EQUITY AND ADEQUACY OF NEW HAMPSHIRE SCHOOL FUNDING

KEY FINDINGS

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Presentation of Key Findings

1. Equity of funding

   a. How is education funding currently distributed across New Hampshire school districts with respect to economic disadvantage?

   b. How is education funding currently distributed across New Hampshire school districts with respect to property wealth?

2. Risk analysis: How do student outcomes vary across New Hampshire school districts in relation to student needs?

3. Cost analysis: What is the cost of providing an adequate education in each of New Hampshire's school districts?

4. Weight estimation

   a. How does the cost of providing an adequate education vary with respect to district cost factors (student needs, district size, grade ranges)?

   b. How does this variation translate to funding weights?

Equity

For Students and Taxpayers

Progressiveness of Funding
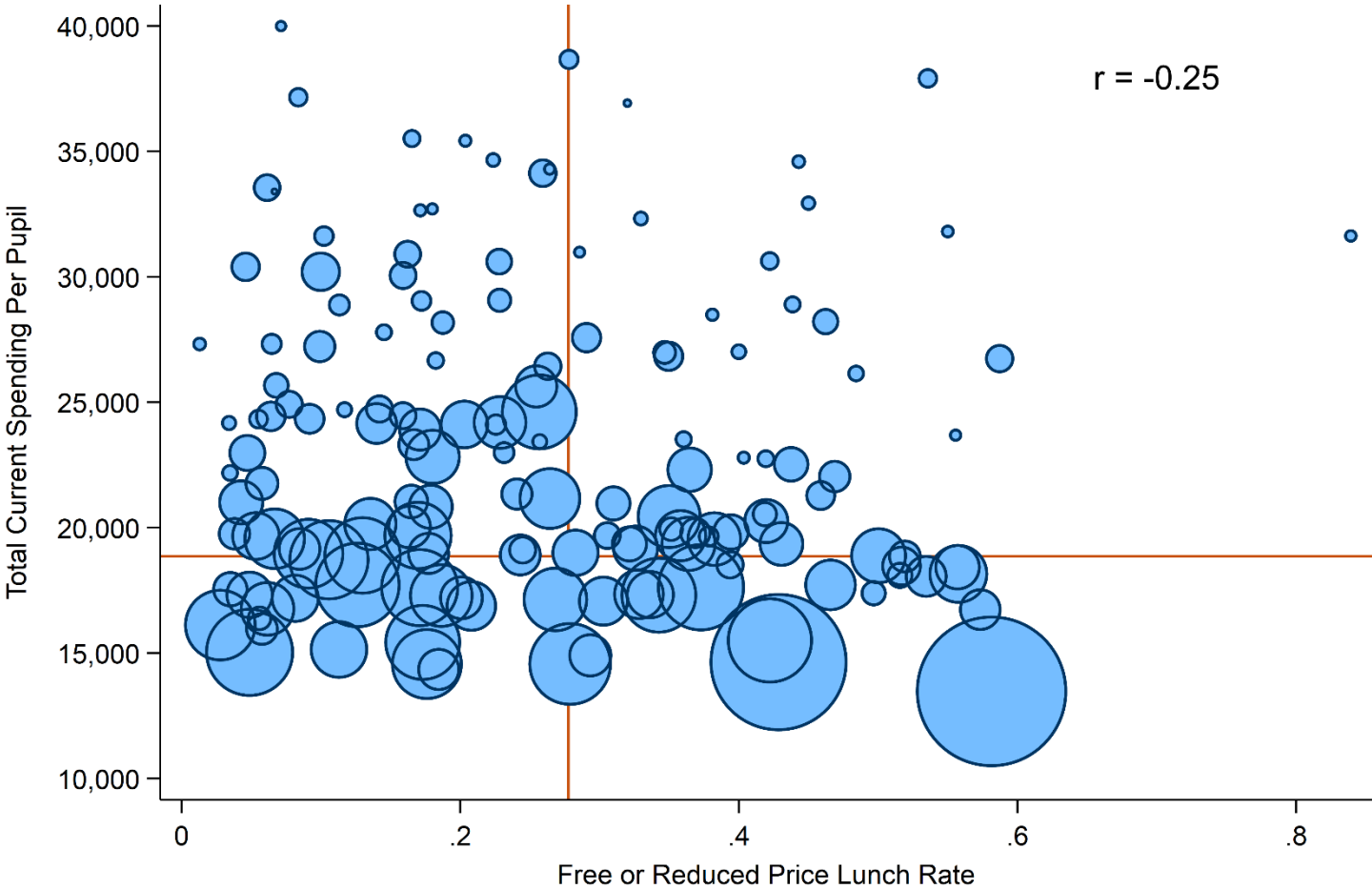
New Hampshire's highest poverty school districts spend less per student, on average, than New Hampshire's lowest poverty school districts.

Notes: Horizontal and vertical orange lines represent the average of their respective variables.
*Source:* Data were collected from NH DOE.

Regression Predicted Spending Per Pupil
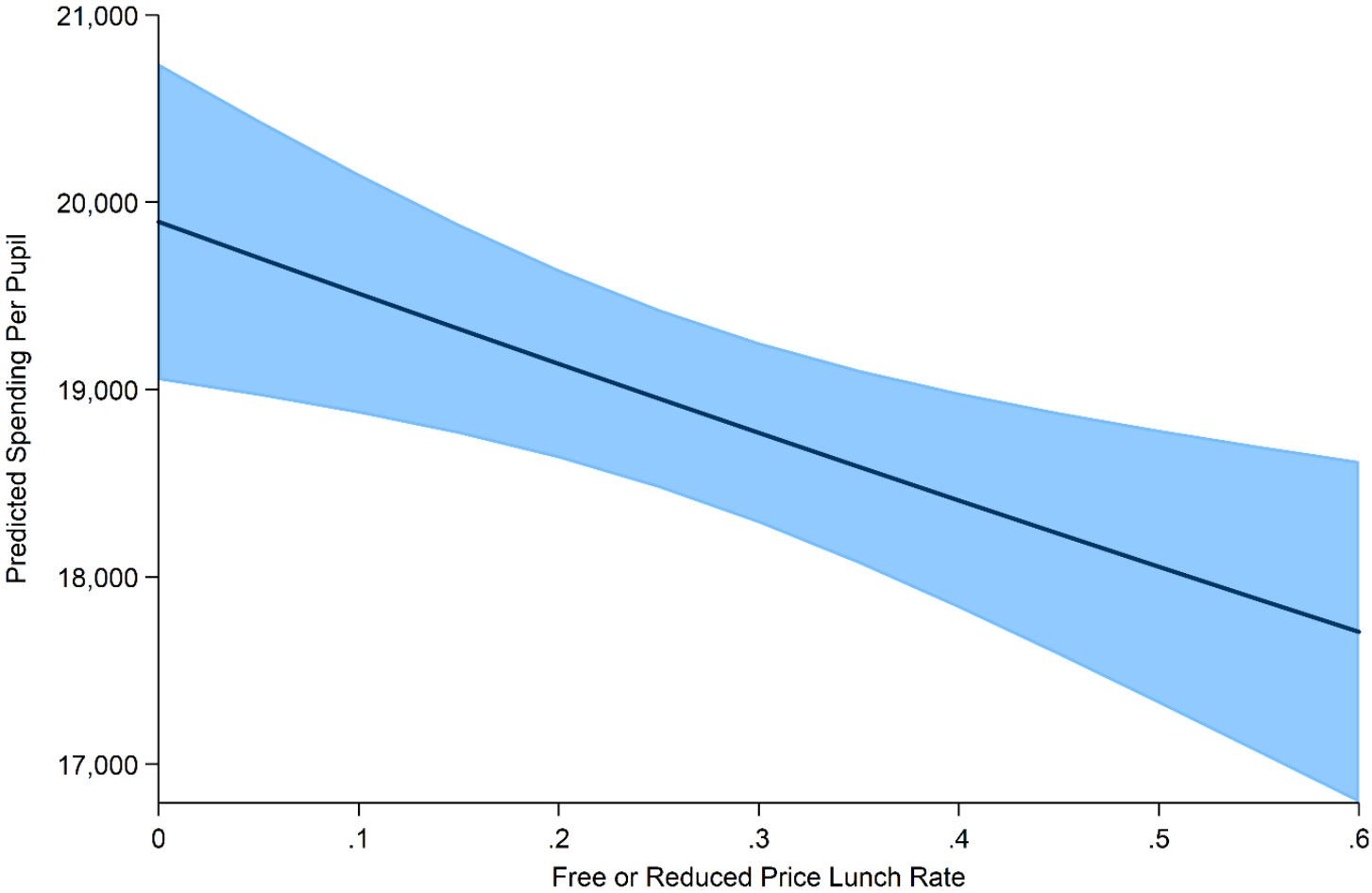
After accounting for other student needs (special education, English learners), district size, population density, and grades served, New Hampshire's highest poverty districts spend approximately $2,000 less per student on average than New Hampshire's lowest poverty districts.

*Source*: Data were collected from NH DOE.

Progressivity of Spending in New Hampshire Compared to Other New England States
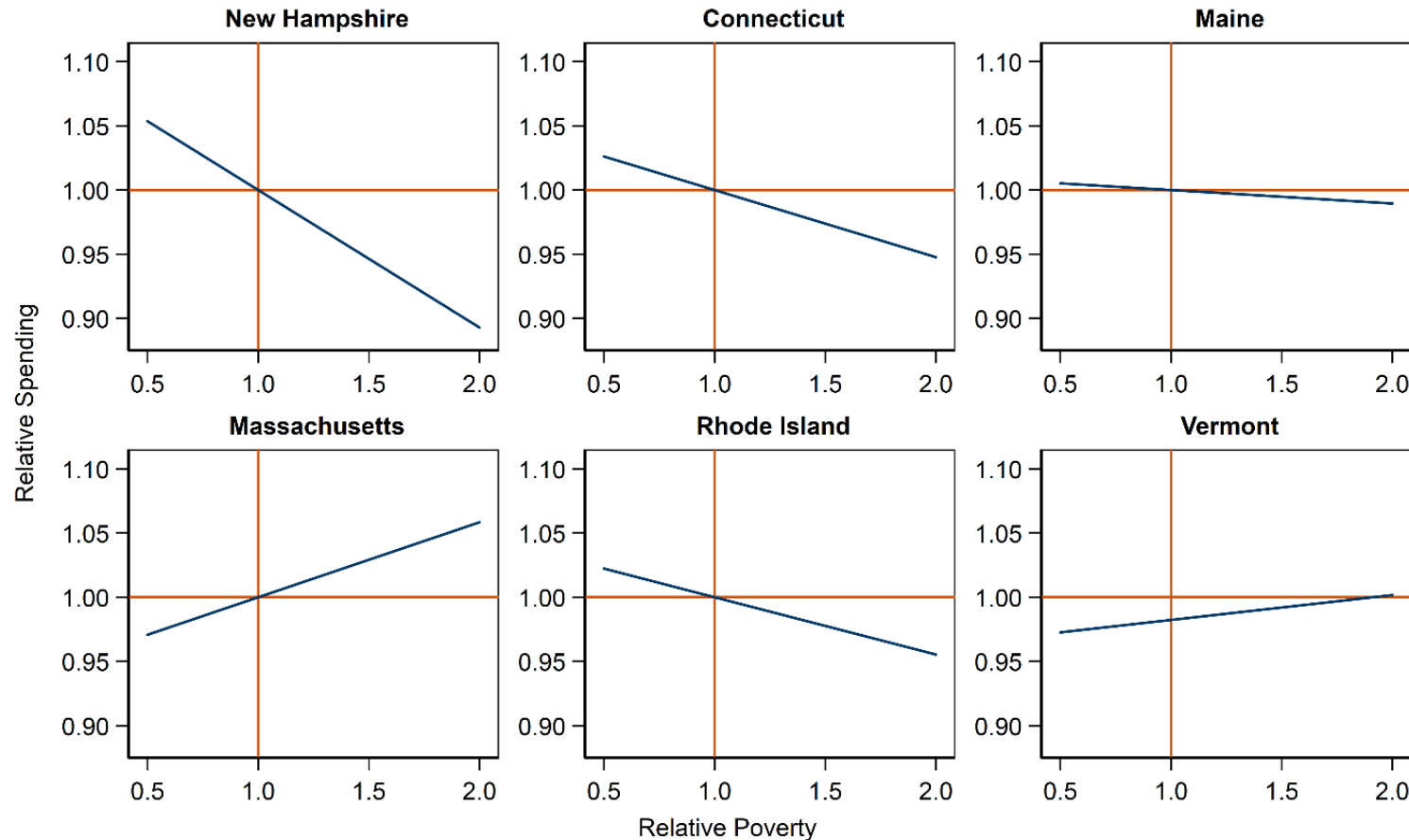
The distribution of spending across districts in New Hampshire is more regressive than in other New England states.

Notes: Data are from the 2017–18 school year. Relative spending and relative poverty are expressed as ratios relative to the average within a given labor market (geographic area). Spending is measured on a per-pupil basis.
Source: Spending is from the Common Core of Data and poverty is from the Census small area income and poverty estimates (SAIPE).
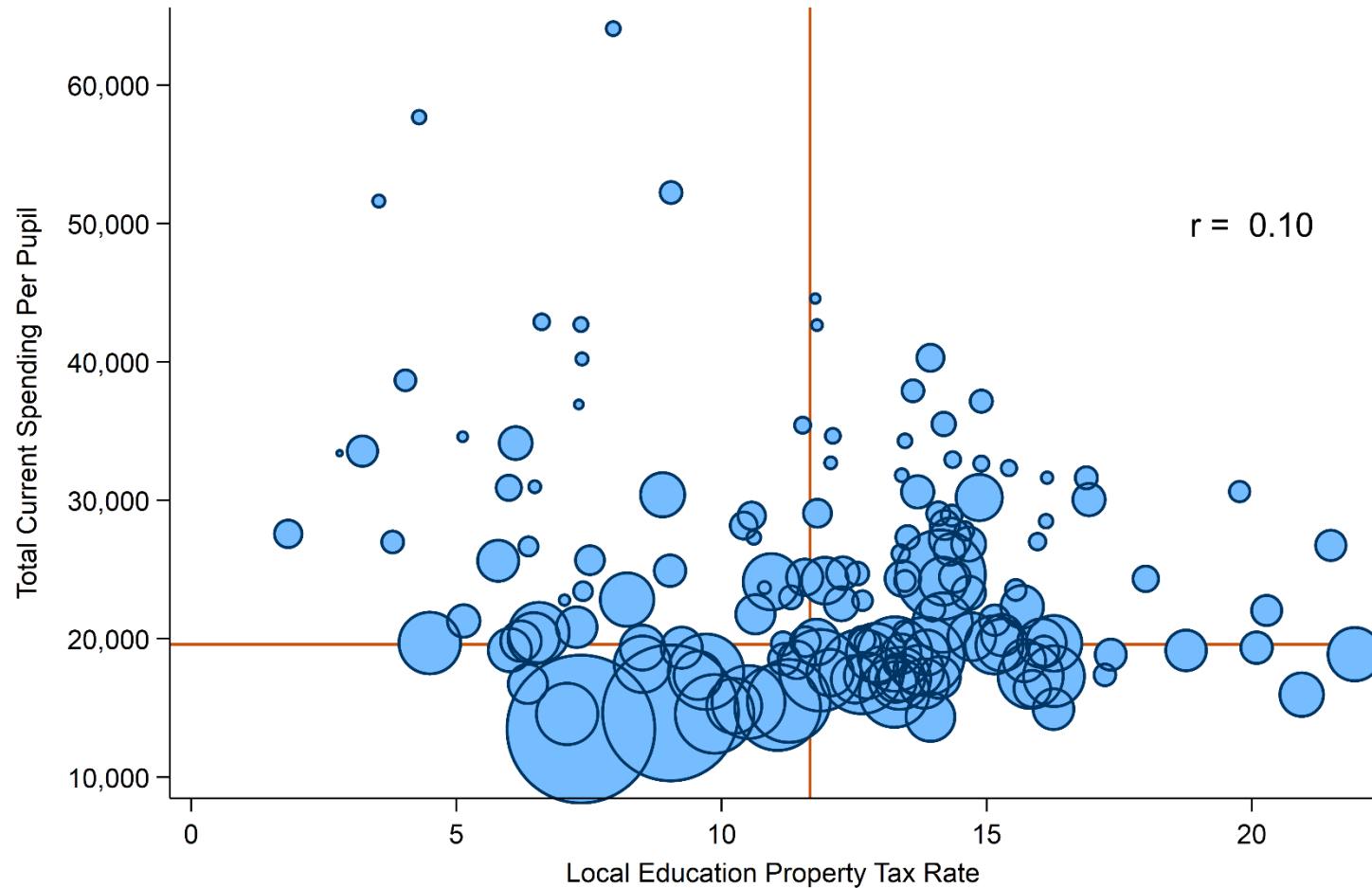
Spending Per Pupil and District Property Wealth
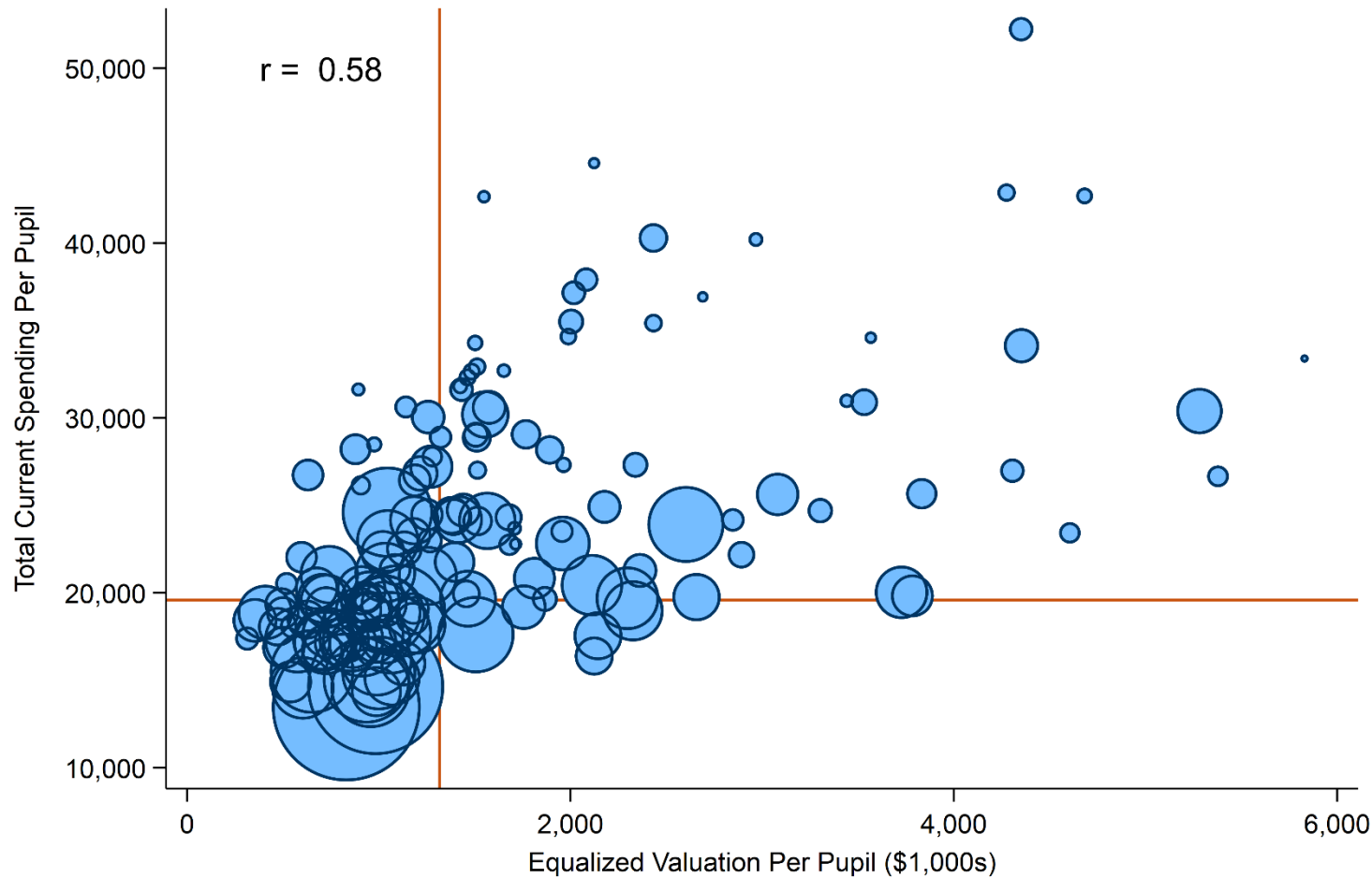
Spending per pupil is generally higher in districts with the highest property wealth per student.

Notes: Horizontal and vertical orange lines represent the average of their respective variables.
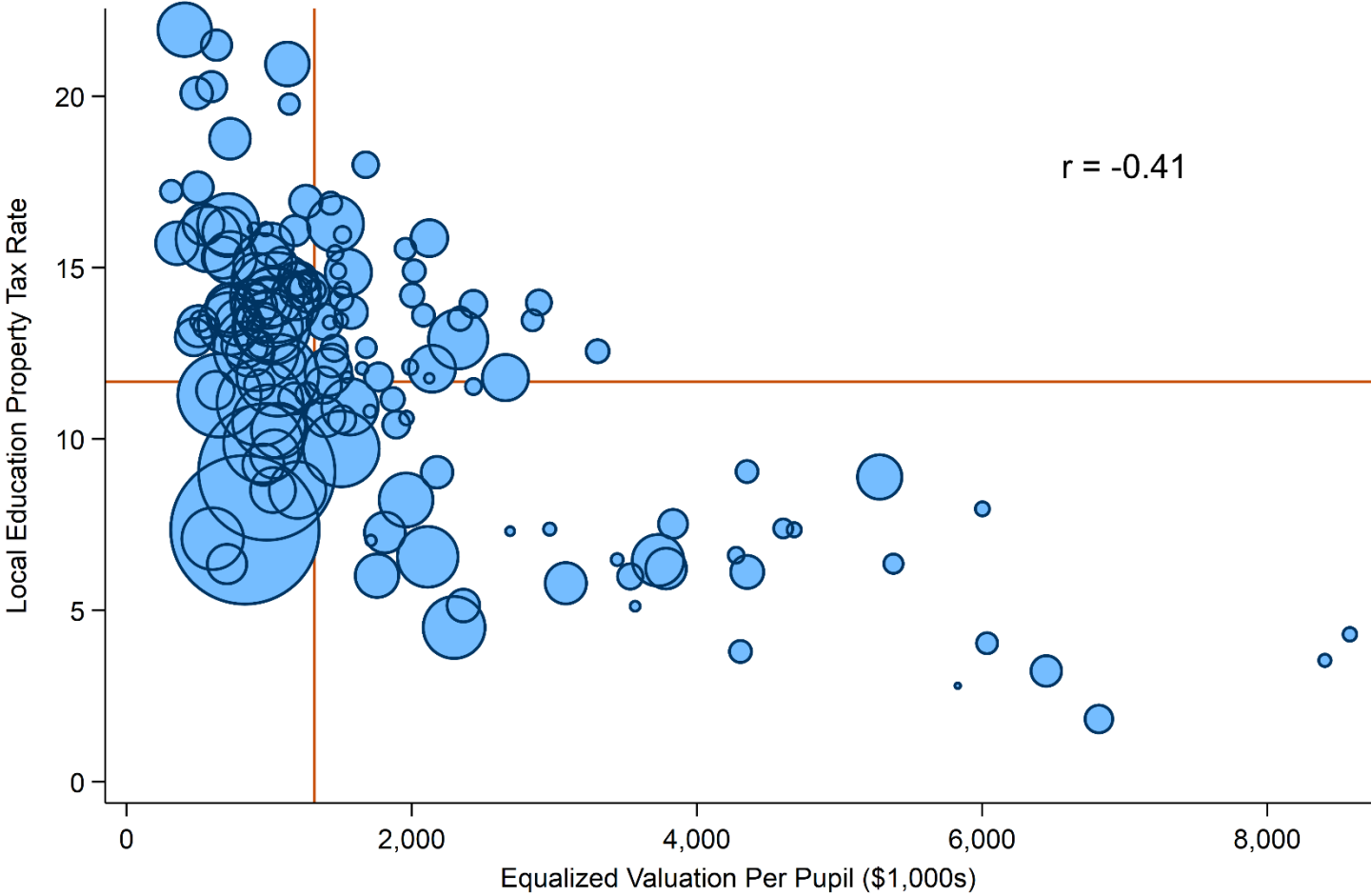*Source:* Data are from NH DOE.

Spending Per Pupil and Education Tax Rates

r = 0.10

Local education property tax rates vary substantially across districts. Districts with the highest local education property tax rates often achieve lower spending per student than districts with lower property tax rates.

Notes: Horizontal and vertical orange lines represent the average of their respective variables.
Source: Data are from NH DOE.

Property Tax Rates and District Property Wealth

r = -0.41

Local Education Property Tax Rate

Equalized Valuation Per Pupil ($1,000s)

Districts with the lowest property wealth have the highest local education property tax rates, on average.

Notes: Horizontal and vertical orange lines represent the average of their respective variables.
*Source*: Data are from NH DOE.

Risk Analysis

Student Outcomes and Student Needs

Description of Outcomes Used

- New Hampshire data

  – Student assessment scores

  – Graduation rates

  – Attendance rates

  – Combined factor score: An aggregation of assessment scores, graduation rates, and attendance rates into one outcome score.

- National data

  – Outcome index: A nationally normed outcome score that is intended to be comparable across all school districts in the U.S. Uses state assessment data and national assessment data (National Assessment of Education Progress).
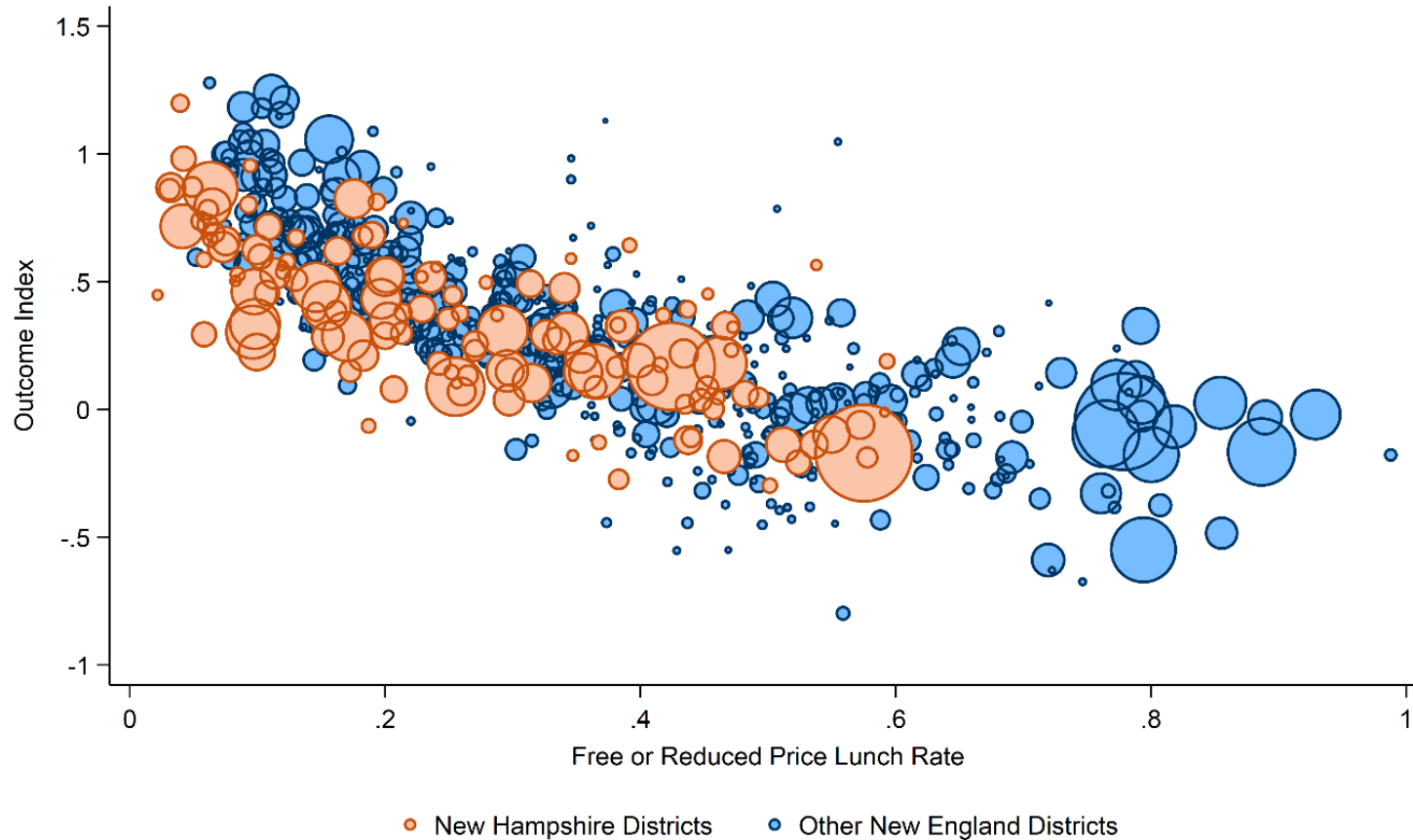
Relationship Between Poverty and Student Outcomes
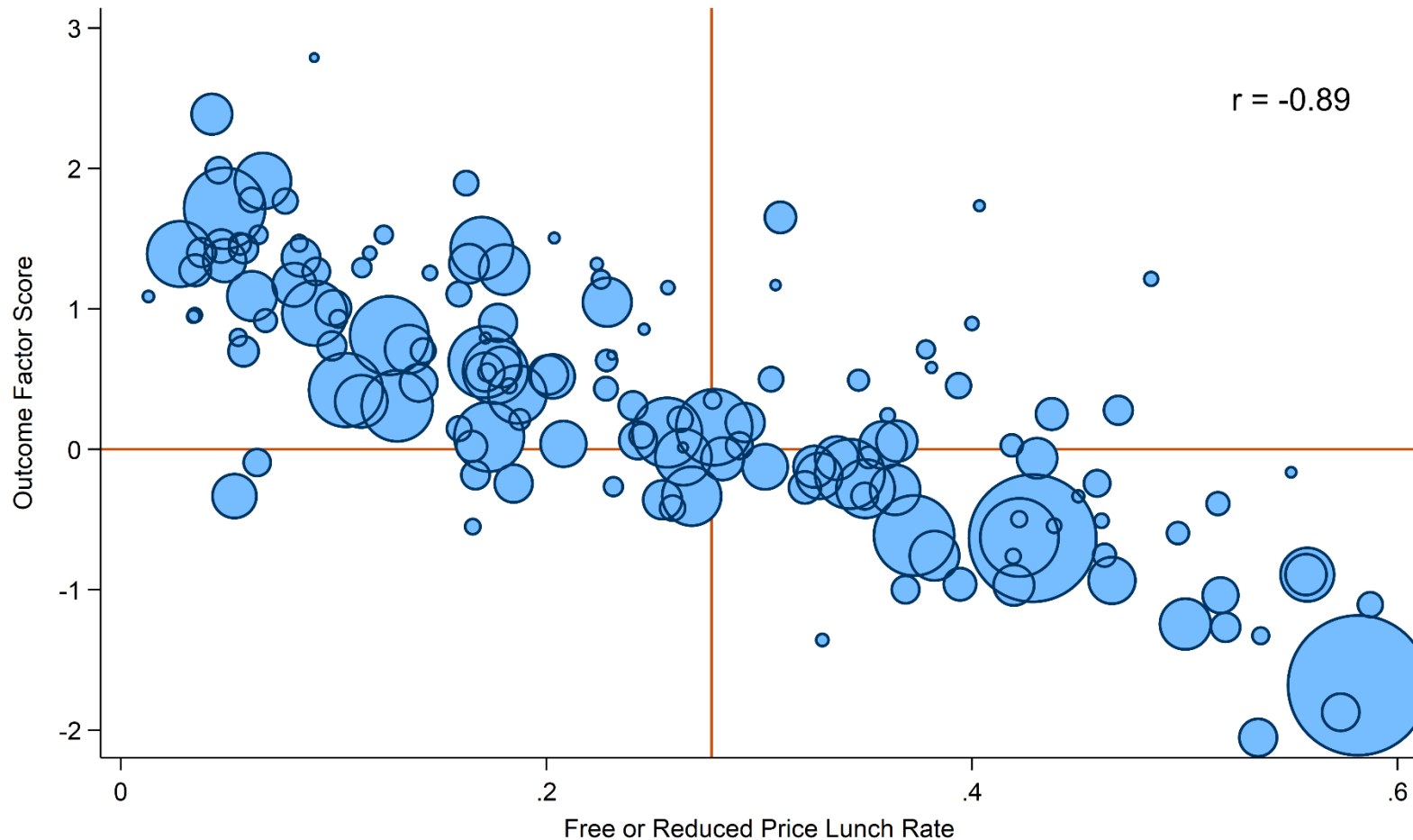
The highest poverty school districts have the lowest student outcomes. The negative relationship between poverty and outcomes is very strong.

r = -0.89

Notes: Horizontal and vertical orange lines represent the average of their respective variables.
Source: Data are from NH DOE.

Relationship Between Poverty and Outcomes Using National Outcome Index

Using a national outcome index, we see that the relationship between outcomes and poverty generally mirrors the relationship observed in other New England districts.

Relationship Between Special Education and Student Outcomes

Districts with higher special education rates perform worse, on average, than districts with lower special education rates.
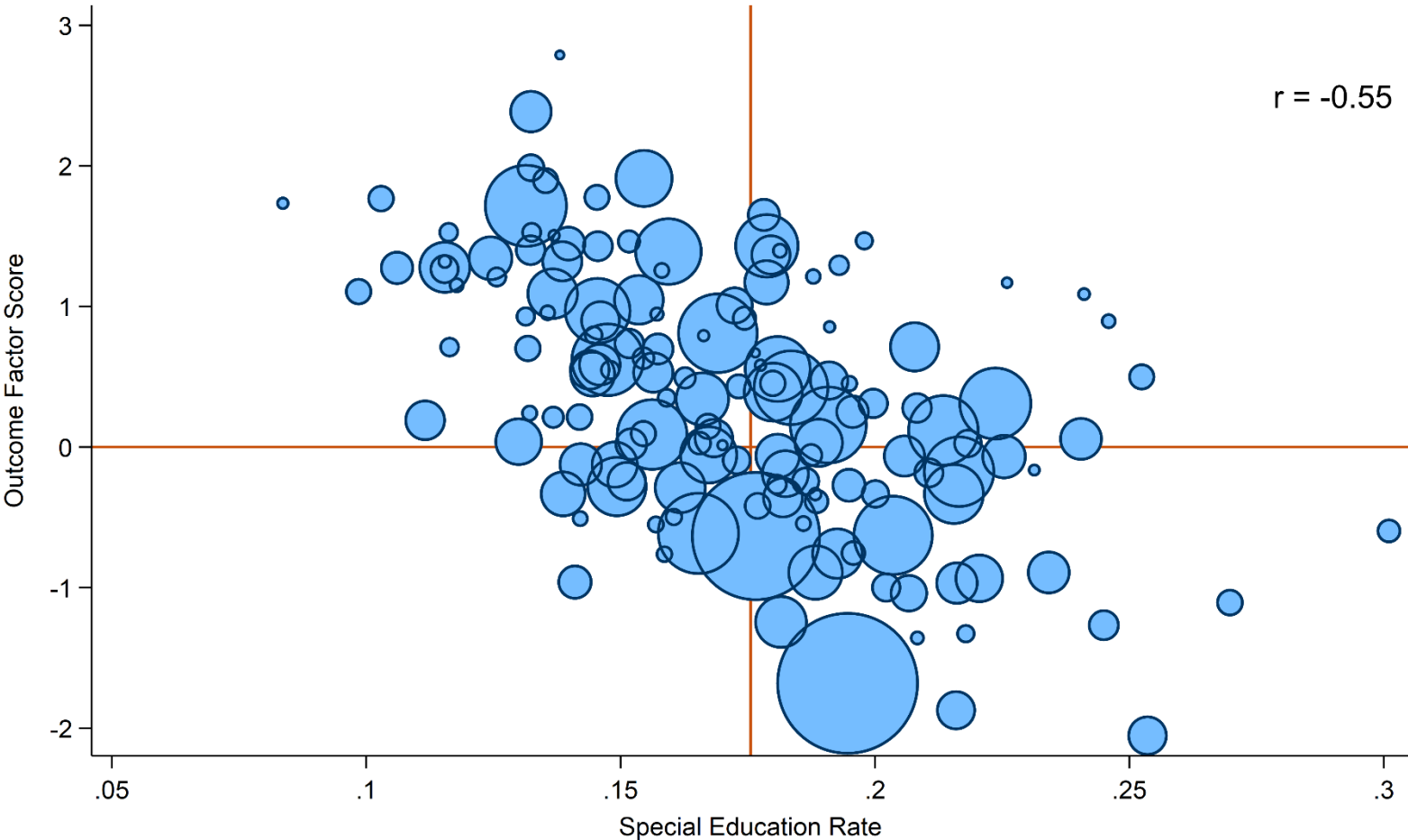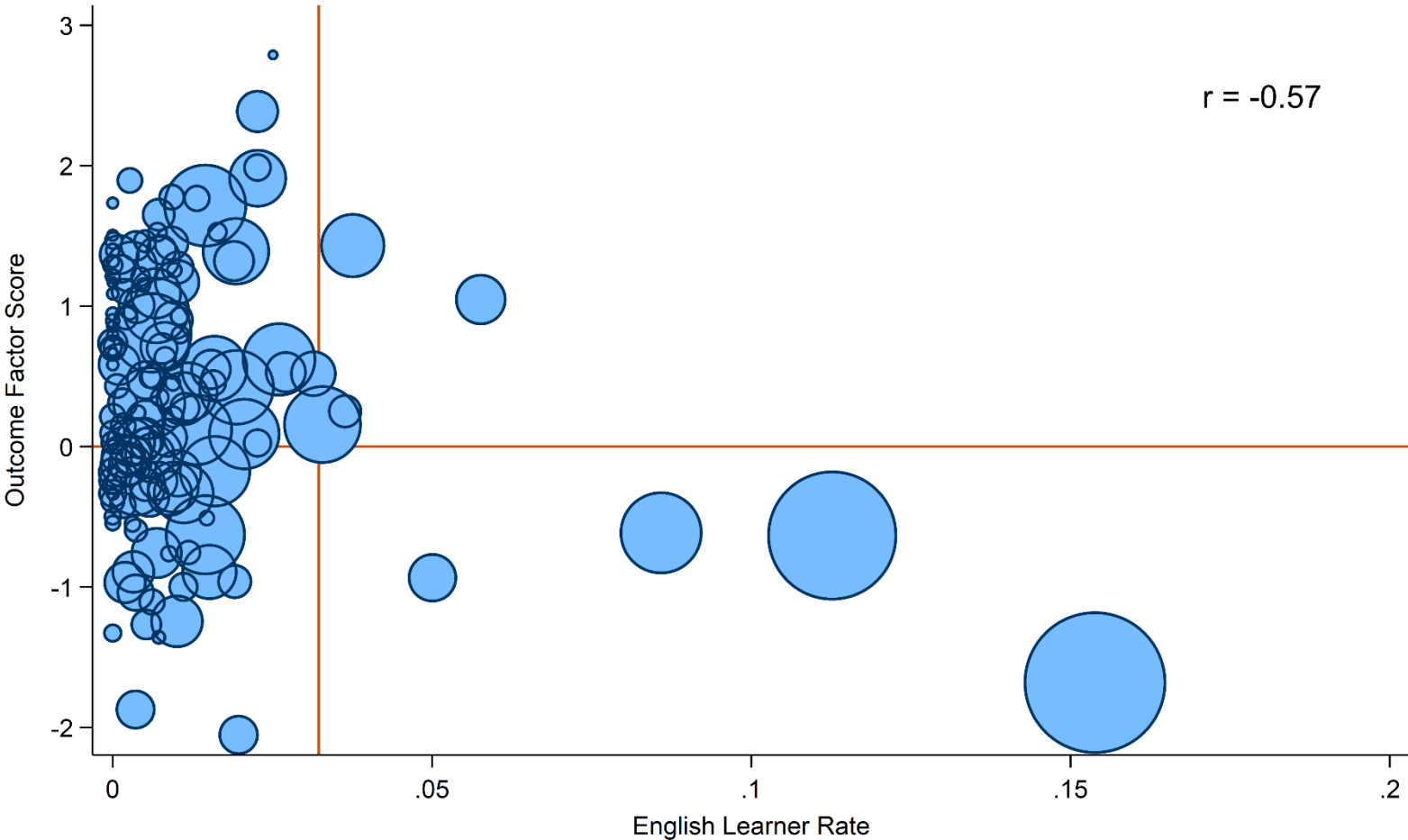
Notes: Horizontal and vertical orange lines represent the average of their respective variables.
Source: Data are from NH DOE.

Relationship Between English Learners and Student Outcomes

r = -0.57

Notes: Horizontal and vertical orange lines represent the average of their respective variables.
Source: Data are from NH DOE.

There are few districts with sizable shares of English learners. The three districts with the largest percentages of English learners all have below average student outcomes.

Risk Analysis Regression Results

When analyzed together using regression, each student need contributes to lower district outcomes.

| Student Need	Combined Outcome Score	Assessment Scores	Graduation Rates	Attendance Rates
Free or reduced-price lunch rate	−4.228***	−1.159***	−3.971***	−2.952***
English learner rate	−3.334***	−0.752***	0.297	−5.231***
Special education rate	−5.167***	−1.882***	−2.195*	−1.731**

*$p < .05$. **$p < .01$. ***$p < .001$.

Notes: Regression models also control for population density, district enrollment, grade levels served, and year. Regression results are based on school years 2008–09 through 2018–19.

Cost Analysis

Estimating the Cost of Adequacy in Each District

Cost Model Overview
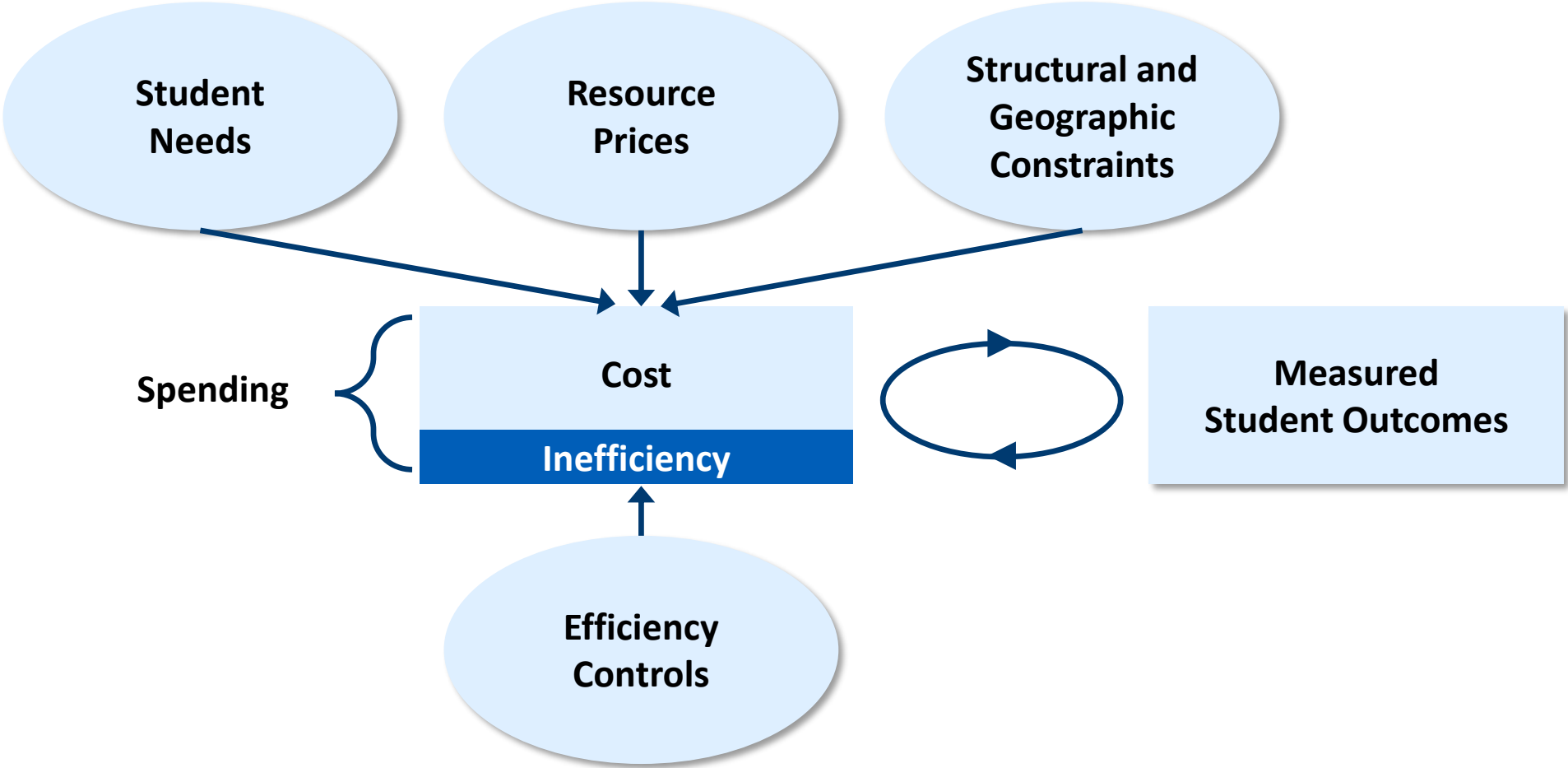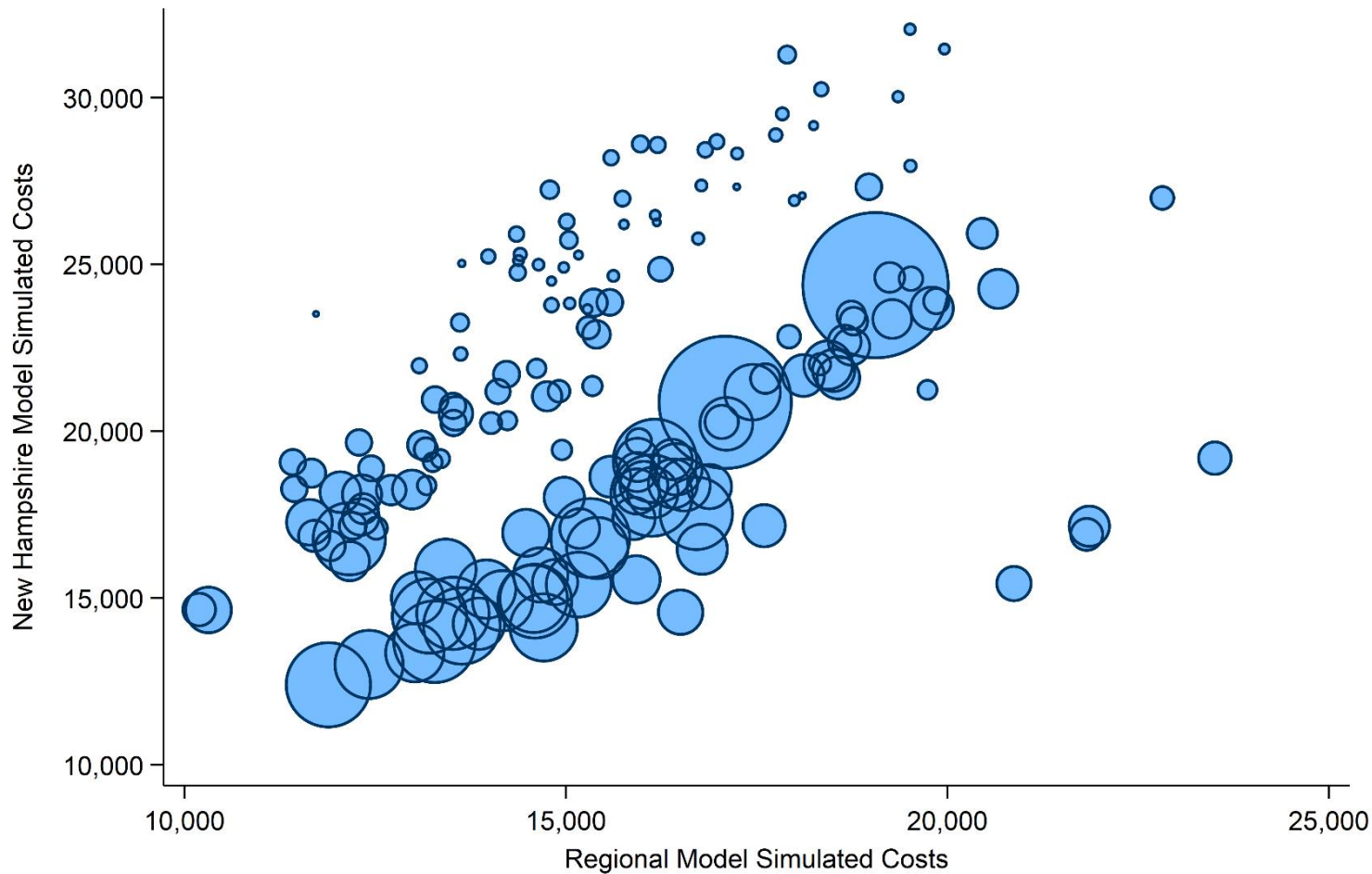
Setting the Outcome Target

New Hampshire's school districts perform well above the national average, on par with other New England states, and only slightly below school districts in Massachusetts. For the cost analysis, we set the achievement target at the New Hampshire average existing achievement level, under the assumption that the current average level of performance is adequate.
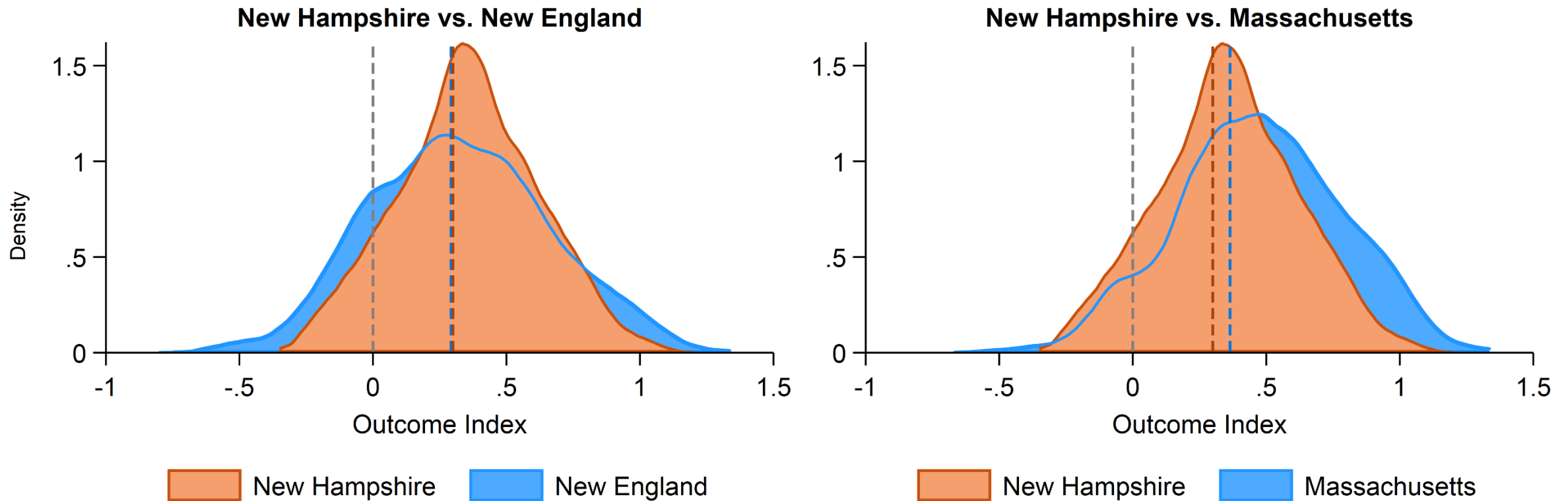
Cost Model Results

Characteristic/Cost Factor	New Hampshire Model	Regional Model
Student outcomes	↑	↑
Free or reduced-price lunch	↑	↑
Special education	↑	↑
English learners	↑	↑
Small districts	↑	↑
Sparsely populated areas	↔	↓
Upper grade levels	↑	↑
Geographic price differences	↔	↔

Comparing New Hampshire and Regional Cost Models

New Hampshire Model Simulated Costs (y-axis): 10,000 / 15,000 / 20,000 / 25,000 / 30,000

Regional Model Simulated Costs (x-axis): 10,000 / 15,000 / 20,000 / 25,000

New Hampshire and Regional Models were generally consistent (correlation of .70).

The regional model serves as a good validation of New Hampshire cost estimates, but we prefer the New Hampshire model for several reasons:

- More up-to-date data (through 2018–19 school year)

- Use of New Hampshire's own data

- More robust outcome measure that combines test scores, graduation rates, and attendance rates

Source: Author's calculations from New Hampshire and regional cost and weight estimation models.

Distribution of Actual and Predicted Spending
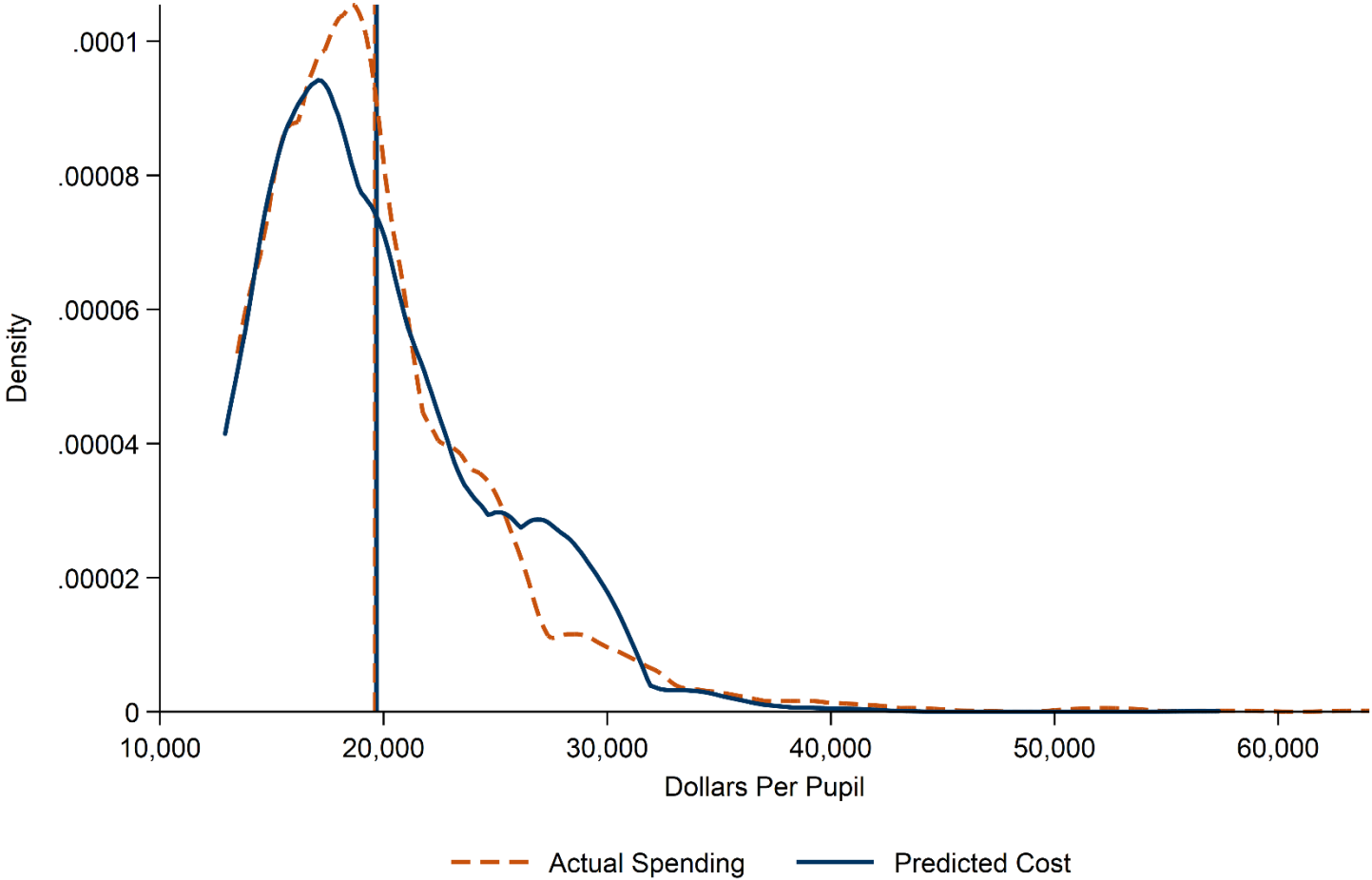
The predicted spending from the cost model results in a similar overall distribution compared with actual spending with a minimum around $13,000 per pupil, a maximum of almost $60,000 per pupil, and a mean of approximately $19,500 per pupil.

Source: Data are from NH DOE and Authors' calculations.

Outcome Gaps and Spending Gaps
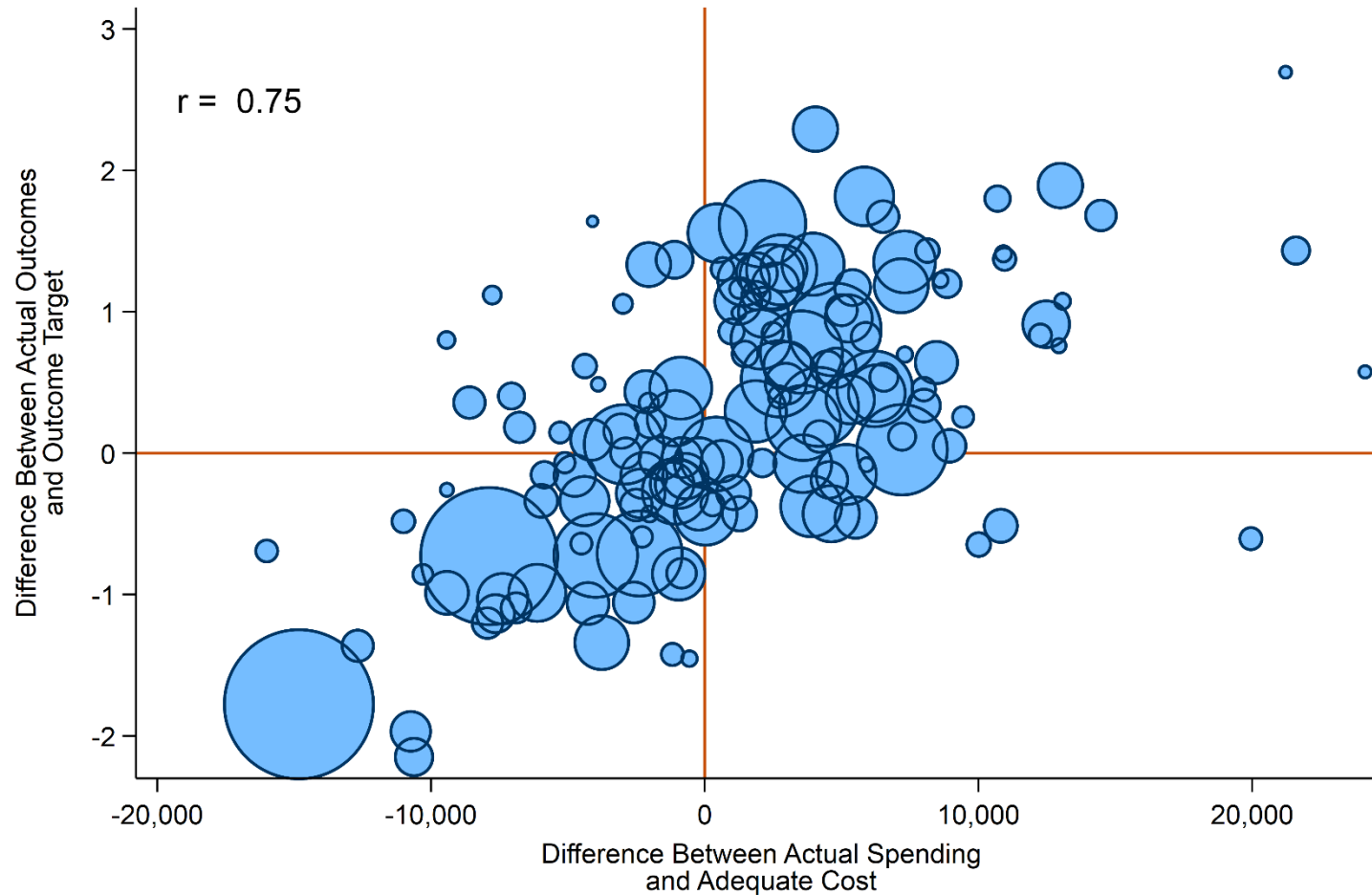
As expected, the model indicates that those districts where outcomes are below the target also generally have actual spending levels that are less than adequate for meeting the outcome target.

Although the overall distribution of spending is similar to actual spending, the model indicates that some districts are spending far less than necessary while others are spending more than necessary.

Source: Authors' calculations from the New Hampshire cost model.

Weight Estimation Model

Weight Estimation Model

- Use a small number of factors that accurately account for the variation in predicted adequate costs and can easily be incorporated into a funding formula:

  – Free or reduced-price lunch rates

  – English learner rates

  – Special education rates

  – Indicators of district size

  – Percentages of students by grade level

- Separate out costs that will not be accounted for in the state funding formula:

  – Federal revenue

  – Special education catastrophic aid

  – Transportation?

Estimated Weights

	Inclusive of Transportation	Excluding Transportation
Base	**$6,927**	**$6,023**
Weight		
Free or reduced-price lunch	1.67	1.89
Special education	3.00	3.29
English learner	4.92	6.32
Enrollment, ≤201	1.67	1.83
Enrollment, 201 to 600	0.88	0.98
Enrollment, 601 to 1,200	0.54	0.62
Enrollment, 1,201 to 2,000	0.26	0.30
Middle school, %	0.76	0.96
High school, %	0.12	0.22

All students receive the base amount of funding ($6,927 when transportation is included).

The weights represent the additional cost relative to the base. So, an FRL student costs $11,568 (1.67 × $6,927) more (or $18,495 in total when including the base).

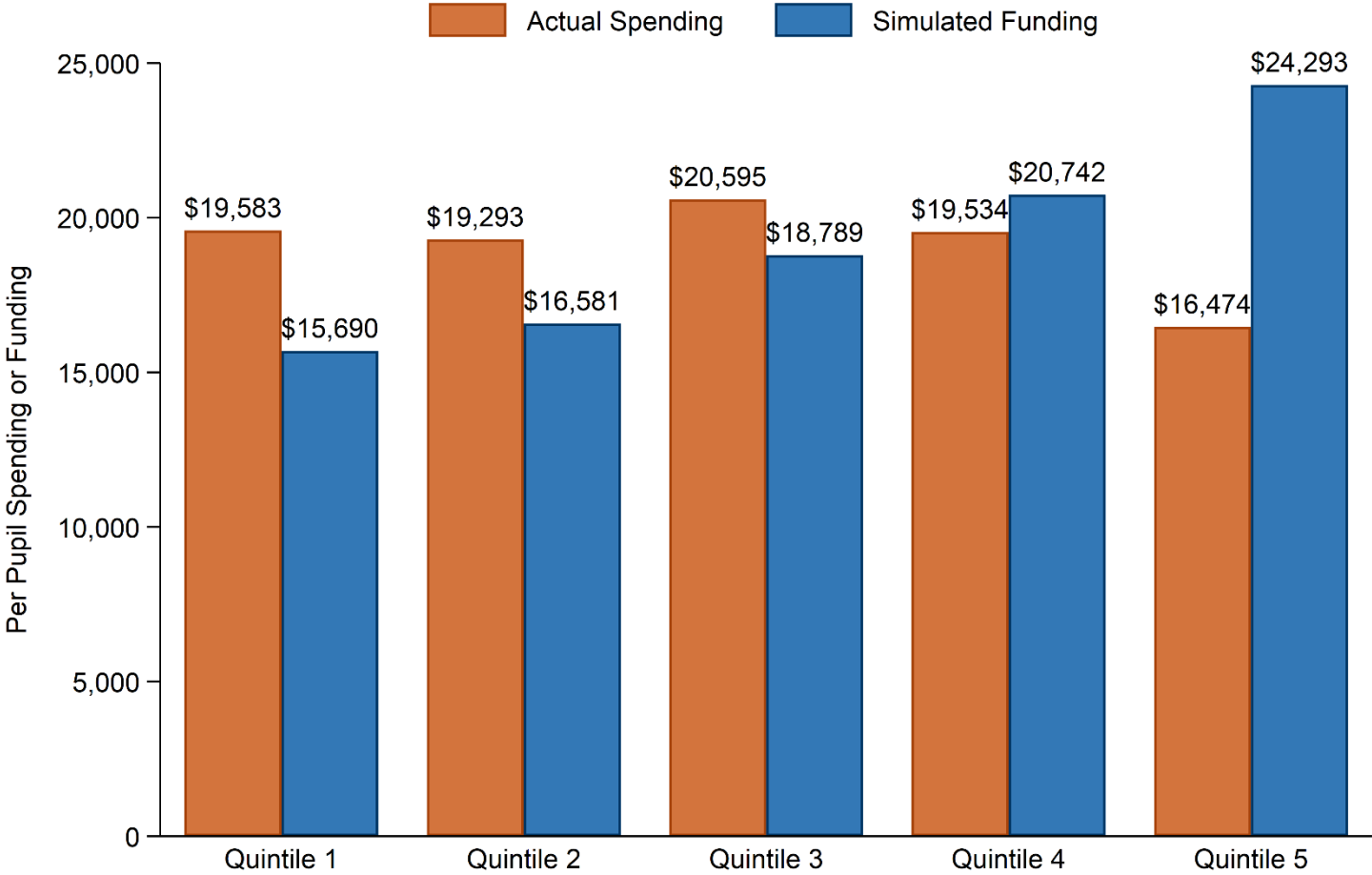*Source:* Authors' calculations from the New Hampshire cost model.

Simulated Formula Funding and District Poverty

r = 0.76

Free or Reduced Price Lunch Rate
Simulated Formula Funding
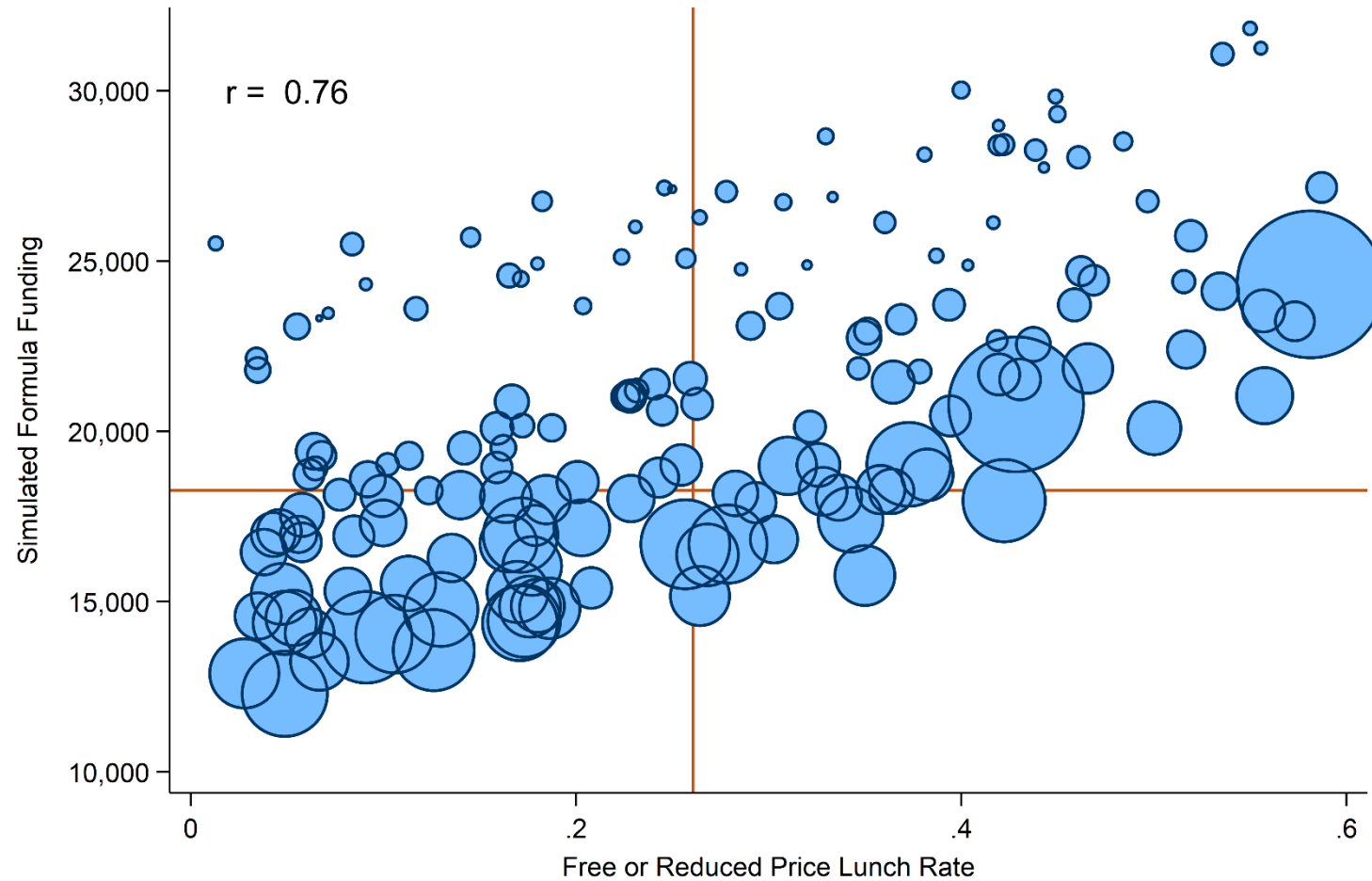
Under the weighted funding formula, the simulated amount of funding for each district ranges from around $12,000 per student to just over $30,000 per student and is positively associated with student needs.

Source: Data from the NH DOE and authors' calculations from the New Hampshire cost model.

Comparison of Actual Spending and Simulated Funding by Free or Reduced-Price Lunch Quintile

The simulated funding formula results in a clearly progressive and purposeful distribution of funding compared with the distribution of actual spending.

Source: Data from the NH DOE and authors' calculations from the New Hampshire cost model.

Examples of Funding by District

District	Simulated Funding Per Pupil	Actual Spending Per Pupil
Newport	$24,114	$18,059
Franklin	$23,233	$16,731
Manchester	$24,318	$13,470
Pittsfield	$25,742	$18,849
Claremont	$20,092	$18,878
Hanover	$17,059	$30,396
Bedford	$12,291	$15,027
Portsmouth	$15,282	$19,687

Under the funding model, high-need districts would get a boost in funding, whereas low-need districts would potentially lose funding unless funding differences were made up for with local revenue.

This redistribution of funding is necessary to achieve a fairer and more equitable funding system.

Source: Data from the NH DOE and authors' calculations from the New Hampshire cost model.

Conclusions

Conclusions

- New Hampshire's existing school funding system is inequitable from both student and taxpayer perspectives.

- Districts' with larger percentages of disadvantages students, English learners, and special education students perform worse, on average, than districts with fewer students with additional needs.

- Our cost modeling indicates that districts with higher needs (free or reduced-price lunch, English learner, special education students) and small districts require more spending per student to achieve a common level of outcomes.

- Our proposed weighted funding formula allocates funding to districts according to the costs facing each districts and results in a progressive distribution of funding that would more adequately fund high-need districts.

PLEASE DIRECT ANY ADDITIONAL QUESTIONS TO DREW ATCHISON

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THANK YOU

Additional Risk Analysis Results

Generating the Combined Outcome Factor Score
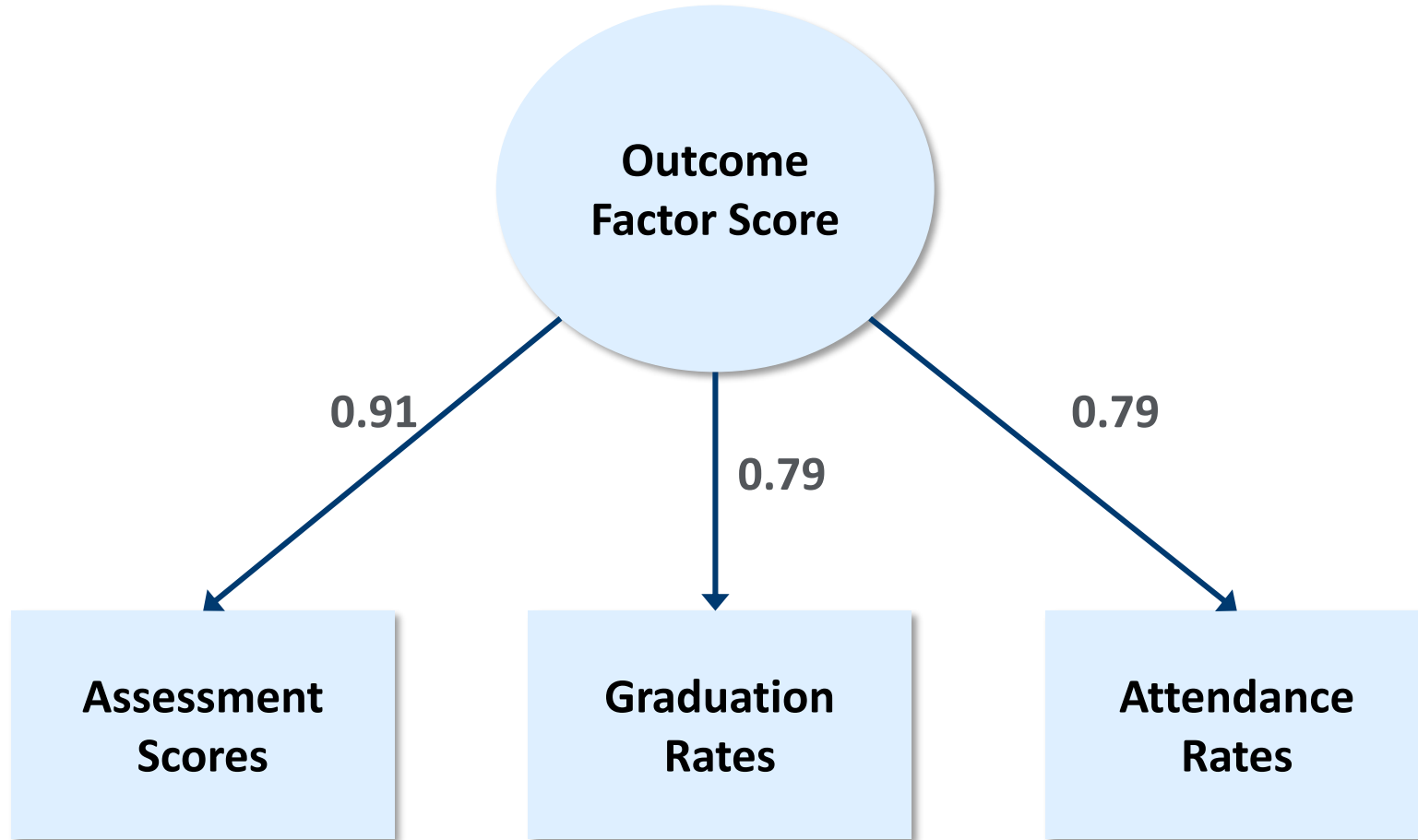
A 1 standard deviation (SD) increase in the combined outcome score is associated with:

- 0.91 SD increase in assessment scores

- 0.79 SD increase in graduation rates

- 0.79 SD increase in attendance rates

Correlations Across New Hampshire Outcome Measures

|	Combined Outcome Score	Assessment Scores (Z)	Graduation Rate (Z)	Attendance Rate (Z)
Combined outcome score	1.00/1.00			
Assessment scores (Z)	0.92/0.96	1.00/1.00		
Graduation rate (Z)	0.75/0.83	0.56/0.72	1.00/1.00	
Attendance rate (Z)	0.65/0.80	0.33/0.64	0.48/0.62	1.00/1.00

Notes: The first number in each cell is the unweighted correlation; the second number in each cell is the enrollment weighted correlation.
Source: Data are from NH DOE.

# Correlations Between Outcome Measures and Student Need

	Combined Outcome Score	**Assessment Scores (Z)**	**Graduation Rate (Z)**	**Attendance Rate (Z)**
Free or reduced-price lunch rate	−0.71/−0.84	−0.68/−0.80	−0.51/−0.70	−0.37/−0.68
English learner rate	−0.13/−0.55	−0.11/−0.51	−0.18/−0.48	−0.10/−0.47
Special education rate	−0.37/−0.43	−0.38/−0.46	−0.30/−0.32	−0.15/−0.28
Mean income-to-poverty ratio	0.65/0.78	0.63/0.76	0.43/0.63	0.34/0.59
Mean poverty (SAIPE)	−0.48/−0.74	−0.47/−0.71	−0.31/−0.58	−0.24/−0.62
Median household income	0.61/0.70	0.61/0.69	0.42/0.57	0.30/0.52
Median housing value	0.63/0.67	0.65/0.69	0.45/0.57	0.27/0.44

Notes: The first number in each cell is the unweighted correlation; the second number in each cell is the enrollment weighted correlation.
Source: Data are from NH DOE.

Relationship Between Special Education and Student Outcomes Using National Outcome Index
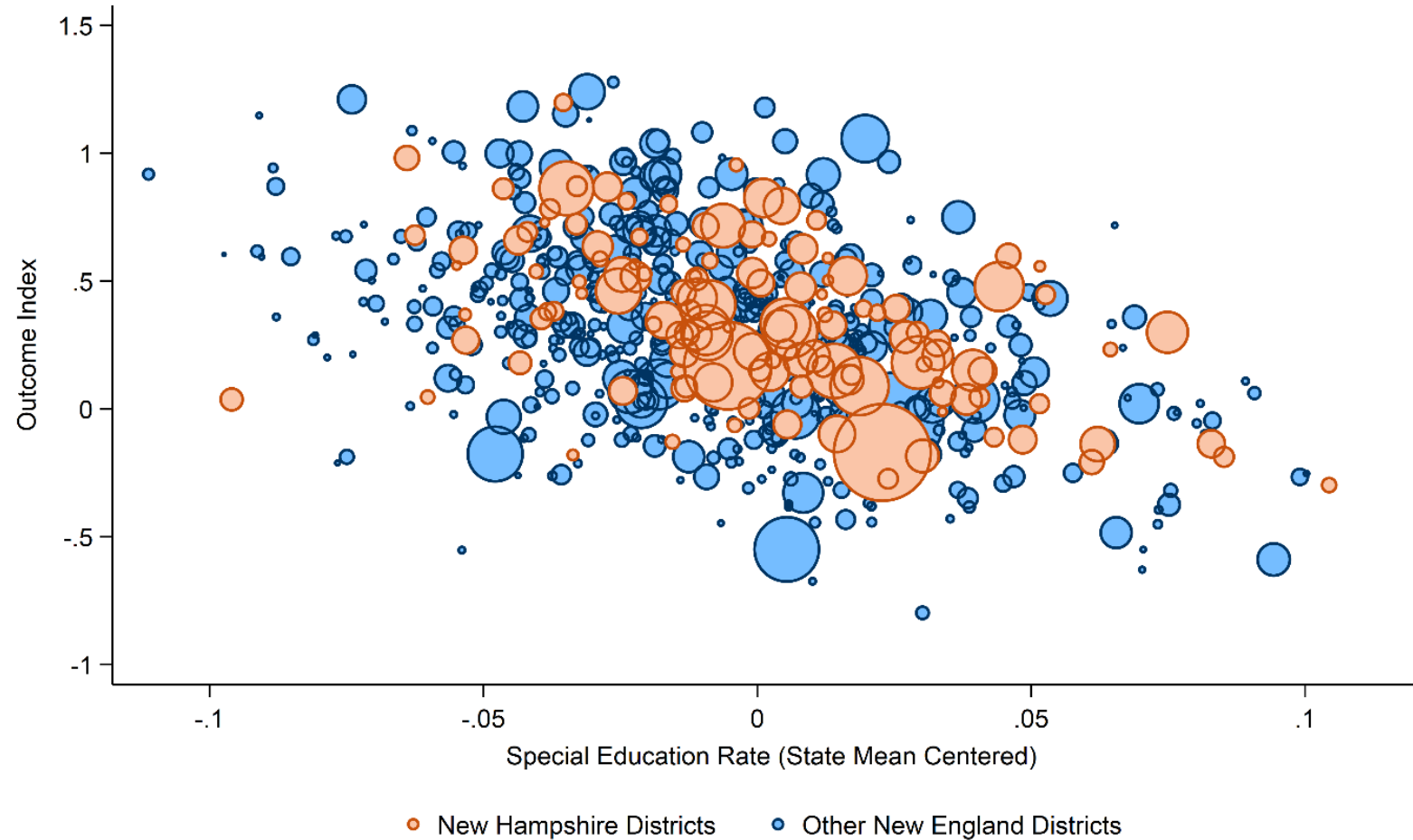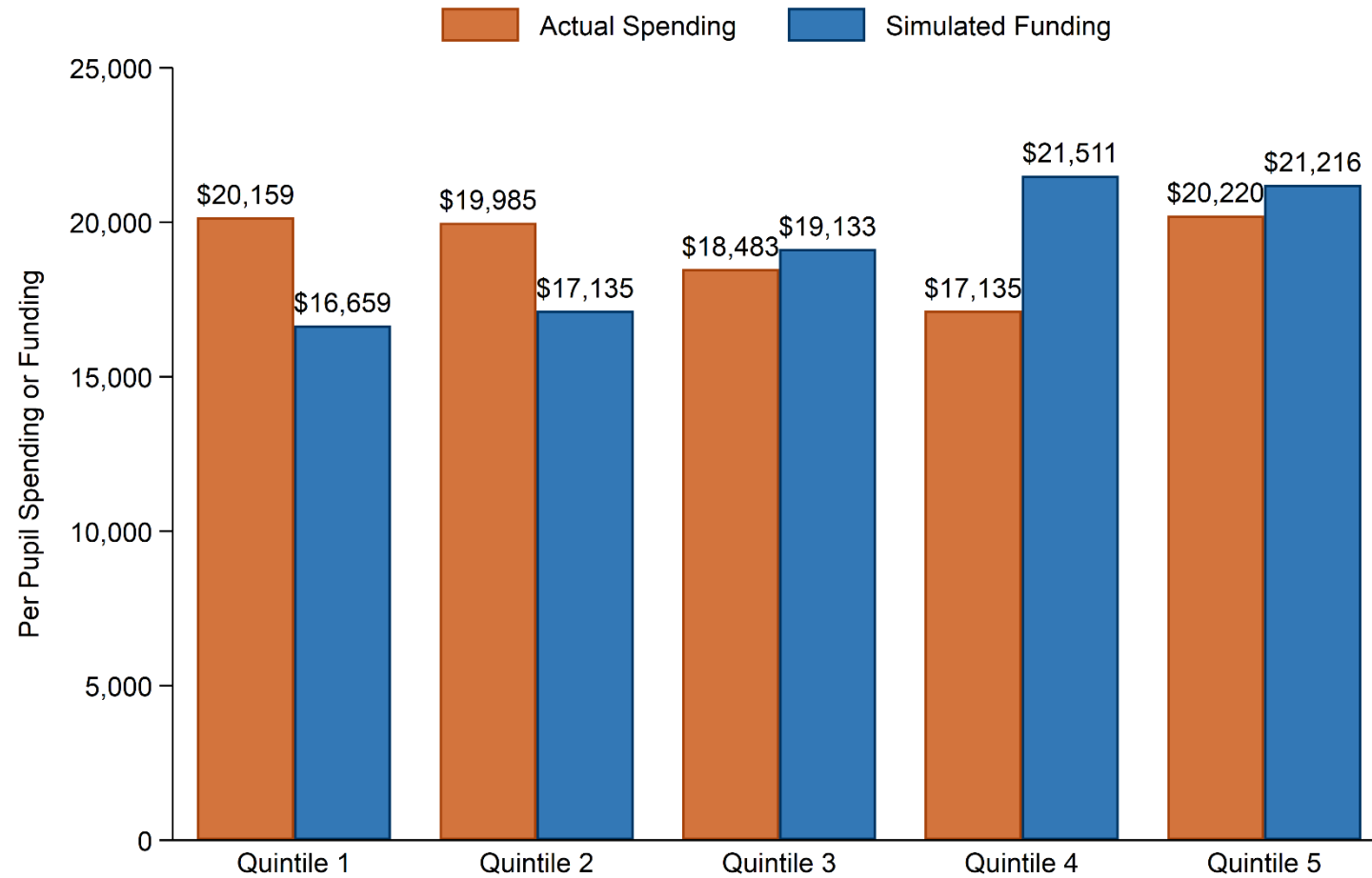
Relationship Between English Learners and Student Outcomes Using National Outcome Index
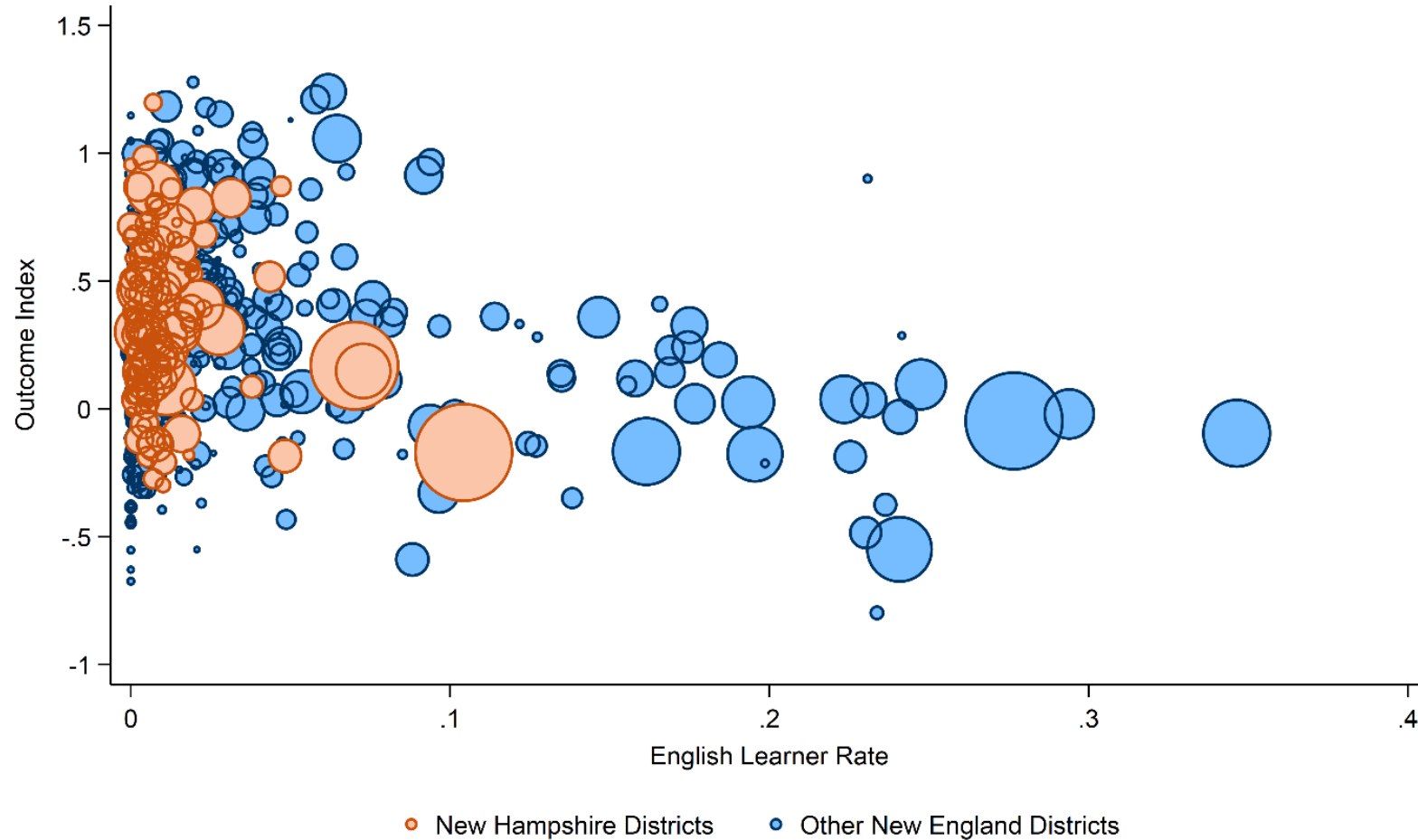
Additional Weight Estimation Results

Comparison of Actual Spending and Simulated Funding by Special Education Quintile

Comparison of Actual Spending and Simulated Funding by Size Category

Chart: Per Pupil Spending or Funding

Size Category	Actual Spending	Simulated Funding
200 or Less	$32,617	$28,084
201 to 600	$24,473	$22,326
601 to 1200	$20,189	$20,388
1201 to 2000	$18,917	$18,635
More than 2000	$16,662	$18,589