

School Funding and Teacher's Labor Market

Aloísio Araujo ¹ Marcos Lee ² Gabriel Sallum ³

¹FGV-EPGE and IMPA

²Queen's University

³FGV-EPGE

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Teacher Pay and School Funding in Texas

- ▶ Teacher pay is tied directly to district funding
- ▶ Texas school funding mix: **53% local property taxes, 39% state funds, 8% federal funds**
- ▶ Local property taxes create disparities; Texas uses a **recapture policy** to partially equalize
- ▶ Recapture districts lose a significant share of local taxes; but recapture is about 10% of state funds

Teacher Labor Markets in Recapture Districts

- ▶ Recapture districts tend to be in **large urban areas** which have:
 - ▶ more dynamic labor markets
 - ▶ higher share of disadvantaged students
- ▶ Teachers face **better outside options**
- ▶ While teacher wages are similar across the state
- ▶ This raises concerns about whether recapture **limits districts' ability to offer competitive wages.**

This paper

1. How do school districts allocate extra revenue? Are recapture paying districts allocating differently?
 - ▶ Approach: Effects of a school finance reform in 2019 that increased overall revenues
2. How does recapture impact the **distribution and composition of skilled teachers**?
 - ▶ Approach: Structural modeling of teacher labor supply and budget allocation

Literature

- ▶ Impact of school funding policies: Hoxby (2001); Boyd, Lankford, Loeb, Wyckoff (2003); Lafortune, Rothstein, and Schazenbach (2018); Card and Payne (2002); Jackson, Johnson, and Persico (2016); Biasi (2023); Neilson (2020)
 - ▶ Focus tends to be on direct effect on intergenerational mobility, student achievement, and future earnings
 - ▶ We focus on how these policies can impact the local teacher labor market
- ▶ Teacher labor markets: Tincani (2021); Biasi, Fu, and Stromme (2021)
 - ▶ Most similar to this paper: structural models about the teacher labor market
 - ▶ Reforms in Wisconsin and Chile that made teacher pay more market based
 - ▶ We focus on school district funding equalization policies

What is House Bill 3 (HB3)?

- ▶ Passed in 2019, HB3 was a major Texas school finance reform aimed at reducing property tax reliance
- ▶ It reduced property tax rates overall, with stronger reductions in districts with higher property wealth growth
- ▶ Also expanded school funding formulas to increase per-pupil minimum thresholds, covered by higher state aid shares
- ▶ Recapture paying districts were in favor, but recapture totals are still increasing nevertheless

Strategy Based on Jackson, Johnson, and Persico (2016)

- ▶ Goal: Identify the impact of **revenue changes** induced by HB3 on ISD expenditure allocation and teacher wages
- ▶ No treatment and control: HB3 affected all districts, but had differential impact on revenue
- ▶ Use **predicted HB3 revenue changes** derived from pre-HB3 district characteristics and HB3 funding rules
- ▶ This approach isolates revenue changes driven by policy rules, minimizing influence of district-specific factors

Econometric Model

- ▶ Model specification:

$$y_{it} = \alpha_i + \delta_t + \beta \cdot \text{RevenueChange}_{it} + \gamma X_{it} + \varepsilon_{it}$$

where:

- ▶ y_{it} = payroll expenditure or teacher wage in district i at time t
- ▶ $\text{RevenueChange}_{it}$ = actual revenue change (endogenous)
- ▶ We use the variation in revenue changes **predicted by HB3's formula and pre-existing district traits**:

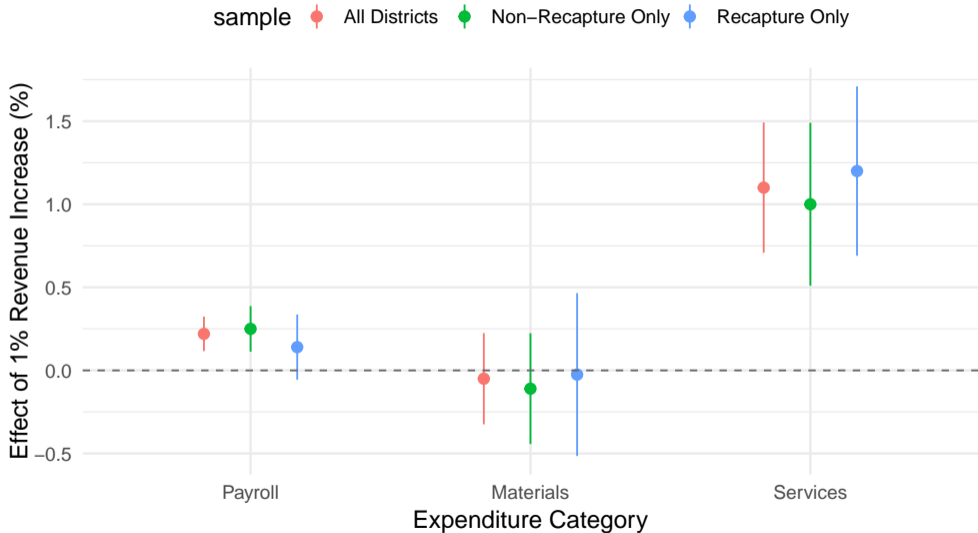
$$\widehat{\text{RevenueChange}}_{it} = f(\text{Pre-HB3 district characteristics, HB3 funding formula})$$

- ▶ This isolates **policy-driven** revenue shifts distinct from local shocks

Data Sources

- ▶ Data range: 2015 to 2023 at school district level
- ▶ Revenue, expenditure, property value and tax incidence is publicly available information
- ▶ Detailed funding formula across years through information request
- ▶ Access to admin data about teacher employment and pay between 2015-2023

Impact of HB3-Induced Revenue Changes



Professional and Contracted Services

- ▶ Largest and most common expenditure categories are:
 - ▶ Generic Professional Services: include legal services, audit services, lobbying, general contracting
 - ▶ Consulting services
 - ▶ Tuition payments for staff development and university contracting

Payroll mechanism

- ▶ Run individual level regressions using admin data on **wages**, **entry**, and **turnover**
- ▶ 10% revenue increases led to
 - ▶ 3p.p higher probability of new hires
 - ▶ 3.5% increase in wages
 - ▶ No impact on turnover

Model Overview and Key Mechanism

- ▶ Static equilibrium model combining:
 - ▶ Labor supply of teachers and non-teachers across M independent markets (Roy model)
 - ▶ Student achievement via value-added framework
 - ▶ School districts choosing payroll vs other expenses constrained by budget

Data Sources

- ▶ Pre-HB3 year of 2018
- ▶ American Community Survey: detailed labor market data of both teachers and non-teachers
- ▶ Texas Education Research Center: 5-8th grade test scores in English and Math

Wage Offer and Value-Added Equations

- ▶ Individuals choose between Teaching, Non-Teaching, Home Production
- ▶ Individual teacher wage offer in market m :

$$w_{i,m,E} = r_m \times s_i, \quad \text{where } s_i = \exp(\lambda_0(\xi_i) + X_i\lambda + \epsilon_i)$$

- ▶ Average teacher skill in market m :

$$S_m = \int_{i \in \text{teachers}} s_i dF$$

- ▶ Student achievement $A_{j,m}$ modeled as:

$$A_{j,m} = \beta_0 + \beta_1 S_m + \beta_2 A_{j,m,t-1} + \beta_3 X_{j,m} + \xi_{j,m}$$

- ▶ Teacher skills s_i come from the Roy labor supply model with discrete occupational choice

School District Problem

$$\begin{aligned} \max_{r_m} \quad & \mathbb{E}[A_m(S_m(r_m))] + \theta G(\text{Service}(r_m)) \\ \text{s.t.} \quad & \text{Revenue} \geq P(r_m) + \text{Service}(r_m) + \text{Recapture} + \text{Fixed Expenses} \\ & P(r_m) = r_m S_m + \kappa n_{\text{Teachers}} \end{aligned}$$

- ▶ Choosing r_m allocates budget in between Payroll and Contracted Services
- ▶ Target elasticities found in HB3 experiment

Counterfactuals

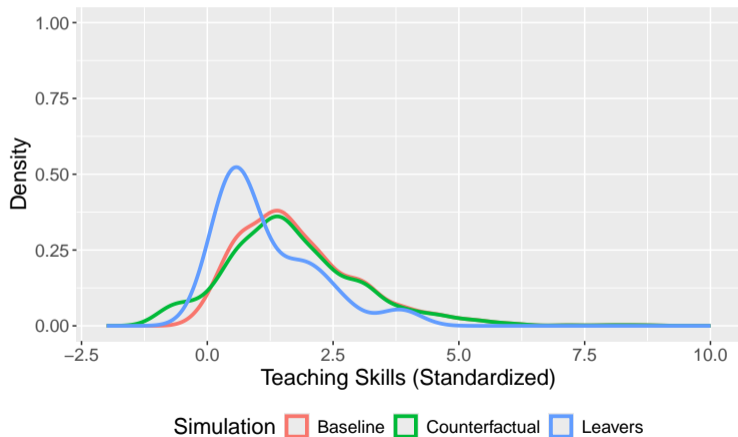
- ▶ This model allows us to link district revenue changes to labor market outcomes:

Higher revenue \rightarrow ISD allocates new payroll \rightarrow Teacher composition changes (s_j) \rightarrow skill aggregate (S_m) \rightarrow test scores

- ▶ Reduced form evidence disciplines black box of budget allocation
- ▶ Is recapture hurting urban districts disproportionately more than it helps others?
 1. Eliminate recapture
 2. Tweak recapture rules to unload burden on highest payers

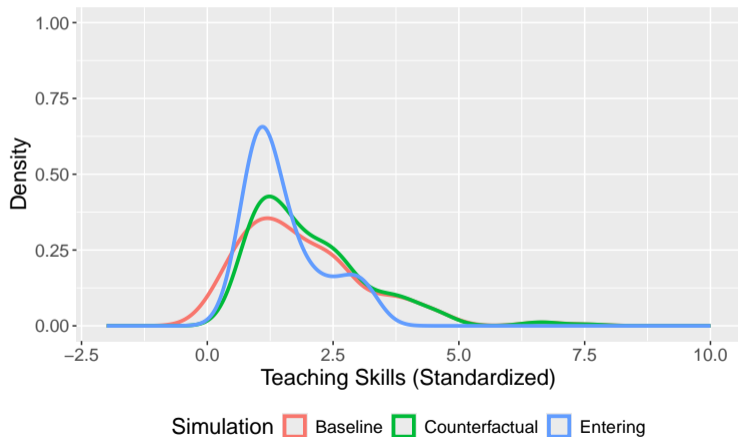
Preliminary No Recapture - El Paso: 10% decrease in revenue, 6% decrease in payroll

Loses budget, lowers wage, skill distribution shifts left



Preliminary No Recapture - Austin: 23% increase in revenue, 12% increase in payroll

Gains budget, increases wage, skill distribution shifts right



Conclusion

- ▶ We show that the passing of House Bill 3 led an increase of payroll via higher average wages
- ▶ Districts split revenue increases into payroll and contracted services
- ▶ We build and estimate an equilibrium model of teacher labor market and districts **informed** by our reduced form analysis
- ▶ Counterfactuals in progress...