.6 (2015–2021, so windows that reach 2022 are dropped). Personnel, quality programs, and student well-being are split into the part financed by the targeted equity subsidy (SEP) and the part financed by all other sources; infrastructure and the operations group enter as totals. The *p*-values test equality of the SEP and non-SEP coefficients within a category. Standard errors clustered at the school level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.15: Spending Composition and Non-Cognitive SVA: Annual versus Cohort-Based Value Added (Broad Categories)

	Attendance	Chr. absenteeism (pp; higher = better)	Dropout
<i>Panel A: Annual SVA (school and year FE; paper's specification)</i>			
Personnel	0.036 (0.054)	0.040 (0.053)	0.210*** (0.045)
Quality programs	-0.249 (0.222)	-0.278 (0.221)	-0.125 (0.201)
Student well-being	0.516 (0.338)	0.397 (0.359)	0.837 (0.951)
Operations	0.404*** (0.151)	0.328*** (0.110)	0.290* (0.163)
Infrastructure	0.221** (0.097)	0.219* (0.113)	-0.216 (0.149)
Other	-0.130 (0.101)	-0.116 (0.095)	-0.104 (0.092)
Observations	17,080	17,080	17,023
Schools	4,270	4,270	4,271
<i>Panel B: Cohort-based SVA (school, year, and transition FE; test-score structure)</i>			
Personnel	-0.203*** (0.055)	-0.078 (0.052)	-0.026 (0.048)
Quality programs	1.094*** (0.308)	0.947*** (0.308)	0.468** (0.215)
Student well-being	0.516 (0.437)	0.463 (0.433)	-0.231 (0.339)
Operations	0.389** (0.191)	0.549*** (0.178)	0.145 (0.124)
Infrastructure	0.357*** (0.138)	0.423*** (0.143)	0.136 (0.097)
Other	-0.079 (0.134)	-0.139 (0.125)	-0.013 (0.126)
Observations	15,425	15,425	13,856
Schools	4,209	4,209	3,809

Notes: Each column is a single regression of standardized SVA (mean zero, unit standard deviation within sample) on the six broad categories entered jointly without a total-spending control, controlling for enrollment, the number of priority and preferential students, and the share of priority students. Urban schools only. Panel A uses the annual SVA measures of the paper (student-level model with school-by-year effects; spending averaged over the three years preceding the outcome year for attendance and chronic absenteeism and over the outcome year and two preceding years for dropout). Panel B re-estimates the three measures with the cohort-transition structure of the test-score SVA: the same baseline–endline grade-year pairs, students observed at both points, the student's baseline attendance rate as the prior-outcome control, endline-school effects (baseline-school effects for dropout, defined as permanent exit from the school system between baseline and endline), empirical Bayes shrinkage with transition-specific variance components, and spending averaged over the three years ending in the endline year; the sample keeps the first and last transition per school, as in the test-score regressions. Spending in USD 1,000 per student (2015 prices). Standard errors clustered at the school level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.16: One-Step versus Two-Step Estimates: Broad Spending Categories

	Test scores (SD)		Attendance	Chr. absenteeism (pp; higher = better)	Dropout
	Reading	Math	(pp)	(pp, reversed)	(pp, reversed)
<i>Panel A: One-step, student-level outcome on spending</i>					
Personnel	0.059*** (0.015)	0.047*** (0.014)	0.220 (0.221)	1.709 (1.049)	0.917*** (0.130)
Quality programs	-0.009 (0.083)	0.131 (0.087)	0.037 (0.995)	-0.994 (4.355)	-0.202 (0.514)
Student well-being	-0.003 (0.129)	-0.092 (0.134)	1.182 (1.256)	1.528 (6.362)	1.126 (1.672)
Operations	0.054 (0.074)	0.077 (0.067)	0.901* (0.462)	3.685* (2.008)	0.475 (0.335)
Infrastructure	0.155*** (0.040)	0.059 (0.039)	0.996** (0.408)	4.407* (2.297)	-0.650*** (0.219)
Other	-0.091** (0.035)	-0.076 (0.047)	-0.889** (0.435)	-4.690** (1.821)	-0.239 (0.245)
Observations	664,839	525,973	7,831,102	7,831,102	7,229,899
Schools	4,216	4,213	4,270	4,270	4,271
<i>Panel B: Two-step, empirical Bayes SVA on spending (same samples, native units)</i>					
Personnel	0.044*** (0.010)	0.054*** (0.009)	0.109 (0.163)	0.551 (0.731)	0.504*** (0.108)
Quality programs	0.075 (0.061)	0.131** (0.063)	-0.756 (0.675)	-3.846 (3.062)	-0.301 (0.482)
Student well-being	0.019 (0.089)	-0.013 (0.091)	1.565 (1.025)	5.486 (4.971)	2.013 (2.288)
Operations	0.020 (0.042)	0.042 (0.043)	1.226*** (0.459)	4.531*** (1.515)	0.697* (0.393)
Infrastructure	0.089*** (0.031)	0.036 (0.031)	0.672** (0.294)	3.032* (1.568)	-0.518 (0.359)
Other	-0.037 (0.024)	-0.033 (0.029)	-0.393 (0.305)	-1.599 (1.320)	-0.249 (0.221)
Observations	15,492	11,817	17,080	17,080	17,023
Schools	4,215	4,092	4,270	4,270	4,271

Notes: Each column is a single regression including the six broad categories jointly without a total-spending control, controlling for enrollment, the number of priority and preferential students, and the share of priority students; urban schools only. Panel A regresses the student-level outcome directly on spending, controlling for the student's own prior outcome (baseline test score, with a slope that varies by transition, or previous-year attendance rate) and grade fixed effects for the annual outcomes; fixed effects are school, year, and transition for test scores and school and year otherwise; standard errors clustered at the school level. Panel B regresses the empirical Bayes SVA of the main specification on the same regressors, on the same school-period samples. Test scores in standard deviations of the endline test; attendance in percentage points; chronic absenteeism and dropout in percentage points with the sign reversed so that a positive coefficient indicates a better outcome. Spending in USD 1,000 per student (2015 prices). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.17: Spending Composition and Questionnaire-Based Outcomes: School Climate, Motivation, Civic Participation, and Healthy Habits

	Self-esteem and motivation	School climate	Civic participation	Healthy habits
Total spending	0.139*** (0.020)	0.201*** (0.019)	0.158*** (0.020)	0.110*** (0.018)
Personnel	0.183*** (0.025)	0.267*** (0.025)	0.211*** (0.025)	0.140*** (0.024)
Quality programs	0.321** (0.125)	0.375*** (0.125)	0.408*** (0.126)	0.466*** (0.123)
Student well-being	0.388* (0.211)	0.443** (0.206)	0.302 (0.224)	0.425** (0.212)
Operations	0.020 (0.090)	0.040 (0.078)	0.058 (0.077)	0.070 (0.070)
Infrastructure	0.028 (0.066)	0.021 (0.068)	0.028 (0.065)	-0.011 (0.067)
Other	0.092* (0.052)	0.019 (0.055)	0.031 (0.054)	0.085* (0.051)
Observations	37,272	36,525	37,260	37,269
Schools	4,259	4,258	4,258	4,259

Notes: Outcomes are the four school-level Personal and Social Development Indicators (IDPS) that the Agencia de Calidad constructs from the SIMCE student and parent questionnaires (0–100 scale), standardized within grade and year; one observation per school, grade (4th, 6th, 8th, 10th), and survey year (2016–2019, 2022). The first row is a regression on total spending per student alone; the remaining rows come from a single regression per column including the six broad categories jointly without a total-spending control; all control for enrollment, the number of priority and preferential students, and the share of priority students, with school and grade-by-year fixed effects. Spending is averaged over the three years ending in the survey year (two years for 2016) and expressed in USD 1,000 per student (2015 prices). Because the indicators are school aggregates, no prior-outcome control is available; identification relies on within-school variation. Urban schools of the balanced panel. Standard errors clustered at the school level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.18: Balance Test: Within-School Changes in Student Composition and Spending Composition (Annual Sample)

	Share priority (pp)	Share preferential (pp)	Share female (pp)	Log enrollment ($\times 100$)
<i>Panel A: No controls</i>				
Total spending	2.492*** (0.242)	2.506*** (0.239)	-0.212** (0.094)	-7.028*** (0.424)
Personnel	1.838*** (0.222)	1.693*** (0.247)	-0.164 (0.112)	-9.649*** (0.526)
Quality programs	1.729*** (0.146)	1.449*** (0.141)	-0.042 (0.046)	0.108 (0.220)
Student well-being	1.165*** (0.188)	0.722*** (0.181)	-0.029 (0.066)	0.149 (0.339)
Operations	0.565*** (0.089)	0.652*** (0.091)	-0.017 (0.041)	-1.257*** (0.183)
Infrastructure	0.120 (0.156)	0.682*** (0.199)	-0.061 (0.038)	0.267 (0.417)
Other	0.093 (0.107)	0.251** (0.119)	-0.061 (0.038)	0.387*** (0.148)
Joint p -value (6 categories)	0.000	0.000	0.211	0.000
Mean of dependent variable	48.3	10.4	48.7	609.1
Observations	17,080	17,080	17,080	17,080
Schools	4,270	4,270	4,270	4,270
<i>Panel B: With main-specification controls</i>				
Total spending			-0.245*** (0.095)	
Personnel			-0.204* (0.112)	
Quality programs			-0.044 (0.049)	
Student well-being			-0.035 (0.067)	
Operations			-0.023 (0.041)	
Infrastructure			-0.062 (0.038)	
Other			-0.059 (0.037)	
Joint p -value (6 categories)			0.166	
Mean of dependent variable			48.7	
Observations			17,080	
Schools			4,270	

Notes: Sample and fixed effects (school and year) as in the attendance and chronic absenteeism SVA regressions (2016–2019); results for the dropout sample (2016–2020) are nearly identical and available on request. The first row is a regression of the column variable on total spending per student alone; the remaining rows come from a single regression per column on the six spending categories entered jointly, as in the main specification, with the same samples, fixed effects, and clustering as the main SVA regressions (urban schools; balanced 2015–2022 panel). Spending regressors are per student and standardized to mean zero and unit standard deviation within each estimation sample, so coefficients measure the within-school change in the composition variable associated with a one-standard-deviation increase in the category, holding the other categories fixed. Shares are in percentage points; log enrollment is multiplied by 100 so coefficients read as percent changes. Panel B adds the controls of the main specification (enrollment, number of priority and preferential students, and share of priority students) and is therefore reported only for composition variables that are not themselves controls. The joint p -value tests that the six category coefficients are jointly zero. Standard errors clustered at the school level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.