

Exploring Cost-Based Funding for California Community Colleges

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Meet the Study Team



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Gratitude

- This presentation is based on research funded by the Gates Foundation. The findings and conclusions contained within are those of the authors and do not necessarily reflect positions or policies of the Gates Foundation.

Presentation Agenda

1. Motivation
2. Research Objectives and Questions
3. Methods and Data Sources
4. Results
5. Leveraging Findings to Inform Policy
6. Concluding Thoughts



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Motivation

Research Motivation – Community Colleges Struggle with Both Funding and Outcomes

- Funding
 - Adequacy: Community colleges have traditionally been funded at lower levels than their public and private research university counterparts (Desrochers & Hurlburt, 2016).
 - Equity: Community college funding is correlated with student demographic characteristics (Kolbe & Baker, 2019; You et al., 2022).
- Outcomes – A large share of community college enrollees fail to complete a two- or four-year program of study after six years (Shapiro et al., 2017).
- Question – Do community colleges receive enough to meet their goals and is funding distributed in an appropriate (equitable) manner?

Research Motivation – Cost-Based Funding Mechanisms As a Solution

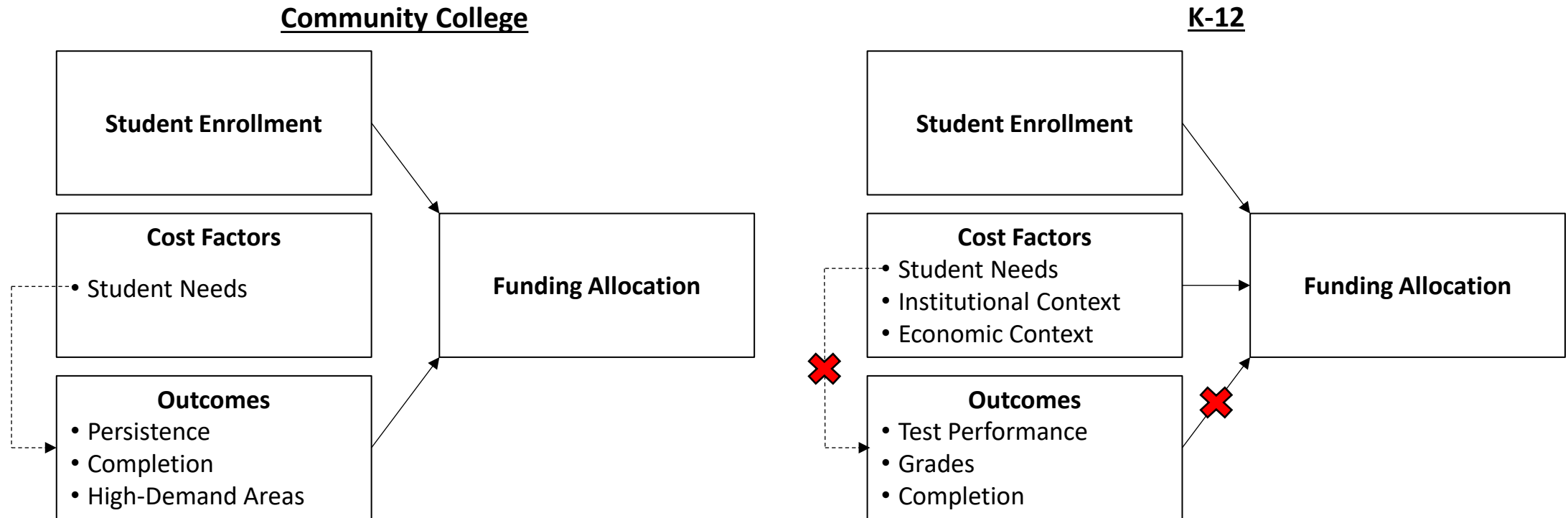
- Cost-based funding mechanisms offer a potential improvement.
- Funding should be provided that allows all students an equal opportunity to succeed at a common level that is aligned with state goals (Baker and Levin, 2019).
- Funding adjustments should represent the true differential costs of generating outcomes for different types of students served in different contexts (i.e., funding adjustments should be cost-based).
- The imperative to develop cost-based funding adjustments becomes even more important in the context of mechanisms that have a performance-based component (Hagood, 2019).

Research Objectives and Questions

Research Objectives

- Apply well-established methods used in K–12 education finance to measure levels of funding necessary to provide all students an equal opportunity to achieve a common target outcome level (Duncombe & Yinger, 2005; 2011).
- Quantify the specific funding levels necessary to support community colleges serving students with diverse needs operating in different contexts.
- Inform policy intended to provide adequate and equitable funding allocations to community colleges based on student needs and other institutional contexts that drive costs.
- Shift thinking surrounding funding system design toward cost-based adjustments for needs and other factors intended to provide equal opportunity to students.

Contrasting the Relationships Between Cost Factors, Outcomes, and Funding in Community College and K-12 Finance Mechanisms



Key Research Questions

1. Which student needs are significantly associated with student persistence and completion outcomes produced by California community colleges?
2. Does institutional spending per student vary with respect to student needs across California community colleges?
3. What spending levels are associated with producing outcomes for students with different needs attending California community colleges in different contexts?



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Methods and Data Sources

Methods – Key Study Analyses

- **Student Needs Analysis:** How do student outcomes associated with community college persistence/completion vary according to the needs of students and characteristics of their institutions?

$$\textit{Student Outcomes} = f(\textit{Student Needs}, \textit{Context})$$

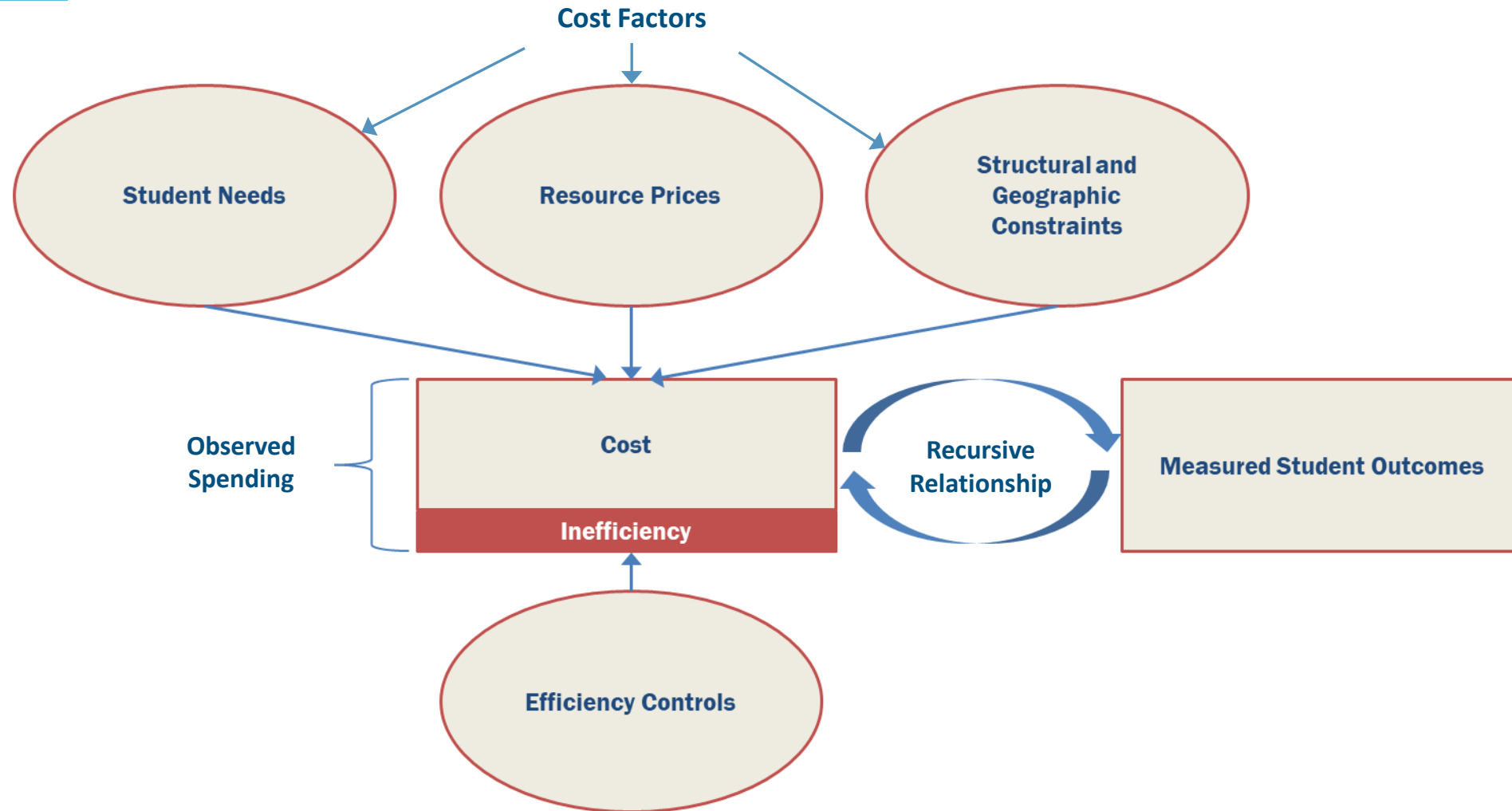
- **Equity Analysis:** How does community college spending per student vary based on student needs, institutional/community context, and local wealth?

$$\textit{Per-Student Spending} = f(\textit{Student Needs}, \textit{Context})$$

- **Cost Analysis:** What is the differential cost of providing students with varying levels of need and attending college in different locations an equal opportunity to achieve at a common level of outcomes?

$$\textit{Per-Student Spending} = f(\textit{Outcomes}, \textit{Student Needs}, \textit{Context}, \textit{Efficiency Controls})$$

Overview of the Outcome-Oriented Approach to Cost Analysis



Data Sources

- Institution-level data collected on all California community colleges for academic years 2014-15 through 2020-21.
- Sources
 - California DataMart: Institution-level data containing a host of student enrollment and outcome characteristics.
 - IPEDS: Institution-level data containing enrollment, spending and faculty salary, Carnegie classification, completions in health or science/technology, and IPEDS 200% graduation rate.
 - School Finance Indicators Database: A collection of district- and county-level data with information on K-12 student needs, outcomes, and school finance measures.
 - California Board of Equalization: Data maintained by the state that includes county-level information on assessed property values.



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Results

Student Needs Analysis – Model and Outcomes

- **Models** – Run at both the community college (institution) and district levels.

$$\textit{Student Outcome} = f(\textit{Student Needs}, \textit{Institutional Contextual Factors})$$

- **Student Outcomes**

- **IPEDS 200% Graduation Rate:** The percentage of students that finish their program within 200% of the standard timeframe.
- **3-Year California Vision Goal Completion Rate:** The percentage of students who earned a certificate, associate degree, and/or a CCC baccalaureate degree approved by the Chancellor’s Office within 3 years of their enrollment.
- **Success Points per FTE:** Points derived from Student Success Allocations included in the Student Centered Funding Formula (SCFF) that drive funding to community college districts based on a variety of student outcomes achieved (1 point = \$440).

Relationships Between Student Outcomes and Need Factors

Student need factor	IPEDS 200% graduation rate	3-Year California Vision Goal completion rate	Success Points per FTE student
Percentage of students who are female	↓	–	–
Percentage of students who are Black	–	–	↓ ^a
Percentage of students who are Hispanic	–	–	–
Percentage of students who are 25 years old or older	↓	↓	–
Percentage of students who received a Pell grant	↓	↓	–
Percentage of students who are first-generation college students	–	–	–
Percentage of students who are U.S. military veterans	–	–	–
Percentage of students who are designated as English learners	↑ ^a	↓	↓
Percentage of students who are designated as foster youth	–	–	–

Note. ↓ denotes statistically significant *negative* relationship between student outcome and need factor; ↑ denotes statistically significant *positive* relationship between spending and student factor; – denotes statistically insignificant relationship between student outcome and need factor.

^a Indicates estimated relationship between student need factor and outcome was only statistically significant at the 5%-error level in the community college institution-level model.

Equity Analysis – Models and Outcomes

- **Model** – Spending model run at institution level.
Spending = f(Student Needs, Institutional Contextual Factors, Geographic Contextual Factors)
- **Spending** – Overall and instructional spending per 12-month fulltime equivalent headcount

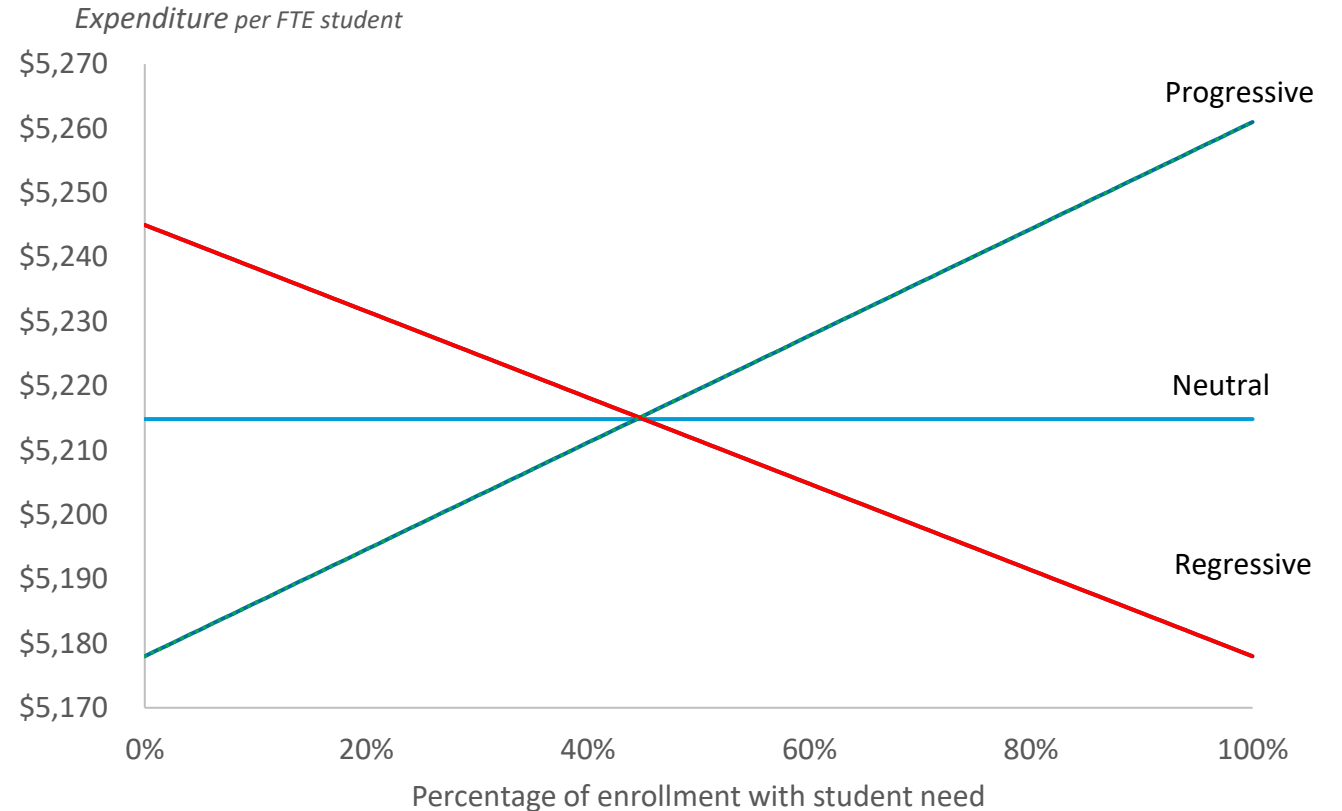
Relationships Between Spending Per Student and Student Needs

Student need factor	Instructional spending per 12-month headcount	Overall spending per 12-month headcount
Percentage of students who are female	↑	↑
Percentage of students who are Black	–	–
Percentage of students who are Hispanic	–	–
Percentage of students who are 25 years old or older	–	–
Percentage of students who received a Pell grant	↓	–
Percentage of students who are first-generation college students	–	–
Percentage of students who are U.S. military veterans	–	–
Percentage of students who are English learner students	–	–
Percentage of students who are foster youth	↑	–

Note. ↓ denotes statistically significant *negative* relationship between student outcome and need factor; ↑ denotes statistically significant *positive* relationship between spending and student factor; – denotes statistically insignificant relationship between student outcome and need factor.

A Note on Equity

- Relationships between spending and student needs can be progressive, regressive or neutral:
 - Progressive: tendency for higher spending at colleges with higher student needs
 - Regressive: tendency for lower spending at colleges with higher student needs
- A progressive relationship between spending and student needs does not necessarily imply that all students are provided a level of funding that allows for an equal opportunity to achieve.



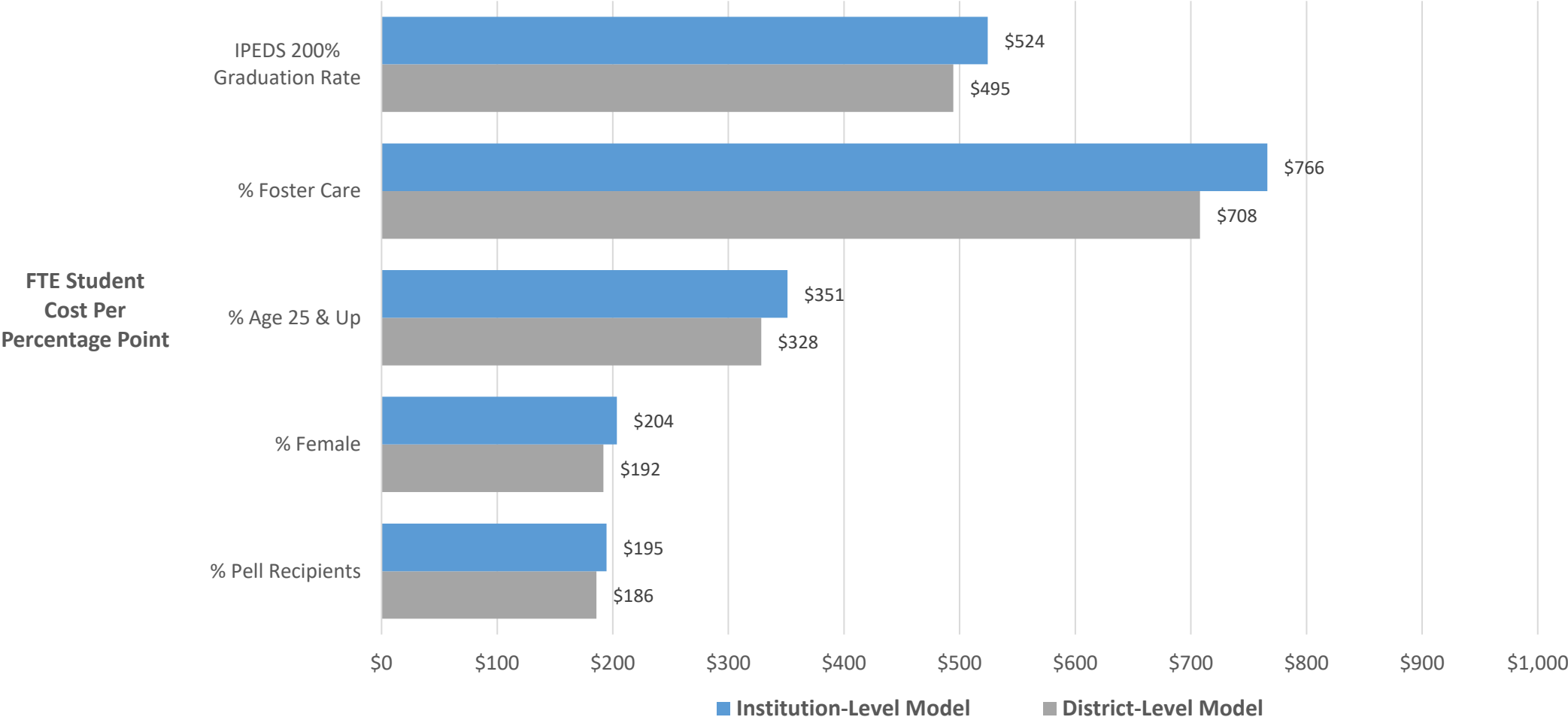
Cost Analysis – Models and Outcomes

- **Model** – Run at both the community college (institution) and district levels.
Per-Student Spending = f(Outcome, Student Needs, Institutional Contextual Factors, Geographic Contextual Factors, Efficiency Controls)
- **Spending Outcome** – Overall spending per 12-month fulltime equivalent headcount
- **Student Outcomes**
 - **IPEDS 200% Graduation Rate:** The percentage of students that finish their program within 200% of the standard timeframe.
 - **3-Year California Vision Goal Completion Rate:** The percentage of students who earn a certificate, associate degree, and/or a CCC baccalaureate degree approved by the Chancellors Office within 3 years of their enrollment.

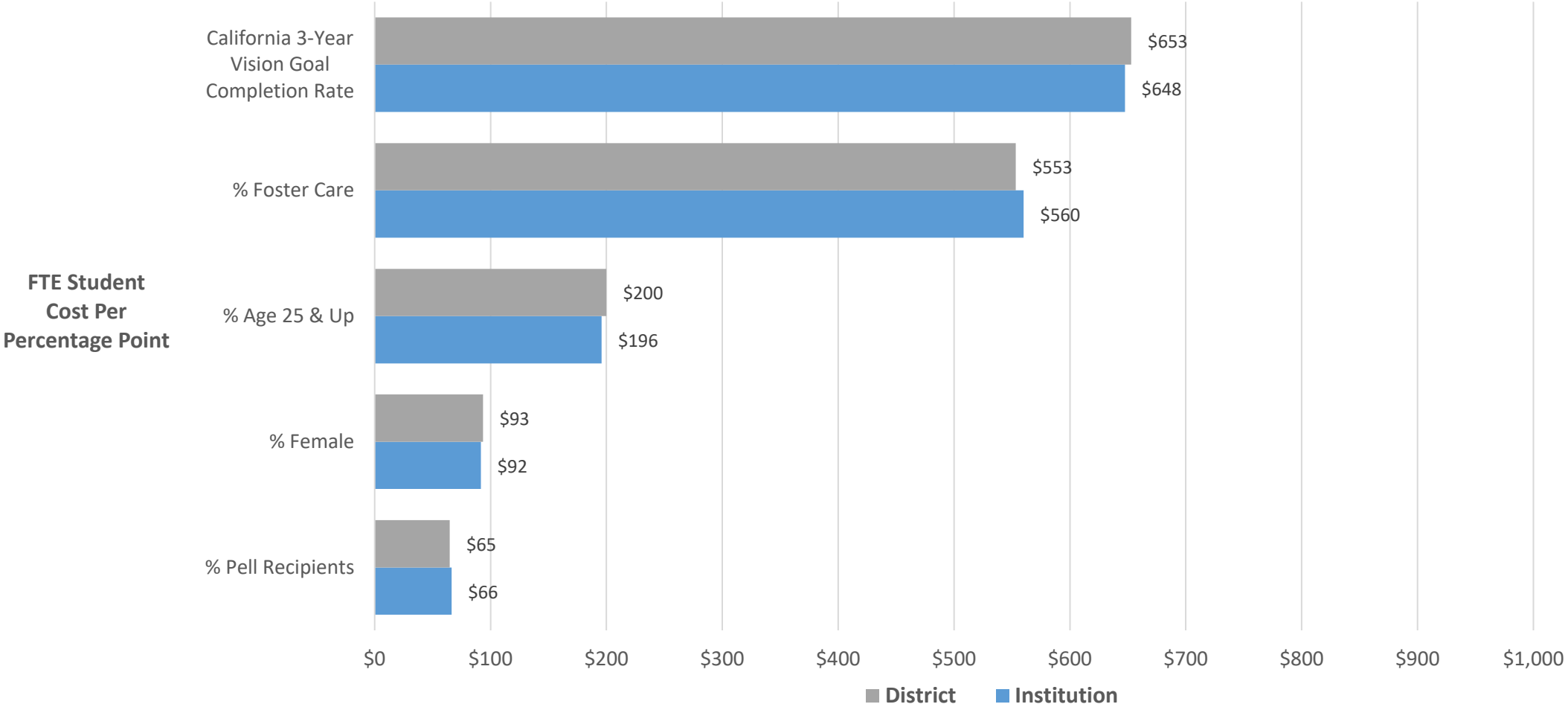
Relationships Between Student Outcomes/Needs and Spending Per Student from Cost Function Models

Student outcome or need factor	Total expenditures per full-time equivalent student			
	IPEDS 200% graduation rate cost model		California 3-Year Vision Goal cost model	
	Institution level	District level	Institution level	District level
Outcome				
IPEDS 200% graduation rate	↑	↑	N/A	N/A
Vision Goal completion rate	N/A	N/A	↑	↑
Student need factor				
Percentage of students who are female	↑	↑	–	–
Percentage of students who received a Pell grant	↑	↑	–	–
Percentage of students who are 25 years old or older	↑	↑	↑	↑
Percentage of students who are foster youth	↑	↑	↑	↑

Estimated Additional Costs Per FTE Student Associated with Percentage Point Increases in IPEDS 200% Graduation Rate and Other Cost Factors



Estimated Additional Costs Per FTE Student Associated with Percentage Point Increases in California 3-Year Vision Goal Completion Rate and Cost Factors



Leveraging Findings to Inform Policy

Developing and Simulating a Funding Formula

- **Steps to Developing a Formula**

- Select outcome target and efficiency levels (e.g., statewide averages).
- Use estimated cost function to predict community college costs corresponding to targets.
- Estimate a simpler funding weights model that serves as formula with a base per-student funding amount and adjustments for student needs and other cost factors.

- **Leveraging Simulation Tool for Policy Development**

- Simulator tool used to generate funding projections under different assumed parameters:
 - » Student needs such as family income, first-generation college enrollee, English learner, non-traditional student age.
 - » College characteristics including enrollment size.
- Dynamic charts showing funding gaps and variation according to student needs.

Texas Community College Example – Calculating Cost-Based Funding Using Weights Model

- The cost of achieving statewide average outcomes for a student with no needs attending a large-sized community college was \$4,537 (base per-student cost).
- To provide an equal opportunity to achieve the statewide average outcomes:
 - Students who are older than 24 years and first-generation college students cost more than twice as much as the estimated base per-student cost.
 - Students from low-income households, English learner students, and students attending small or medium-sized colleges cost 18 to 31 percent more than the estimated base per-student cost.
 - Students participating in dual-credit programs cost 16 percent less than the estimated base per-student cost.

Student need factor or institutional contextual factor	Expenditure per full-time equivalent student <i>Weight</i>
<i>Need factor</i>	
Percentage of students who are first-generation college students	2.49
Percentage of students who are from households earning less than \$30,000	1.31
Percentage of students who are older than 24	2.63
Percentage of students who are English learner students	1.19
Percentage of students who are enrolled in dual-credit programs	0.84
<i>Contextual factor</i>	
Fewer than 4,001 students enrolled	1.28
4,001–30,000 students enrolled	1.18
Base per-student cost (constant)	\$4,536.86

Funding Simulator Example: Funding Projections Made Easy



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Texas Community College Funding Simulator Tool v1.0 (TX-CCFS) User Guide

Jesse Levin, Bruce Baker, Jason Lee, Drew Atchison, and Robert Kelchen

October 2022

This guide provides user documentation for the Texas Community College Funding Simulator Tool (TX-CCFS) v1.0. The tool is designed to emulate community college per-student funding projections using a formula derived from the REL Southwest report *An Examination of the Costs of Texas Community Colleges*.

Simulator Example: Customizable Weights and Base Per-Student Funding

- Allows policymakers to consider potential changes to how community colleges are funded to ensure that institutions serving students from different backgrounds are equitably and adequately funded. The tool is capable of:
 - Emulating the community college per-student funding projections generated by the study analysis.
 - Generating alternative funding scenarios by changing key formula settings such as base per-pupil cost and funding adjustments related to student need characteristics and institution enrollment size.

A. Set Custom Funding Weights									
	Custom/Suggested Funding Weights and Base Per-Student Funding Definitions	Percent First Generation	Percent Income Less Than \$30,000	Percent Older Than 24	Percent English Learner	Percent Dual Credit	Enrollment Less Than 4,001	Enrollment Between 4,001 and 30,000	Base Per-Student Funding
A1. Set Custom Funding Weights (Use Up/Down Arrows To Adjust Values)	Custom Funding Weights	▲▼ 2.49	▲▼ 1.31	▲▼ 2.63	▲▼ 1.19	▲▼ 0.84	▲▼ 1.28	▲▼ 1.18	▲▼ \$4,537
	Suggested Funding Weights	2.49	1.31	2.63	1.19	0.84	1.28	1.18	\$4,537
A2. Select Funding Weight Type (Choose From Pull-Down Menu) ----->	Suggested Funding Weights								

Simulator Example : Dynamic Charts of Spending versus Projected Funding

- The simulator tool includes dynamic charts that update when the user makes changes to the weights or base per-student cost.
- Example: Scatter plot chart maps projected funding and spending for community colleges and provides a dashed line as a reference that indicates when projected per-student funding and actual per-student spending are equal.

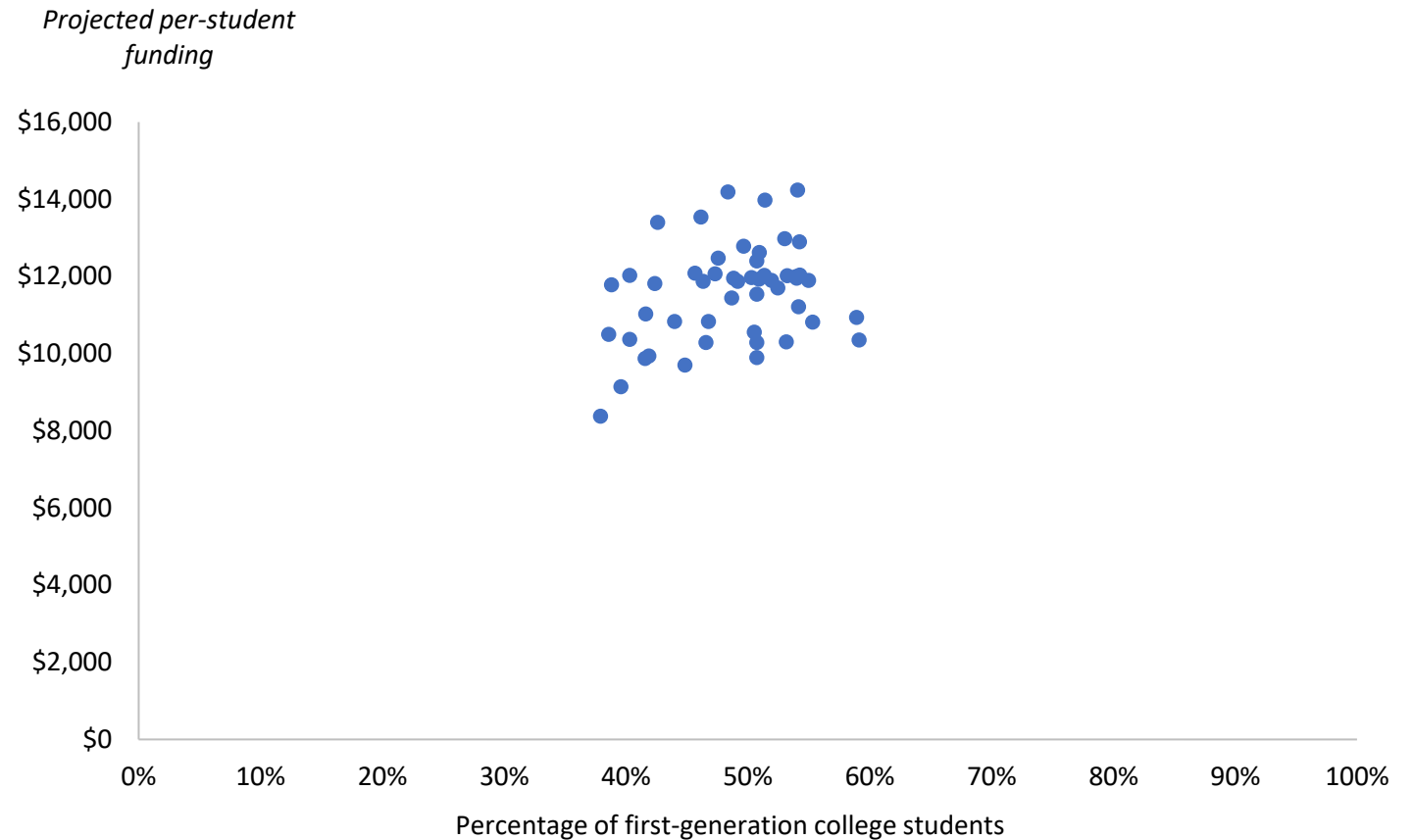
Actual per-pupil spending versus projected per-student funding for Texas community colleges, 2019–20



Simulator Example: Dynamic Charts of Projected Funding by Student Needs

- The simulator tool also produces a series of dynamic charts that plot projected per-student funding by student needs for each of the study community colleges.
- Example: Scatter plot chart depicts projected per-student funding by the percentage of first-generation college students.

Percentage of first-generation students versus projected per-student funding for Texas community colleges, 2019–20



Incorporating Analysis Findings into Mapping Application

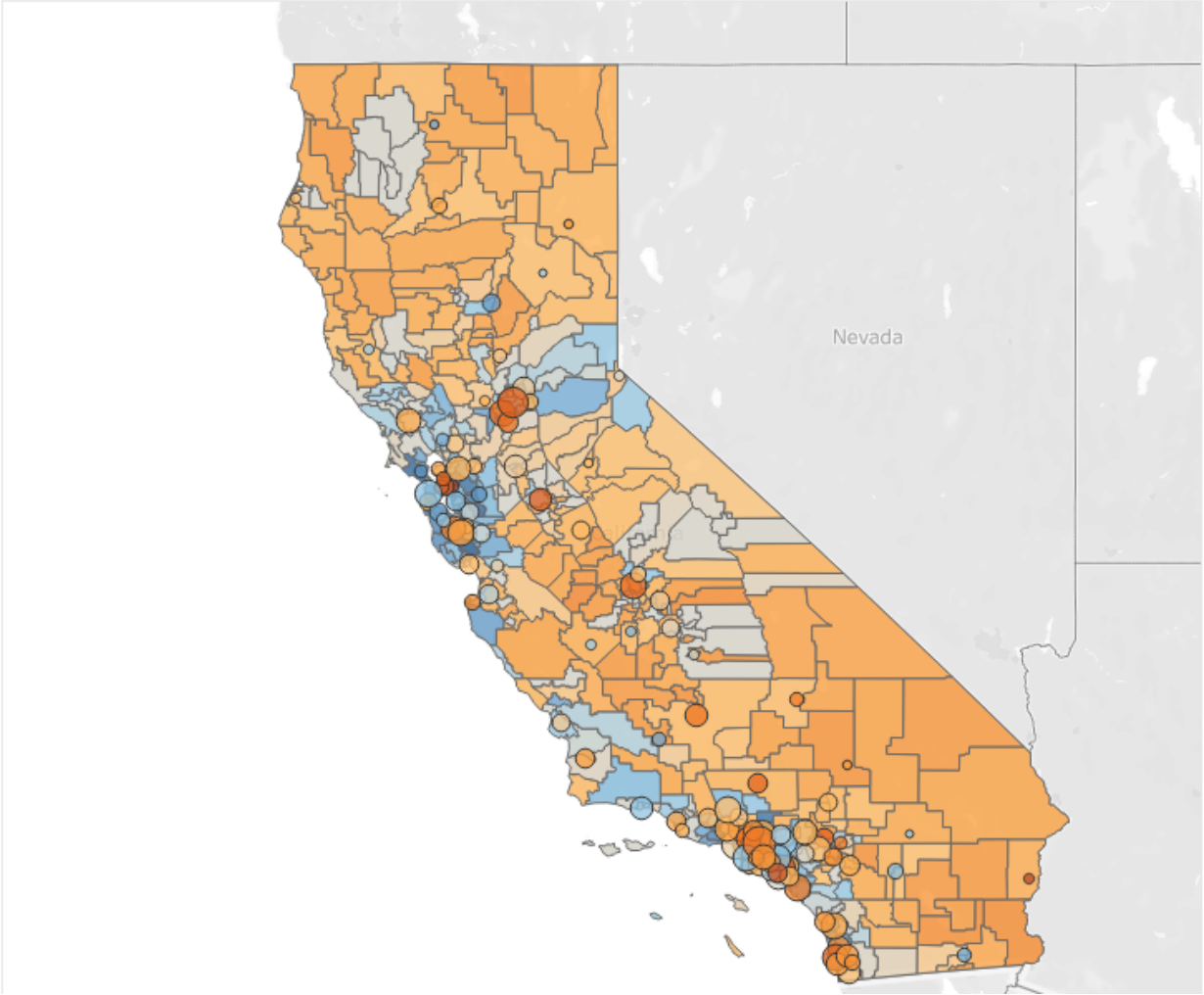
- **Primary (Top) Layer**

- **Outcome Gaps:** Absolute differences between current community college outcomes and statewide averages.
- **Funding Gaps:** Absolute and relative differences between current spending and cost of meeting statewide average outcomes (IPEDS 200% Graduation and California Vision Goal Completion rates).

- **Secondary (Bottom) Layer**

- **Poverty:** K-12 school district poverty rates from Small Area Income Poverty Estimates (Census).
- **Income/Poverty Ratio:** Ratio of family income to poverty threshold in neighborhoods surrounding K-12 schools (Census).
- **K-12 Student Needs:** School district percentages of students by race, eligible for free/reduced-price lunch, or designated as English learners (National Center for Education Statistics).

Overlay of California Community Colleges with High School District Variables



Background (LEA) Layer Value
EDGE Income-Poverty Ratio Estimate (Standardized)

Foreground (CC) Layer Value
Funding Gap (Vision Goal)

EDGE Income-Poverty Ratio Estimate (Standardized)



Funding Gap (Vision Goal)



Definitions

Funding Gap: Represents the gap between current spending and the cost of meeting average outcomes.

Outcome Gap: Represents the gap between current outcomes and the average outcome.

Spending Adequacy: Represents the deviation of current spending from the average, calculated as current spending as a percent of meeting average outcomes minus one.



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Concluding Thoughts

Concluding Thoughts

- **Critical Need for Cost-Based Funding:** Helping community colleges succeed in generating student outcomes requires that they are funded appropriately.
- **Apply Accepted School Finance Methods:** Should be applied to promote community college funding mechanisms that provide equal opportunity for all students to achieve.
- **Next Step:** Perform a *Funding Weights Analysis* which leverages the cost function predictions to emulate a simpler equation that can be used as a funding formula.
- **Key Limitations of the Cost-Function Approach:**
 - It provides no direct information on *how* funding is spent to generate outcomes.
 - Cost-function outcomes may not be broad enough.
 - This can be addressed using an alternative input-based costing method.

Accessing the California Study

- Full study and summary brief are available at the following location:
 - <https://www.air.org/project/exploring-costs-california-community-colleges-and-implications-funding>

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Thank You

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