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Comparative Fiscal Architecture: A Two-Axis Framework for Understanding Educational Inequality Across Tax Jurisdictions

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While existing school-finance literature often treats income as a demographic variable, this paper reframes income differences as products of fiscal architecture: tax rules, eligibility criteria, budget transfers, and jurisdiction-level constraints. I argue that educational inequality cannot be understood without clarifying how money is collected, redistributed, and translated into rule-based access points.

The framework offers a replicable way to examine institutional tension across educational systems—including K–12, postsecondary, and adult education—providing a basis for future measurement tools such as the Institutional Tension Index (ITI).

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Comparative Fiscal Architecture: A Two-Axis Framework for Understanding Educational Inequality Across Tax Jurisdictions

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ABSTRACT

This paper introduces a structural, mechanism-based framework for understanding how inequality in education emerges from fiscal design rather than from demographic patterns alone. I propose a Two-Axis Fiscal Architecture in which educational opportunity is shaped by (1) horizontal flows of capital across tax jurisdictions (the X-axis), divided into cross-border movement (X1) and cross-regional movement (X2), and (2) intergenerational after-tax capacity (the Y-axis). These two flows jointly determine how public and private capital enter different educational pathways.

While existing school-finance literature often treats income as a demographic variable, this paper reframes income differences as products of fiscal architecture: tax rules, eligibility criteria, budget transfers, and jurisdiction-level constraints. I argue that educational inequality cannot be understood without clarifying how money is collected, redistributed, and translated into rule-based access points.

The framework offers a replicable way to examine institutional tension across educational systems—including K–12, postsecondary, and adult education—providing a basis for future measurement tools such as the Institutional Tension Index (ITI).

1. INTRODUCTION

Income appears almost everywhere in contemporary research on educational inequality. Studies of school sorting, residential clustering, and district-level performance routinely show that higher-income families concentrate in high-performing districts and that property values track school quality (Owens, 2020; Reardon, 2016). Work in school finance further documents how funding formulas, often anchored in local tax bases, can entrench spatial advantage over time (Jackson, Johnson, & Persico, 2016; Lafortune, Rothstein, & Schanzenbach, 2018). Recent analyses of post-pandemic enrollment patterns extend this picture, showing that higher-income and White families were disproportionately likely to exit local public schools for private and home-school options (Francis & Goodman, 2025). In Massachusetts, for example, Francis and Goodman (2025) find that enrollment losses are concentrated in the highest-income quintile of districts, while lower-income districts largely recover, and higher-income and White families are more likely to move into non-public options.

Across this literature, however, income typically enters as a background characteristic or control variable. “High-income” and “low-income” households or districts are treated as fixed categories

whose internal formation and transformation do not require explanation. Empirical work rarely asks how tax systems produce after-tax income distributions, how jurisdictional boundaries structure public funding capacity, or how those fiscal arrangements are converted into rule-based differences in who can attend which schools under what conditions (Slemrod & Bakija, 2022; OECD, 2022). As a result, we know a great deal about where income-based gaps appear but far less about the fiscal architectures that make those gaps possible in the first place.

This paper starts from the premise that income differences become educational inequality through a prior layer of design that is itself structured and measurable. I use the term *fiscal architecture* to denote the ensemble of tax rules, jurisdictional constraints, and capital flows that determine how money is collected, classified, and redeployed—and how households experience "after-tax capacity" when they make decisions about housing, schooling, and professional pathways (Pistor, 2019; Chetty et al., 2014). The same pre-tax earnings can support very different educational trajectories depending on how cross-border income is taxed, how intergenerational transfers are treated, and how subnational finance links local tax bases to school budgets (Corak, 2013; Musgrave, 1989). When studies report outcome gaps between income groups, they are often observing the downstream effects of this architecture without naming it.

To make this hidden layer visible, I introduce a Two-Axis Fiscal Architecture framework. The horizontal axis tracks fiscal flows across jurisdictions, distinguishing cross-border movement across national tax systems (X_1) from cross-regional variation within countries (X_2) as resources move across states, provinces, and school districts. The vertical axis tracks intergenerational after-tax capacity as it moves through time, capturing how tax regimes and legal rules shape the ability of families to sustain or alter their position across generations. Together, these axes allow educational opportunity to be read not just as a correlation between income and outcomes, but as the output of rule-sequenced interactions between tax design, jurisdictional scale, and household capacity.

Existing scholarship offers increasingly precise descriptions of funding gaps, income segregation, mobility patterns, and sectoral shifts in enrollment (Jackson et al., 2016; Reardon, 2016; Chetty et al., 2014; Francis & Goodman, 2025). What is still missing is a structural account of how fiscal systems organize capital flows in ways that systematically advantage some educational pathways over others. The Two-Axis framework is offered as that connective tissue. It treats educational inequality as a problem of fiscal architecture and institutional rules, providing a mechanism-level lens that can be applied to K–12 systems, postsecondary access, and cross-national comparisons such as the contrasting income tax architectures of the United States and Canada. In this sense, I do not merely take "high-income" and "low-income" categories as given; I use fiscal architecture to examine how those categories are produced, stabilized, and converted into differentiated educational pathways.

2. THE TWO-AXIS FISCAL ARCHITECTURE

The Two-Axis Fiscal Architecture treats educational opportunity as the outcome of interactions between two kinds of movement: horizontal flows of capital across jurisdictions and vertical

transmission of after-tax capacity across generations. Rather than treating taxation and legal rules as a background "context" for education systems, the framework models them as an active geometry within which households, schools, and governments operate. Figure 1 presents a simple visual version of this geometry; Figure 2 shows how the same coordinate system can be read as an econometric state space. A fuller ontological justification of this dual structure—distinguishing the domain of pre-tax public capital from the domain of post-tax private capacity—is developed in Huang (2025, SSRN Working Paper No. 5696303). The present paper outlines only the institutional components required for the fiscal analysis.

2.1 X-Axis: Horizontal Fiscal Flows

The horizontal dimension captures how capital moves across jurisdictions and how fiscal rules shape the tax bases that support education. I distinguish between cross-border flows (X1) and within-country regional flows (X2), which together determine how both public and private resources enter territorial education systems.

X1: Cross-Border Fiscal Flows.
X1 refers to the movement of income and assets across national tax jurisdictions through residence rules, international reporting standards, withholding mechanisms, and the design of global income taxation. Countries differ substantially in how they define taxable residence, how they treat foreign-source income, and how they coordinate information through bilateral treaties and multilateral standards such as the OECD's Common Reporting framework (OECD, 2022). These rules shape the portion of globally mobile income that becomes part of the domestic tax base and, correspondingly, the after-tax capacity available to households' making decisions about housing, schooling, and mobility (Slemrod & Bakija, 2022; Pistor, 2019).

X2: Cross-Regional Fiscal Flows.
X2 captures how capital moves within a country across states, provinces, and school districts. In many systems—including the United States—local property tax bases remain central to school funding, creating substantial variation in per-pupil resources across districts with different levels of taxable wealth (Lafortune, Rothstein, & Schanzenbach, 2018). State-level equalization formulas can offset or reinforce these differences by reallocating revenues through grants, categorical funding, or foundation models (Jackson, Johnson, & Persico, 2016). Other systems—such as certain Canadian provinces—centralize collection and redistribute through uniform rates and province-wide formulas, reducing the direct connection between local wealth and school budgets (Corak, 2013).

Taken together, X1 and X2 organize how pre-tax public capital (revenues and transfers) and post-tax private capital (household capacity) circulate across jurisdictions. Observed income-based disparities in educational opportunity reflect these underlying fiscal structures rather than exogenous characteristics of families.

To situate the framework analytically, Figure 1 positions the two X-dimensions—cross-border flows (X_1) and cross-regional flows (X_2)—along a single horizontal axis, with the Y-axis capturing intergenerational after-tax capacity. The distinction between X_1 and X_2 reflects the

different scales at which fiscal rules operate: some govern how income and assets move across national jurisdictions, while others determine how resources circulate within states, provinces, and school districts. Both channels shape the public and private capital that enters territorial education systems, but they do so through different institutional mechanisms. With this structure in place, Section 2.1 describes the horizontal dimension (X_1/X_2), followed in Section 2.2 by the vertical dimension (Y), which traces how after-tax capacity accumulates and transmits across generations.

Figure 1. The Two-Axis Fiscal Architecture.
The horizontal axis (X) captures fiscal flows across jurisdictions. Cross-border flows (X_1) move across national tax boundaries, while cross-regional flows (X_2) move within a country across states, provinces, and school districts. The vertical axis (Y) represents intergenerational after-tax capacity—the resources households retain and transmit over time. Together, these dimensions provide a coordinated way to read how fiscal rules structure educational opportunity.

Figure 1. Two-Axis Fiscal Architecture.
The diagram summarizes the framework's core geometry. The horizontal axis represents fiscal movement across jurisdictions, divided into $\mathbf{X_1}$ (cross-border flows shaped by international tax rules) and $\mathbf{X_2}$ (cross-regional flows within a country's fiscal system). The vertical axis represents intergenerational after-tax capacity, shown as a downward vector to reflect its one-directional movement from older to younger cohorts. Together, the axes depict how fiscal rules structure the range of possible moves across space and the depth of capacity that families can carry across time.

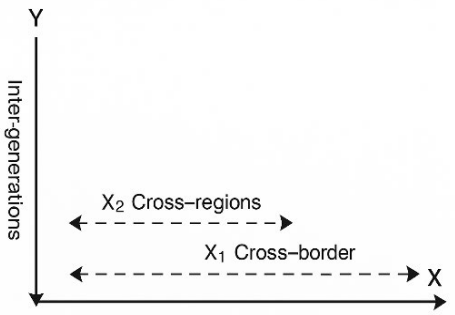

Figure 1. Two-Axis Fiscal Architecture

2.2 Y-Axis: Intergenerational After-Tax Capacity

The Y-axis tracks how fiscal rules structure a family's after-tax capacity over time.
While horizontal flows (X_1/X_2) shape the resources entering public systems, the Y-axis captures how much private capacity families can deploy across generations when making decisions about housing, schooling, tutoring, and postsecondary pathways.
Intergenerational capacity is not simply "wealth." It is the cumulative result of tax treatment, legal classification, and the timing of capital transfers (Piketty, 2014; Pistor, 2019). Estate and gift taxation, retirement-account rules, preferential capital-gains treatment, and the classification of education-related savings instruments all determine how much after-tax capital can be preserved or expanded across generations (Gale, 2021; OECD, 2022).

This vertical movement matters for education because many decisions—moving districts, purchasing a home, paying private tuition, investing in enrichment—occur on multi-year or multi-decade horizons (Chetty et al., 2014; Corak, 2013). Families with stable or increasing after-tax carrying capacity can convert long-term financial advantages into institutional access: qualifying for mortgage financing in high-performing districts, absorbing tuition shocks,

sustaining extracurricular spending, or supporting postsecondary choices with lower debt burdens.

For many higher-income households, after-tax capacity does not arise from current earnings alone. It is shaped by the legal and organizational vehicles through which assets are held and transmitted—family businesses, holding companies, inter vivos and testamentary trusts, and other succession structures. Research on business succession and wealth transfer consistently shows that a substantial share of top-decile wealth takes the form of closely held firms and trust-mediated assets. These arrangements can smooth income, protect principal, and stage transfers across time rather than at a single point (Piketty, 2014; OECD, 2021). They expand the range of feasible options: families can retain control over productive assets, separate legal ownership from beneficial enjoyment, and pre-arrange educational support for children and grandchildren while staying within the boundaries of tax law.

By contrast, households whose after-tax capacity is periodically reduced by volatile income, limited savings, or rules that heavily tax transfers face tighter constraints on mobility, timing, and educational choice. These pressures accumulate. Even modest advantages in tax-preferred savings or inheritance compound into significant educational divergence by adolescence and early adulthood (OECD, 2022).

Within the Two-Axis Fiscal Architecture, the Y-axis functions as the vertical constraint structure that determines how financial position over time interacts with the horizontal fiscal landscape. While X_1 and X_2 shape how public and private capital are distributed across space, the Y-axis determines who can carry resources across time and how that temporal capacity becomes embodied in educational pathways.

Succession and trust arrangements are therefore not treated as marginal "planning choices." They are integral components of the institutional machinery that influences who is classified—and who remains—"high income" across generations.

2.3 A Dual Reading of the Coordinate System

At a first, purely visual level, the two axes are meant to give an intuitive picture of how opportunity moves. Along the horizontal axis, people and capital shift across borders and regions: households migrate, firms relocate, tax bases expand or contract, and public budgets recompose themselves as money flows through different legal and policy modules. On the vertical axis, after-tax capacity cascades across generations, as earnings, inheritances, trusts, and family decisions shape how much fiscal room each generation has to sustain or alter its educational trajectories. The simple X–Y diagram is therefore a way of seeing horizontal movement and vertical transmission at the same time.

The same diagram, however, also defines a space in which more formal measurement can occur. Once households, students, or cohorts are represented as points in this plane, econometric models can be used to study how different legal and policy regimes transform their positions—how

certain tax rules, family-law arrangements, or program designs bend trajectories, create clusters, or widen the distance between groups. In this sense, the coordinate system does double work: it offers an accessible geometric picture of fiscal flows, and it quietly establishes the state space in which quantitative tools and future indices can be constructed.

The Two-Axis framework is not only a conceptual device; it also defines a geometric space in which empirical measurement can take place. Each household, student, or cohort at a given point in time can be represented as a coordinate (x_i, y_i), where $x_i$indexes its position along horizontal fiscal flows—cross-border and cross-regional public and private capital—and $y_i$indexes its intergenerational after-tax carrying capacity. Legal and policy modules—tax rules, family law, trust law, immigration rules, and program design—then operate as transformations on this space, shifting points, bending trajectories, or clustering certain groups into specific regions of the plane.

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Figure 2 summarizes this dual role. At a visual level, it is simply the same X–Y diagram, populated with schematic points representing empirical configurations. At a methodological level, it can be treated as an econometric state space: once observations are mapped into this plane, context-specific models can be estimated within a common geometric frame, and institutional tension can be quantified as patterns of distortion or clustering in the X–Y space. The paper does not fix a particular functional form or disclose any proprietary index algorithms; instead, it lays out the coordinate structure within which future measurement—such as institutional tension indices—can be developed.

Econometric models can be understood as tools for estimating how these transformations play out in different institutional settings. In one context, the focus might be on how a change in cross-border tax treatment alters the distribution of $x_i$among mobile professional households; in another, on how inheritance and trust rules reshape $y_i$for families at different points in the wealth

distribution. Across cases, the underlying geometry remains the same, but the functional forms and identifying assumptions adapt to the local data and legal environment. In this sense, the Two-Axis architecture provides a common state space, while econometric practice supplies a family of context-specific models that trace how fiscal architecture becomes educational opportunity.

This geometric view also points toward measurement tools such as an Institutional Tension Index. Rather than treating "inequality" as an undifferentiated outcome, one can define benchmarks or "ideal trajectories" in the (X, Y)space—for example, a reference relationship between horizontal opportunity to move and vertical capacity to sustain that move across generations—and then quantify how far particular groups, jurisdictions, or policy regimes deviate from those trajectories. Doing so opens the door to comparative work in which institutional tension is not only described but also measured as the degree and pattern of distortion in the X–Y plane.

Figure 2. The Two-Axis Coordinate System as an Econometric State Space.

This figure illustrates how the Two-Axis Fiscal Architecture can be read at two levels. Visually, the X–Y diagram shows horizontal movement across jurisdictions and vertical transmission of after-tax capacity across generations. Methodologically, the same coordinate system functions as an econometric state space in which households, students, or cohorts can be represented as points. Legal and policy regimes operate as transformations on this space—shifting positions, bending trajectories, or generating clusters. The figure is schematic and does not encode a specific functional form; its purpose is to show how the Two-Axis framework provides a unified coordinate system within which context-specific models and future indices of institutional tension can be constructed**.**

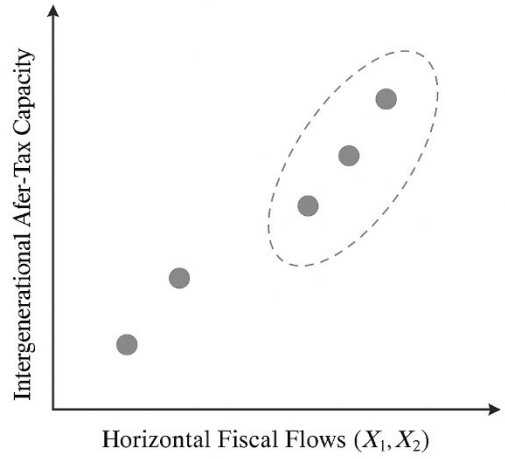

Figure 2. The Two-Axis Coordinate System as an Econometric State Space

Measurement Potential in the Two-Axis System

Although the Two-Axis Fiscal Architecture is conceptual, it is designed to be measurable. The X–Y plane creates a unified coordinate system where fiscal movements (X-axis) and intergenerational capacity (Y-axis) generate observable distributions. Districts, households, and tax-policy environments appear as clusters, gradients, or transitions across this plane.

This makes the framework compatible with standard econometric tools.
Panel models can estimate how shifts along the X-axis affect access at different Y-levels; fixed-

effects structures can isolate jurisdictional constraints; and semi-parametric designs can compare districts with similar capacity but different fiscal interfaces. The framework therefore does more than describe patterns—it defines a measurable space where fiscal and educational dynamics can be empirically evaluated.

Figure 3. From the Two-Axis Framework to Econometric Measurement.

The Two-Axis system defines a shared coordinate space in which horizontal fiscal flows and intergenerational capacity appear as observable distributions in the X–Y plane. Econometric models—such as panel designs, fixed effects, clustering, and semi-parametric comparisons—operate within this space to generate measurable outputs, including indices or fiscal-access profiles.

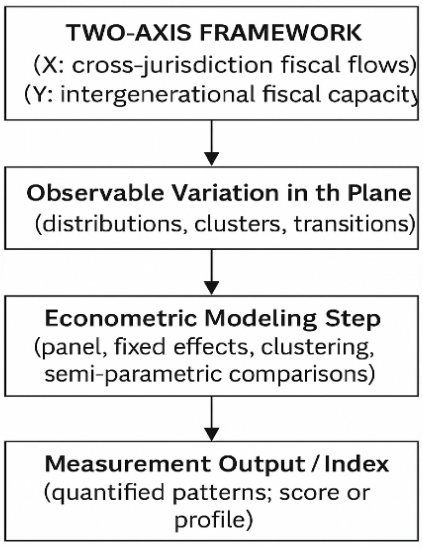

Figure 3. From the Two-Axis Framework to Econometric Measurement

2.4 From Fiscal Architecture to Educational Pathways

Educational pathways do not arise directly from family income. They emerge through a series of rule-based conversion points where fiscal architecture interacts with district regulations, verification processes, and timing constraints. I use "conversion points" to highlight that households do not simply choose schools; they navigate eligibility rules that translate fiscal position into institutional access.

First, horizontal fiscal flows shape the public side of the system. Cross-regional revenue variation (X2) affects the per-pupil resources available to districts, especially where local property taxes remain central to school budgets. States with strong equalization systems narrow these differences, while states with capped or volatile tax bases amplify gaps (Baker & Green, 2020). Cross-border flows (X1), though less visible, also matter: high-income households whose global income is taxed more lightly—or whose assets sit in entities taxed under asymmetrical international rules—experience greater post-tax discretion when evaluating school and residential options (Slemrod & Bakija, 2022).

Second, intergenerational after-tax capacity (Y) determines whether households can absorb the timing and liquidity demands embedded in education systems. Mortgage approvals tied to stable taxable income, advance tuition payments, extracurricular fees, and early postsecondary deposits all require financial buffers that are unevenly distributed (Piketty, 2014; OECD, 2021). Families whose resources are mediated through trusts, holding companies, or business-succession vehicles often face fewer liquidity constraints: these structures can smooth taxable income, shield principal, or pre-arrange distributions precisely at educational transition points. As a result, "high

income" in administrative datasets frequently reflects deeper legal-organizational arrangements rather than labour-market earnings alone (Pistor, 2019).

Third, school systems translate these fiscal differences into differentiated pathways through a set of administrative nodes. Residency verification, waitlist priority, transportation zones, special-program eligibility, and documentation requirements serve as institutional interfaces that reward stability, timing flexibility, and financial carryover from prior generations. When public capital is uneven across regions and private capital is uneven across families, these nodes become the mechanism through which fiscal architecture materializes as opportunity structure (Francis & Goodman, 2025).

Taken together, these conversion dynamics show why income-based outcome gaps cannot be understood solely as correlations between socioeconomic status and achievement. They are downstream expressions of a fiscal architecture that determines which households can meet rule-defined thresholds at the right time, in the right jurisdictional space, and with the necessary financial buffers. The Two-Axis Fiscal Architecture framework provides a way to read these patterns as products of institutional design rather than traits of families, linking X1, X2, and Y to the specific decision points that govern educational movement.

2.5 Why Fiscal Architecture Matters for Educational Research

Many explanations of educational inequality rely on correlations between family income, geography, and achievement. These patterns are robust, but they tell us little about how those income differences are produced, maintained, or converted into institutional privilege. Fiscal architecture matters because it provides the rule-defined channels through which resources become educational access. It explains *why* income groups diverge in the first place and *how* those divergences are sustained as children move through school systems.

First, fiscal architecture determines the size and stability of the public resources available to schools. Cross-regional variation in tax bases and state-level equalization formulas leads districts with similar student demographics to receive vastly different levels of funding (Baker & Corcoran, 2012; Lafortune, Rothstein, & Schanzenbach, 2018). Where property taxes remain central, small shifts in housing markets or assessment caps can alter the long-term trajectory of district budgets. These public-capital dynamics (X2) structure the environments into which families sort themselves and shape the quality of educational services accessible in different jurisdictions.

Second, fiscal architecture influences the private resources households bring to educational decisions. Differences in after-tax capacity—from labour earnings, capital gains, inheritances, trust distributions, or business-succession vehicles—shape whether families can meet the financial and timing requirements embedded in school systems (Piketty, 2014; OECD, 2021). These resources determine whether households can secure stable housing within preferred attendance zones, manage childcare and transportation costs, pay for supplemental programs, or support postsecondary transitions without excessive debt (Corak, 2013). The Y axis captures this intergenerational dimension: the capacity of families to transfer educational advantages across time.

Third, fiscal architecture interacts with administrative rules to create differentiated pathways within and across educational institutions. Residency verification, application deadlines, transportation eligibility, special-program lotteries, and documentation requirements all function as decision nodes that translate fiscal resources into actual enrollment outcomes (Francis & Goodman, 2025). When public resources are uneven across regions, and private resources are uneven across families, these nodes become the mechanism through which structural differences become lived educational experiences.

Taken together, these dynamics show that fiscal architecture is not a background condition. It is a system of rules and flows that organizes educational opportunity. By tracing capital movement across borders and regions (X1/X2) and across generations (Y), the Two-Axis Fiscal Architecture framework provides a structured way to analyze how educational pathways emerge from institutional design rather than demographic labels. This shift—from income as a descriptor to fiscal architecture as an explanatory system—offers a way to connect school-finance research, mobility studies, and administrative-rule analysis within a single analytic lens.

3. MECHANISMS: WHY INCOME DIFFERENCES CANNOT BE LEFT AT THE SURFACE

Empirical work on educational inequality often opens with descriptive claims such as "high-income households cluster in high-performing districts" or "low-income students are underrepresented in selective programs" (Owens, 2020; Reardon, 2016). These statements are not wrong, but they treat "high-income" and "low-income" as self-evident categories and leave the mechanisms that produce and stabilize those categories largely unexamined. Income appears as a convenient sorting variable rather than as the contingent outcome of a designed fiscal system.

Left at this descriptive level, income functions as what might be called a floating variable: it captures correlation patterns, but it is detached from the rules that shape its distribution and from the institutional processes that convert it into access. A regression coefficient on parental income, for example, does not by itself explain why income differs across jurisdictions, how tax and transfer policies shape disposable capacity, why mobility is easier for some families than others, or how specific rule sequences in housing, schooling, and credit markets reproduce advantage over time (Chetty et al., 2014; Corak, 2013; Slemrod & Bakija, 2022). Nor does it specify how districts and states transform public revenue streams and private payments into concrete opportunities to enroll in particular schools or programs (Jackson, Johnson, & Persico, 2016; Lafortune, Rothstein, & Schanzenbach, 2018).

The Two-Axis Fiscal Architecture framework re-anchors income in the mechanisms that produce and operationalize it. Along the horizontal dimension, differences in cross-border and cross-regional fiscal flows (X_1/X_2) shape the tax bases and transfer systems that determine how much public capital is available to different jurisdictions and how unevenly private capital is distributed across space (OECD, 2022; Baker & Corcoran, 2012). Along the vertical dimension, intergenerational after-tax capacity (Y) captures how tax treatment of earnings, wealth, and

succession—together with the use of trusts, holding structures, and business-succession arrangements—affects which families are most likely to be classified and to remain "high income" across generations (Piketty, 2014; Pistor, 2019; OECD, 2021). When school systems apply residency rules, verification procedures, and program-specific eligibility criteria to these differentiated fiscal positions, they convert public and private capital into patterned access to educational pathways (Francis & Goodman, 2025).

In what follows, "income" is therefore not taken as an exogenous descriptor of households, but as the observable surface of a fiscal architecture that operates through these mechanisms. The aim is not to replace existing income-based analyses, but to supply the missing structural layer that explains how income differences arise, why they map onto particular places and programs, and how educational institutions participate in reproducing or interrupting those patterns.

The next section moves from this structural reframing to the specific decision nodes inside educational systems, showing how concrete rules translate fiscal architecture into the institutional tensions that families experience when they seek access to particular schools and program.

4. INSTITUTIONAL TENSION: HOW RULES TRANSLATE CAPITAL INTO EDUCATIONAL PATHWAYS

Educational pathways emerge at decision nodes where rules and resources intersect. Families do not simply choose schools in the abstract; they navigate sequences of eligibility requirements, verification procedures, priority structures, and financial conditions that convert public and private capital into concrete opportunities. I use *institutional tension* to describe how these nodes either amplify or buffer underlying differences in fiscal position.

Eligibility rules determine who is allowed to appear at the gate. Attendance boundaries link school access to residential location, tying eligibility to housing markets and the ability to secure an address within defined zones (Goldring, 2012; Monarrez, 2021). Open-enrollment schemes and selective programs add further conditions—credit-transfer rules, program prerequisites, or language-placement thresholds—so that students with similar academic potential face different feasible sets depending on their prior trajectories and the resources that supported them (Abdulkadiroğlu & Andersson, 2022).

Verification rules specify what must be documented or audited for eligibility to count. Proof-of-address requirements, notarized leases, employer letters, and prior-school transcripts create administrative friction that is not evenly distributed. Households with stable tenancies, formal employment, and access to professional assistance often experience verification as routine; households with unstable housing, informal work, or complex caregiving arrangements experience it as a substantial barrier (Goldring, 2012). The same fiscal capacity can therefore yield different enrollment outcomes depending on whether families can assemble the required documents on the required timeline.

Priority rules structure how seats are allocated when demand exceeds supply. Centralized enrollment systems and school-choice mechanisms assign students by combining lottery numbers with priorities for neighborhood residents, siblings, or continuing students (Abdulkadiroğlu & Andersson, 2022; Valant, 2023). Even when the algorithm itself is formally neutral, families with more information, time, and stability are better positioned to align their rank-ordered choices with these priorities and deadlines, effectively converting informational and temporal advantages into higher placement probabilities (Sattin-Bajaj & Roda, 2020).

Financial rules set the explicit and implicit prices attached to different pathways. Tuition categories, transportation fees, extracurricular charges, payment schedules, and deposit deadlines all interact with subsidy formulas, vouchers, and tax expenditures to determine who can persist in particular tracks (Pham, 2022). Families with greater and more flexible after-tax capacity can absorb upfront costs, bridge delays in aid disbursement, or finance commuting and childcare arrangements; others may meet formal eligibility criteria but be priced out in practice. Institutional tension is high when these rule sequences magnify small differences in fiscal position—for example, when narrowly drawn attendance zones, strict documentation standards, early non-refundable deposits, and limited subsidies are layered on top of uneven housing and wealth distributions (Monarrez & Chien, 2021). Tension is lower when rules are explicitly designed to buffer capital differences, through broader catchment areas, automatic re-enrollment, flexible deadlines, reduced documentation burdens, or targeted financial support. In both cases, inequality becomes visible not only in test scores or enrollment aggregates, but in the rule-based pathways that families must traverse.

In this sense, the Two-Axis Fiscal Architecture is operationalized through institutional tension. Horizontal flows (X_1/X_2) and intergenerational capacity (Y) set the distribution of resources; eligibility, verification, priority, and financial rules determine how those resources are converted into access. The following sections use this lens to reinterpret existing empirical findings on enrollment shifts and funding gaps, treating income not as a surface descriptor but as the observable trace of these underlying institutional mechanisms.

5. CASE ILLUSTRATIONS: STATE SCHOOL FINANCE ARCHITECTURE

Recent analyses and advocacy reports on U.S. school finance can be read as concrete manifestations of the fiscal architectures described above. Education Law Center's *Making the Grade 2021* report, for example, evaluates state funding systems on three measures—funding level, funding distribution, and funding effort—and finds large gaps in per-pupil revenue across states and systematic shortfalls for high-poverty districts. The report notes that per-pupil funding ranges from under $10,000 in some low-spending states to over $26,000 in higher-spending states and that many states provide less funding to high-poverty districts than to low-poverty ones. In terms of the Two-Axis framework, these cross-state differences in revenue levels, progressivity, and effort trace the X_2 patterns through which public capital is distributed across territorial units and set the baseline against which families' after-tax private capacity operates.

State-level cost studies and reforms further illustrate how X_2 rules interact with Y-axis dynamics. The Michigan Education Finance Study commissioned by the state legislature recommended a common base cost per pupil, with additional weighted funding for students in poverty and English learners, and linked observed spending gaps to differences in local property-tax bases. In New Jersey, the School Funding Reform Act of 2008 established a weighted-student formula explicitly tied to state academic standards, designed to deliver more resources to districts with higher concentrations of need and often cited as a model of "standards-linked" finance reform. Read through the Two-Axis lens, these designs specify how state formulas can either reinforce or mitigate the uneven distribution of taxable capacity across districts and how that, in turn, shapes the resources available to support different educational pathways.

School-finance litigation highlights the same mechanisms when fiscal architecture becomes the object of constitutional challenge. In Delaware, plaintiffs in *Delawareans for Educational Opportunity v. Carney* successfully argued that outdated property assessments undermined uniform taxation and constrained districts' ability to raise revenue, while litigation in Illinois and New Mexico has focused on whether underfunding violates state education clauses and whether courts can review the adequacy of finance systems in light of standards-based reforms.

These cases can be understood as contestations over the X_2 structure—the mix of local tax bases, assessment rules, and state aid formulas that organize public capital flows. Importantly, shifts in X_2 arrangements can also interact with, and at times induce, movement along the X_1 dimension. In a highly mobile, immigrant-receiving country such as the United States, changes in state-level tax bases, assessment rules, or school-funding formulas can alter not only cross-district residential patterns but also the incentives for households and capital to relocate across national borders. This interdependence of X_1 and X_2 underscores that fiscal architecture operates across multiple scales simultaneously and that tracing these multi-level movements remains an important direction for further inquiry. These disputes also concern whether existing structures provide sufficient capacity for students in higher-need communities to sustain their educational trajectories along the Y axis.

Finally, federal budget debates and associated tools illustrate how cross-level fiscal decisions overlay state architectures. Education Law Center's recent "Trump 2.0" analysis uses Census school finance data to estimate the district-level impact of proposed FY2026 federal education cuts, including the elimination or consolidation of programs serving English learners, migrant students, and other groups. In the Two-Axis framework, such proposals represent adjustments to the X_1 layer of federal transfers into state and local systems, altering the mix of public capital available to districts and potentially shifting how families' post-tax private resources interact with public support when they navigate schooling, housing, and related decisions. Together, these reports and cases show that what appears in empirical work as "income differences" between districts is closely tied to contested and revisable choices about how fiscal rules allocate and stabilize both public and private capital.

6. IMPLICATIONS FOR U.S.–CANADA COMPARATIVE TAX ANALYSIS

Although the analysis in this article centers on educational inequality, the Two-Axis Fiscal Architecture also clarifies why the United States and Canada—two federations with markedly different income-tax architectures—produce divergent patterns of fiscal pressure and institutional tension. The framework treats the U.S. Internal Revenue Code (IRC) and the Canadian Income Tax Act (ITA) as alternative implementations of the same underlying coordinates: X_1 and X_2 specify how capital flows move across and within jurisdictions, while Y specifies how after-tax capacity is transmitted across generations.

On the horizontal axis, contrasts in tax design and cross-border income treatment shape X_1. The United States taxes worldwide income and applies anti-deferral regimes such as Subpart F and GILTI, alongside a separate estate and gift tax system (Slemrod & Bakija, 2022). Canada, by contrast, relies on residence-based taxation, foreign accrual property income (FAPI), and a single deemed-disposition-at-death regime rather than a separate estate tax (Li & Cockfield, 2020). At the X_2 level, the countries structure school finance differently: U.S. K–12 systems remain heavily dependent on local property-tax bases and state formulas (Baker & Corcoran, 2012), whereas Canadian provinces operate far more centralized funding models with reduced local variation (Kitchen, 2021). These fiscal architectures shape how public capital enters educational systems and how private capital interacts with these flows when families make decisions about housing, mobility, and schooling.

Vertical transmission introduces a final layer of divergence. U.S. rules governing estate and gift taxation, tax-preferred education savings, and capital-gains realization define one set of Y-axis trajectories; Canadian rules for registered plans, principal-residence exemptions, and the absence of a separate estate tax define another (Piketty, 2014). Differences in mobility rules—residency tests, immigration pathways, and cross-border employment arrangements—further shape the conditions under which families can convert fiscal advantages into educational opportunities. By situating U.S. and Canadian systems on the same analytic coordinates, the Two-Axis Fiscal Architecture highlights a broader comparative question: how varying fiscal designs generate distinct forms of institutional tension in education. This opens a clear pathway for subsequent comparative tax-education research, including analyses of how X_1, X_2, and Y interact in each jurisdiction and how these interactions shape rule-based educational pathways.

7. CONCLUSION

This paper advances a mechanism-level account of educational inequality by repositioning income not as a demographic attribute but as the downstream expression of fiscal architecture. By tracing how capital moves horizontally across jurisdictions (X_1, X_2) and vertically across generations (Y), the Two-Axis Fiscal Architecture shows that educational opportunity is organized through rule-based conversions of public and private capital rather than through income alone.

The framework highlights how tax design, jurisdictional scale, and institutional rules jointly structure the conditions under which families make decisions about housing, mobility, and schooling. It also clarifies why similar income distributions can produce different educational pathways depending on how fiscal rules sequence eligibility, verification, priority, and funding nodes.

While the focus here is conceptual, the architecture creates a foundation for empirical and comparative work. Mapping X–Y interactions across states or provinces can illuminate where institutional tension arises and how fiscal design shapes mobility and access. The framework also provides the analytic base for developing a future diagnostic instrument that reads educational inequality through fiscal mechanisms rather than through surface-level indicators.

Taken together, this approach reframes educational inequality as a problem of institutional design. It suggests that understanding—and ultimately comparing—educational systems requires attention to the fiscal architectures that make certain pathways possible for some families and not for others.

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