# The Economics of UW-System: Net prices, returns, and state funding

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Department of Economics

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# Outline

- Rationale for state support of higher education
- Decline in college enrollment
- Understanding increase in tuition and college premium
- Returns to college – private, social
- Administrative intensity at UW
- State support of Higher Ed – Is the Wisconsin taxpayer stingy?
- Efficacy of budget allocation at UW

# The Role of State Government in Higher Education

- Why do states support higher education?
- Promote equality of opportunity
- Provide workforce talent for businesses in the state
- Remove inefficiencies
  - Higher education externalities
    - Benefit to society exceeds the benefit to the individual
  - Easing borrowing constraints (financial impediments)
    - Inability to borrow against future income

# Two views of state support to UW System

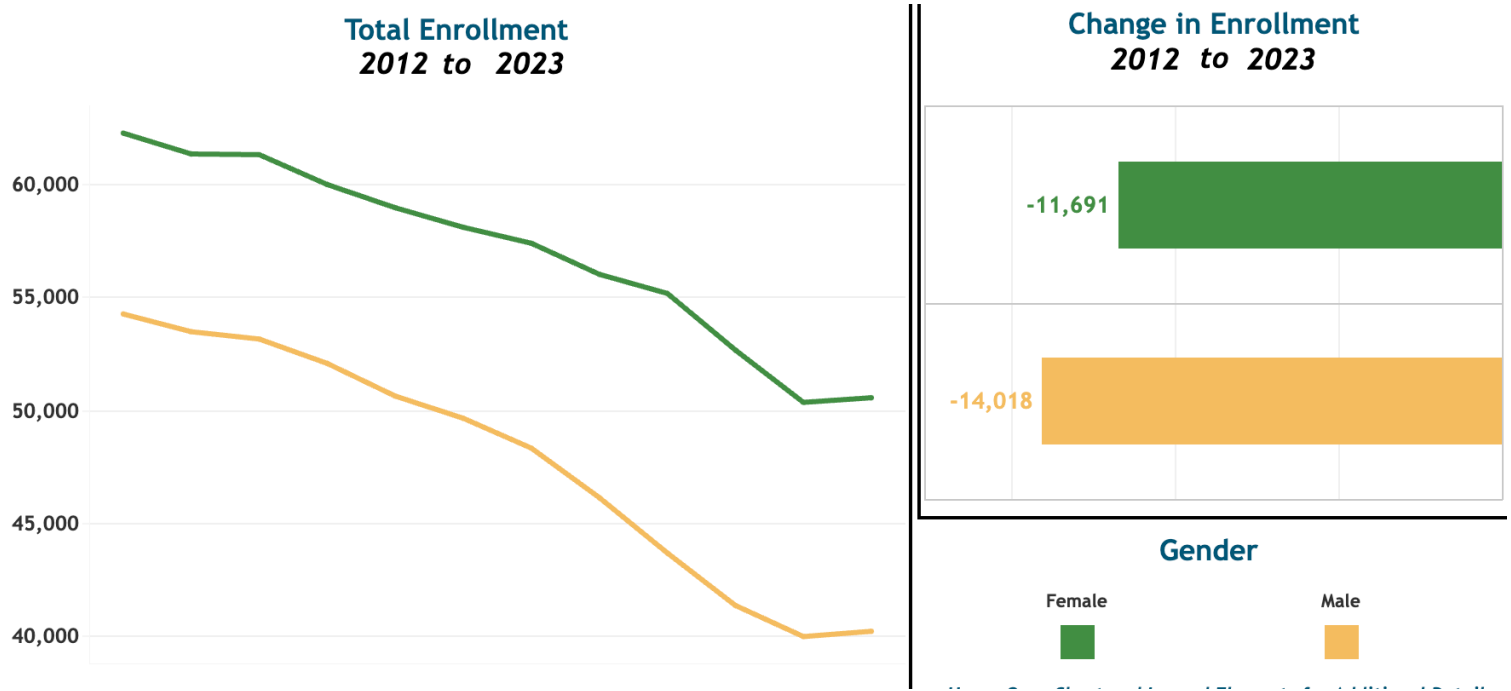
- The state (effectively) gives each in-state student a discount to attend a UW System school at a subsidy relative to out-of-state tuition
  - For UW-Madison, the difference roughly equals GPR
- State support is not to augment citizens' private benefit but rather for societal benefits (externalities)
  - Effects on non-college graduates, creation of industries etc.
- A high private return doesn't warrant a state subsidy, but a high social return does. Measuring the social return to higher education is difficult

# Decline in Enrollment

- Both UW System and WTCS have seen significant enrollment declines in the past decade

# FTE enrollment at UW (excluding UW-Madison) fell 22.1%:

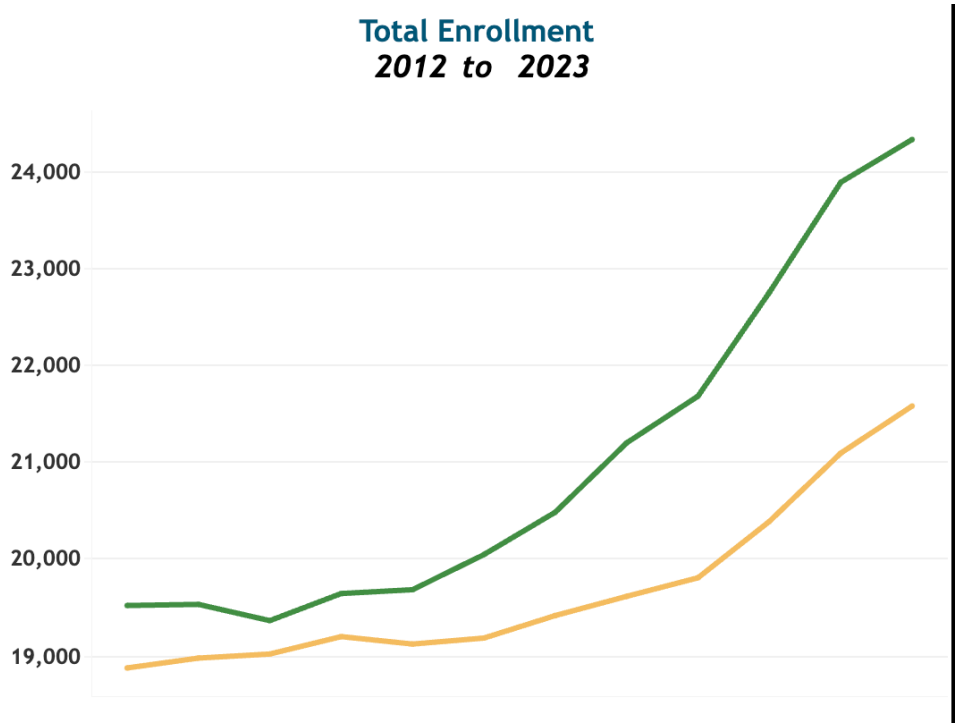
## 25.8% for male and 18.8% for female

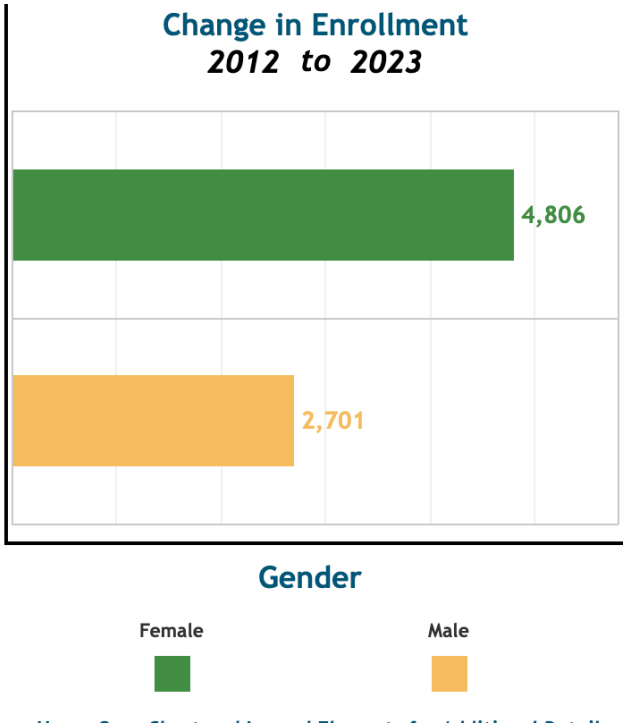



FTE enrolment at WTCS dropped by 22.7% from 2012 to 2023

*Source: UWA Office of Policy Analysis & Research*

# UW-Madison's FTE enrollment increased by 19.6%: 14.3% for male and 24.6% for female

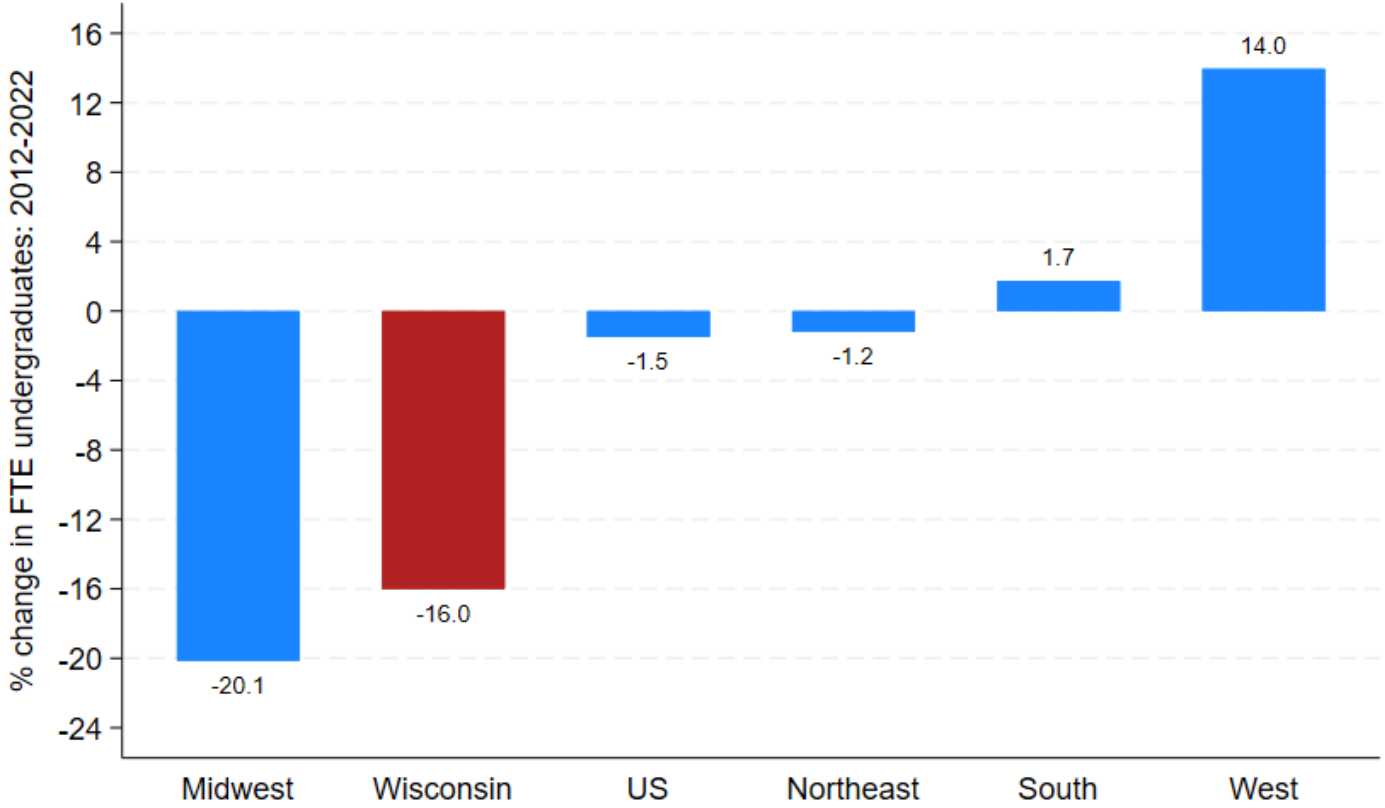



Source: UWA Office of Policy Analysis & Research

# % change in FTE undergraduate enrollment: 2012-2022

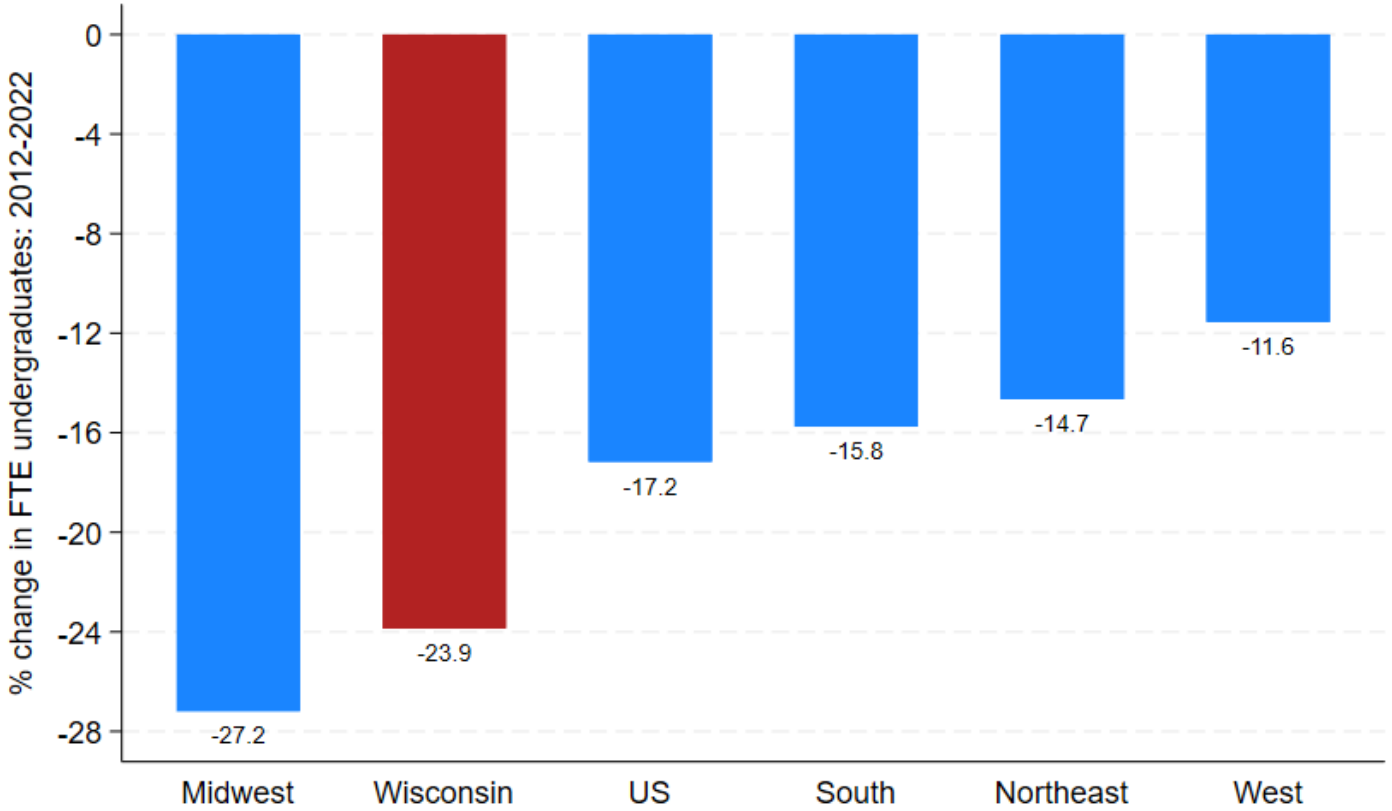
## 4-yr+ institutions




*Source: Own calculation using data from IPEDS*

# % change in FTE undergraduate enrollment: 2012-2022

## All institutions




*Source: Own calculation using data from IPEDS*

# The increase in Tuition Costs

# Why have tuition increases outpaced inflation?

- Federal support for higher education
- Proliferation of subsidized college loans
- Administrative costs
- Slow productivity growth in higher education

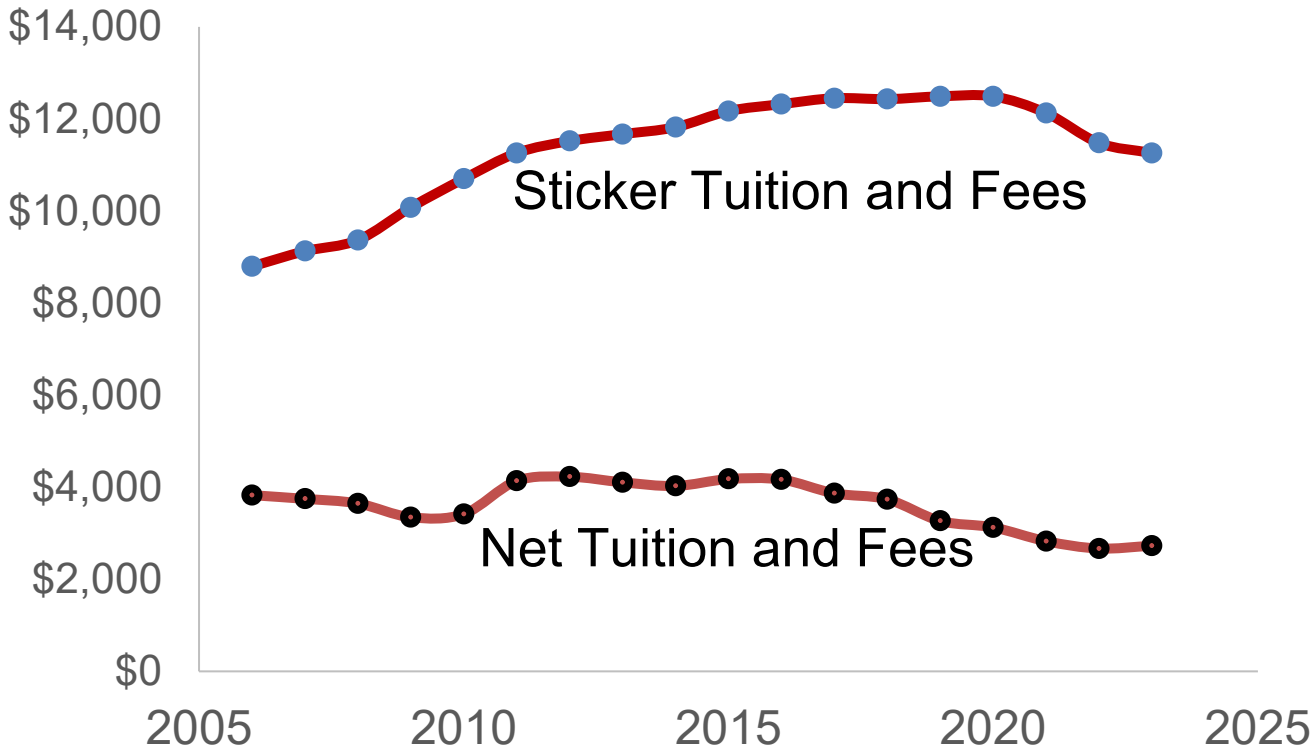
The primary cost of running a university is highly skilled labor. Wages for highly skilled labor have risen at a much faster rate than inflation in the past few decades.

*Source: Jones and Yang (2016)*

# Tuition – Sticker vs Net

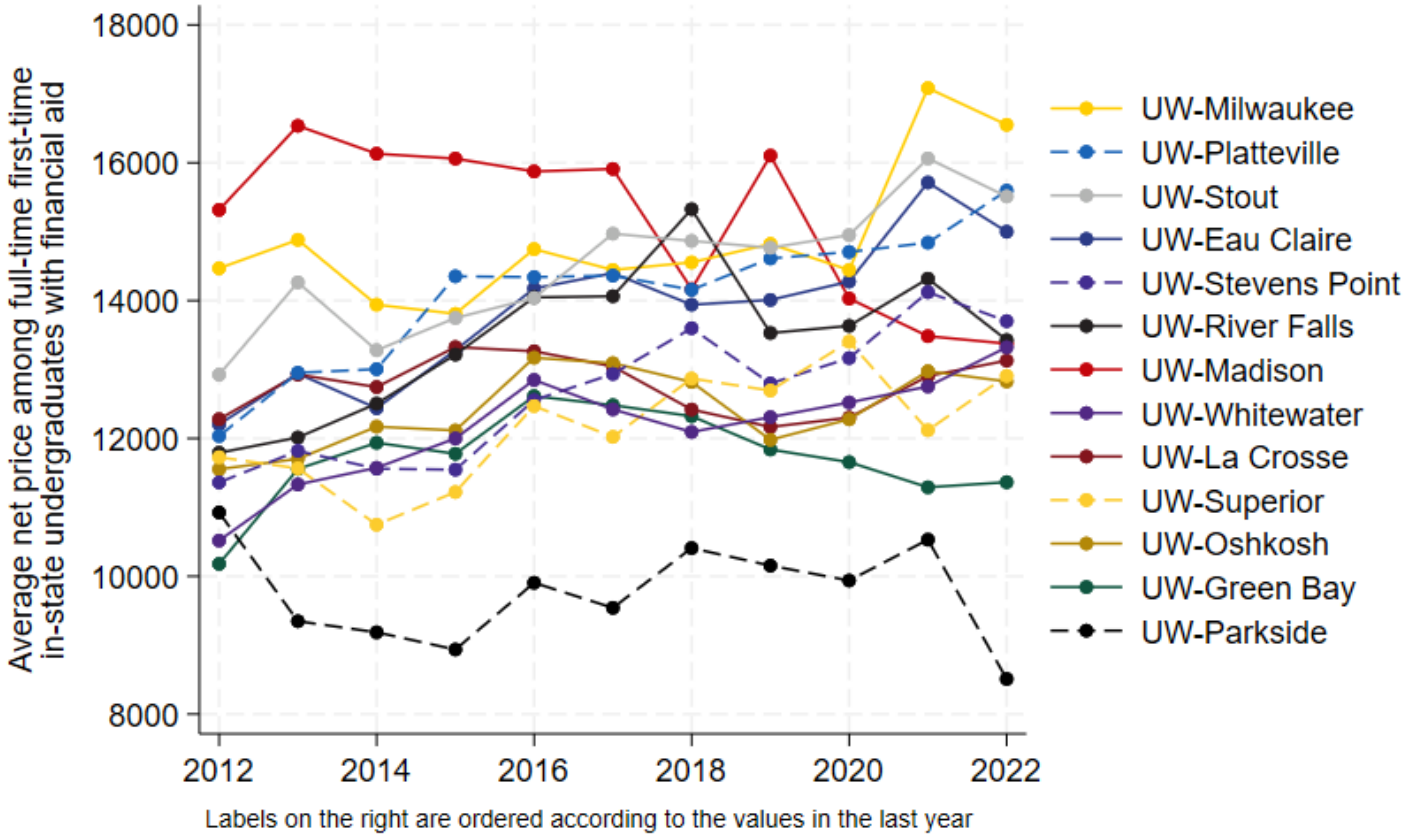
- Low- and moderate-income families pay net prices that are well below sticker price
- While sticker prices have increased substantially, net prices have increased at nearly the same rate as income per capita
  - At four-year colleges, net prices have decreased in real terms
- Colleges are very good at price discriminating

# Average Sticker and Net Tuition and Fees at Public Four-Year Institutions




*Source: College Board - Trends in College Pricing 2023*

# Net price: in-state students with financial aid




Source: IPEDS

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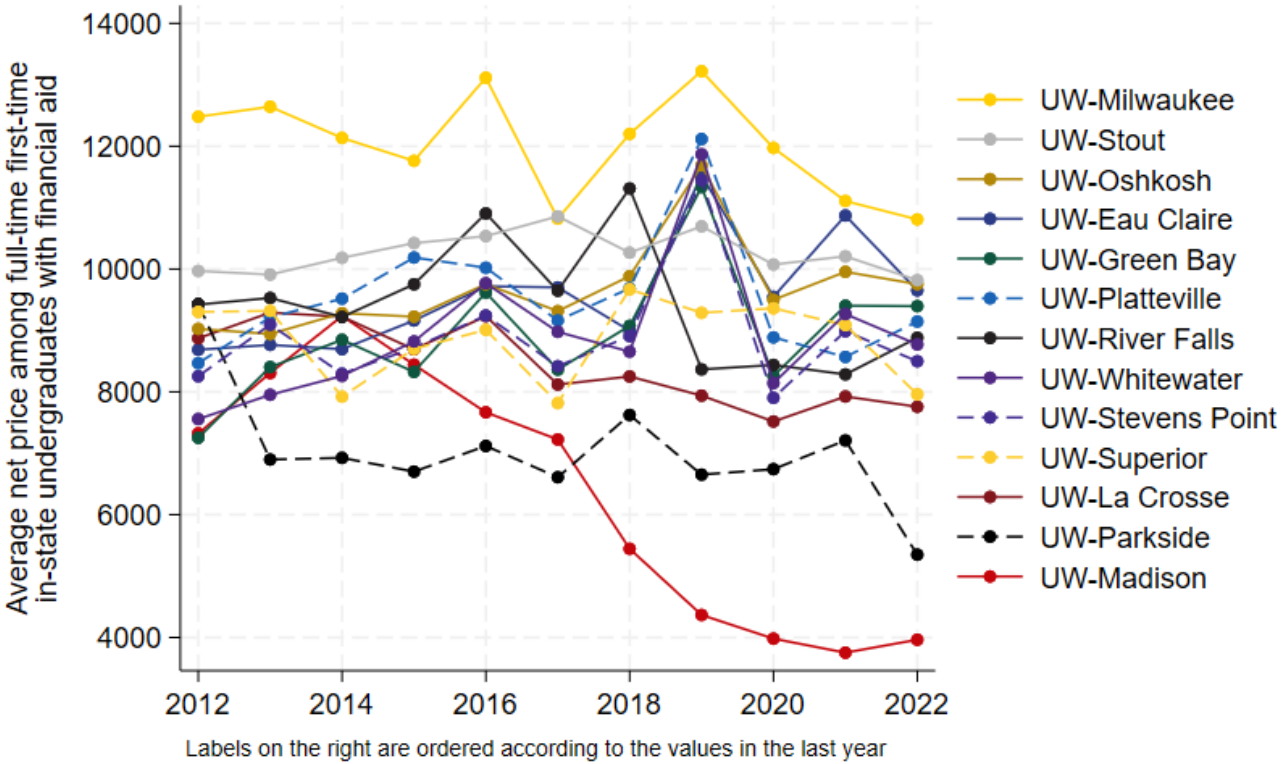
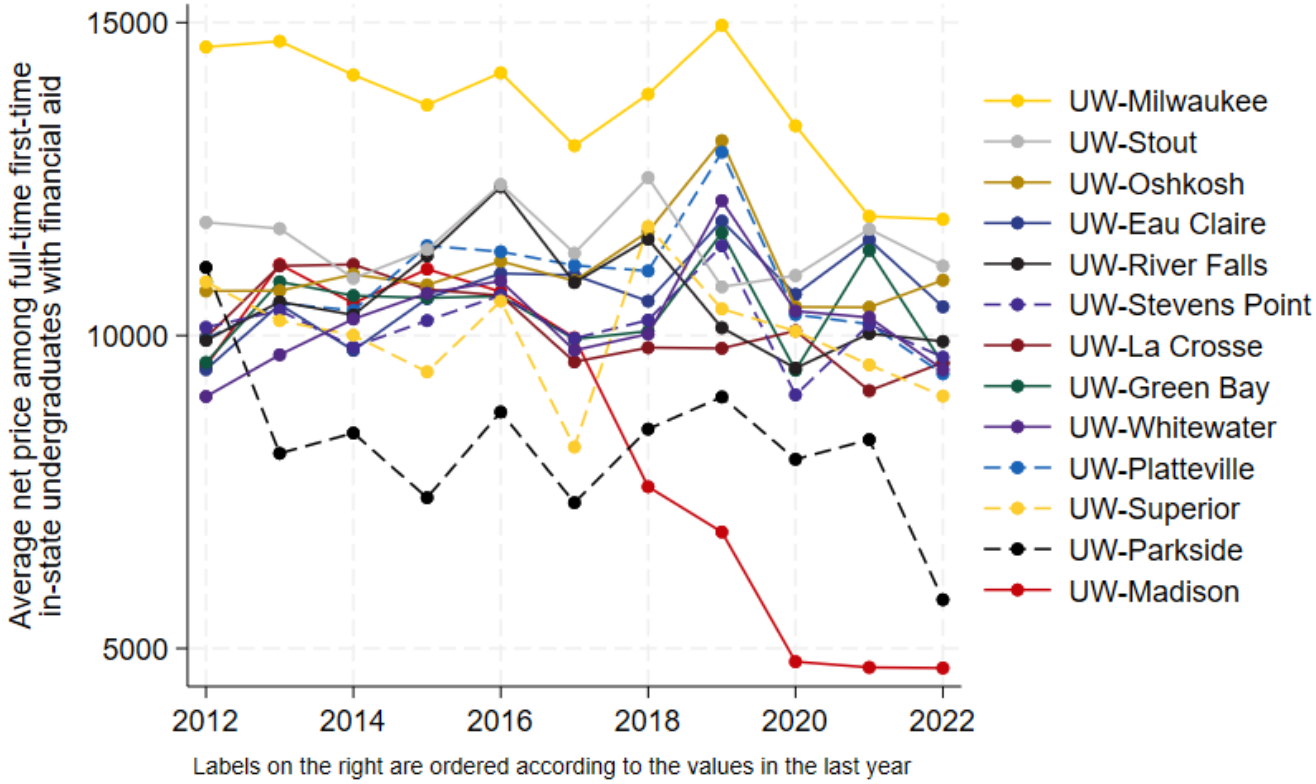
# Net price: in-state students with financial aid
# Family income <=30K




Source: IPEDS

# Net price: in-state students with financial aid
# Family income 30K-48K




*Source: IPEDS*

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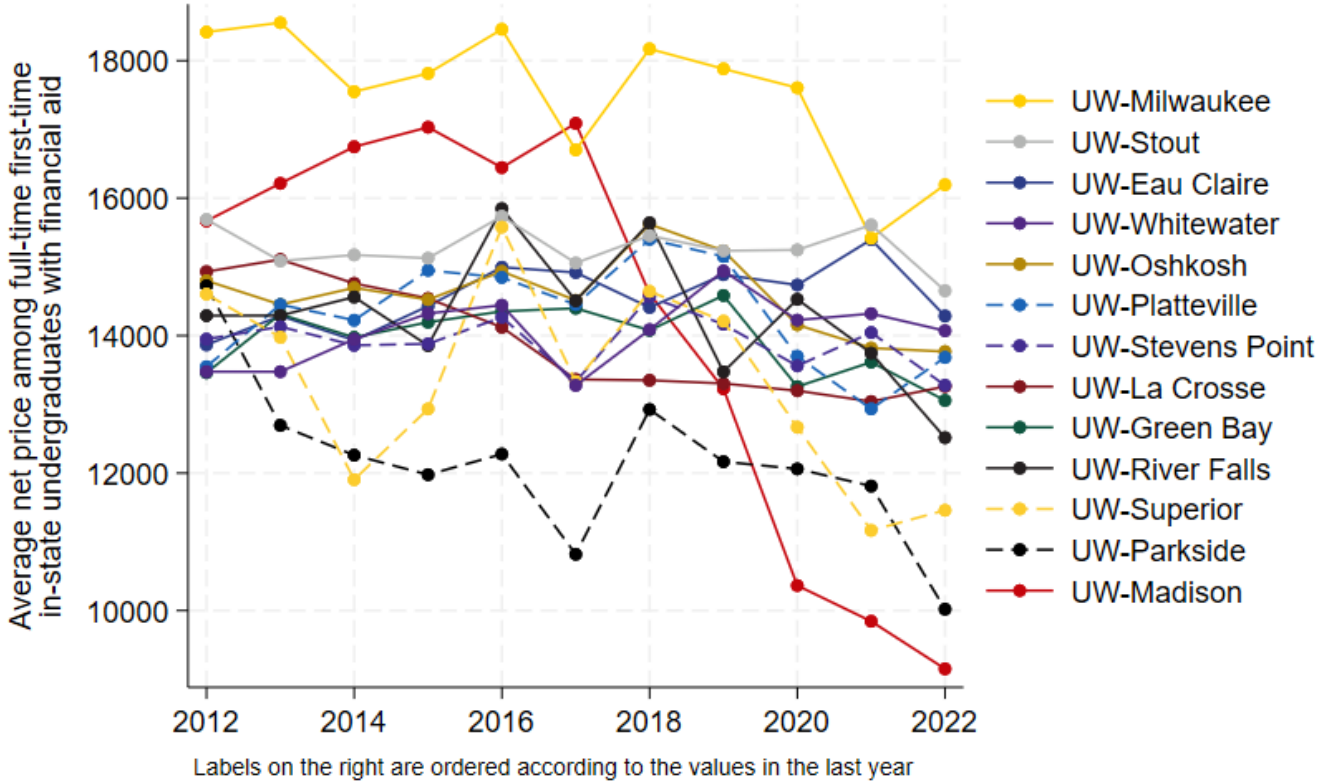
# Net price: in-state students with financial aid
# Family income 48K-75K




Source: IPEDS

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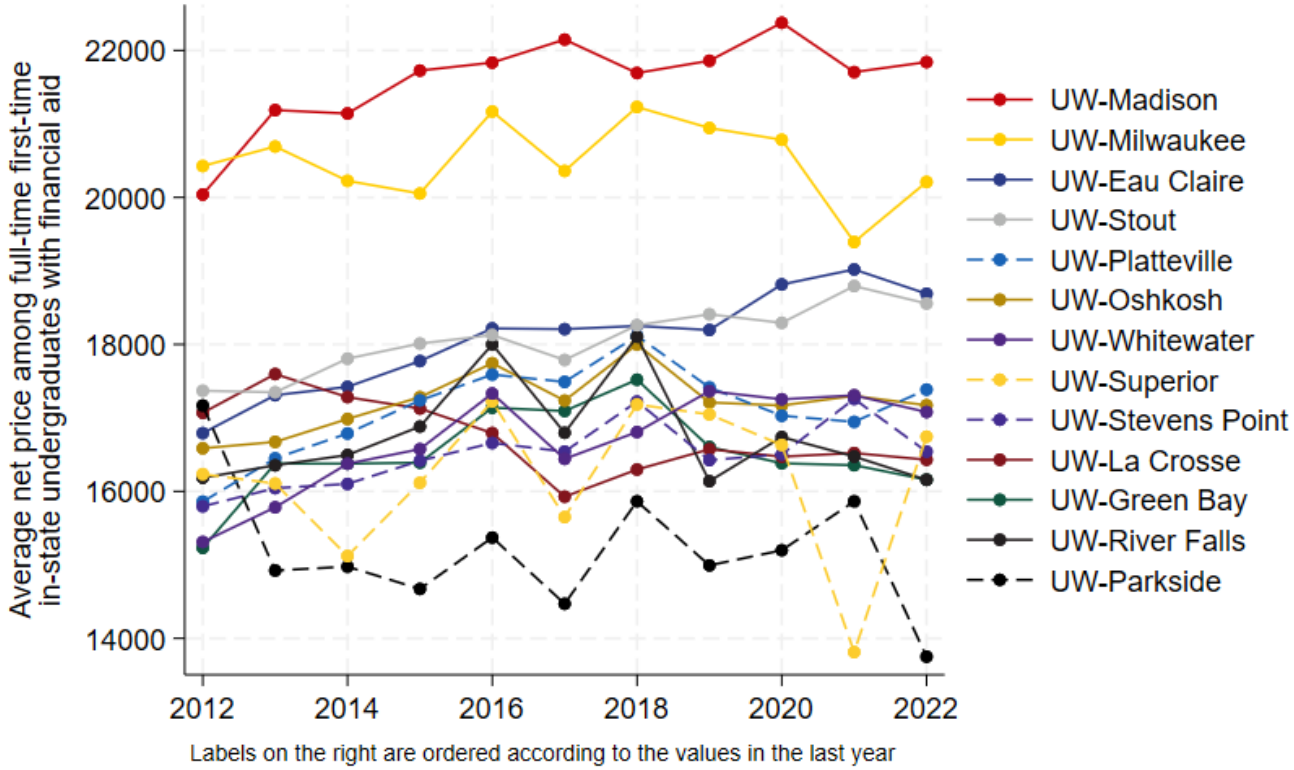
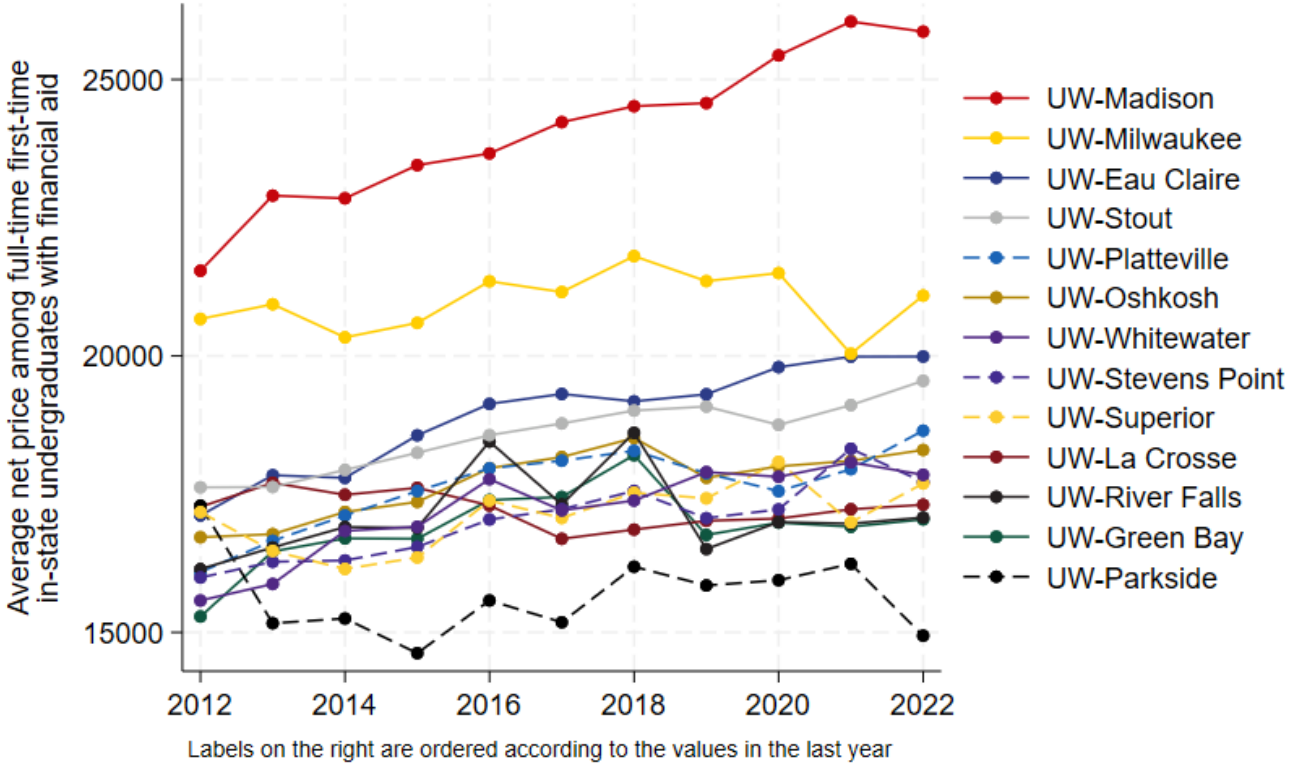
# Net price: in-state students with financial aid
# Family income 75K-110K




*Source: IPEDS*

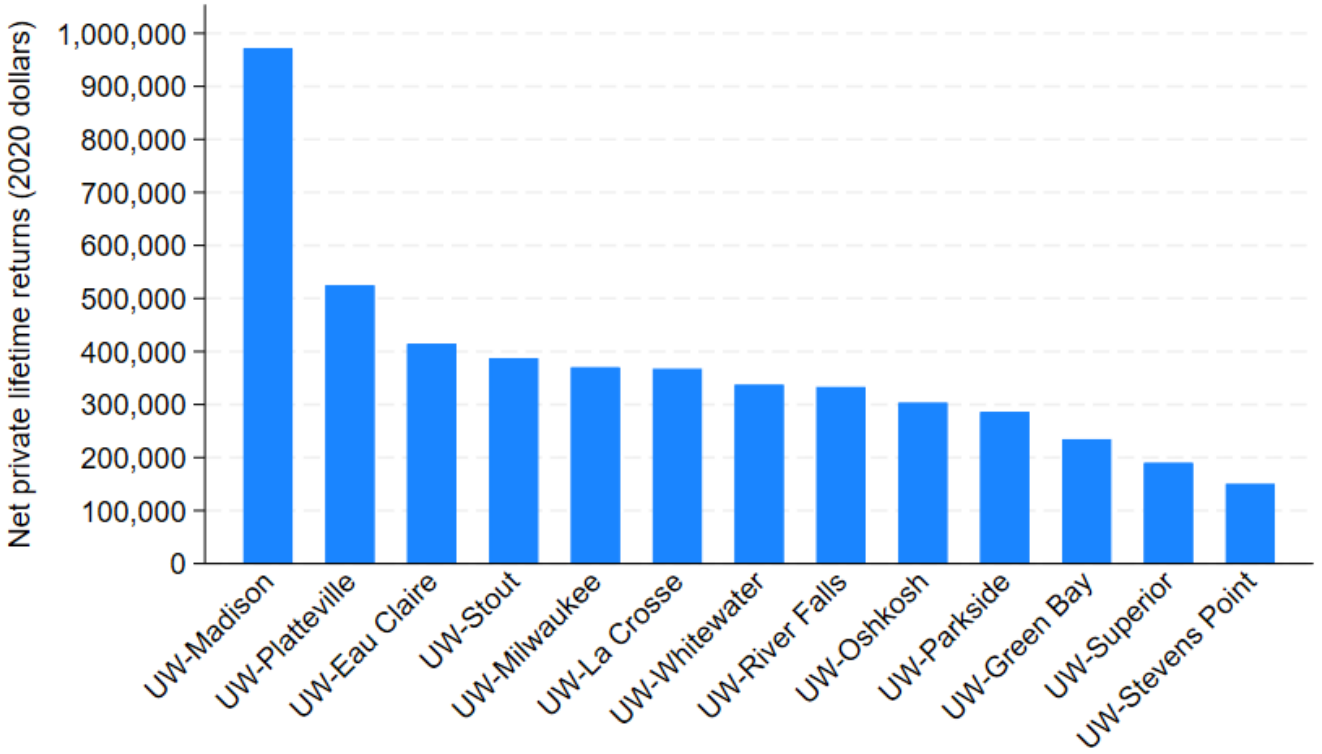
# Net price: in-state students with financial aid
# Family income >110K




*Source: IPEDS*

# Returns to College

# Net Private Lifetime Returns of a Bachelor's degree (relative to median high school graduates in Wisconsin)




*Source: Own calculation using data from the U.S. Census Bureau*

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# Expected Return from choosing to attend college

- Depends on dropout risk
- Varies by institution quality
- Varies by choice of major
- Depends on ability
- Depends on college preparation
- Depends on family background

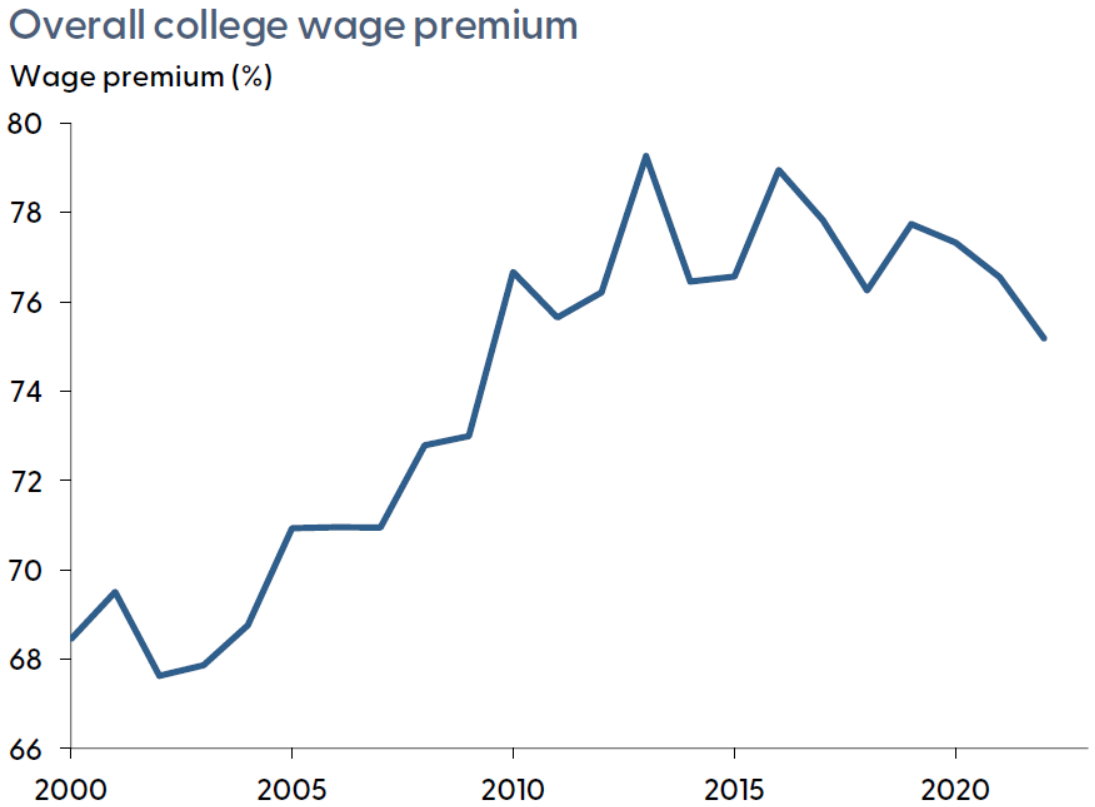
# Selection

- The median high school graduate who completes college is different from the median high school graduate who chooses not to go to college
- Controlling for observable differences significantly reduces the college premium

| | Men | Women |
|---|---|---|
| Raw difference in lifetime earnings: BA minus HSG | $900,000 | $630,000 |
| Controlling for key socio-economic variables | $655,000 | $450,000 |
| Present discounted value at age 20 (r = 4%) | $260,000 | $180,000 |

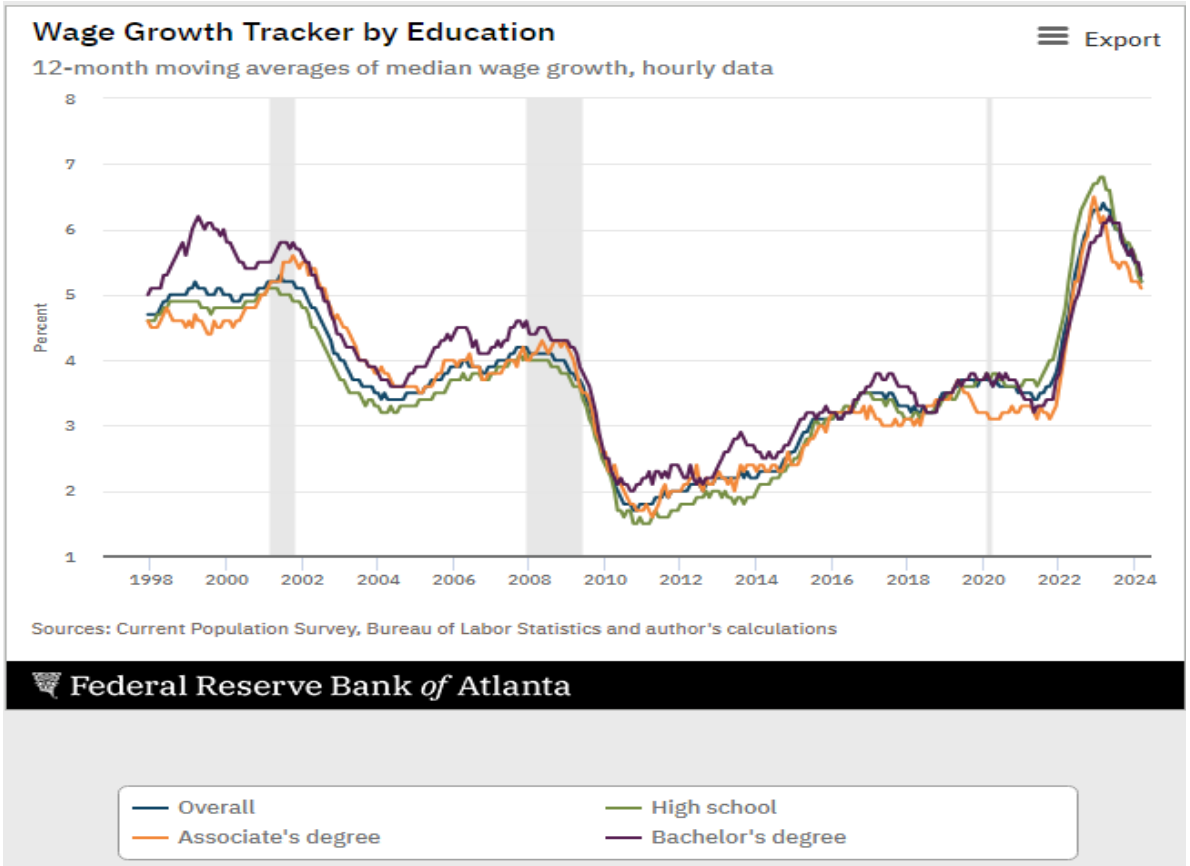
*Source: U.S. Social Security Administration, citing Tamborini et al. (2015)*

# The raw college wage premium stopped growing in the last 10 years and declined in the last 5 years




*Source: Bengali et al. (2023): Federal Reserve Bank of San Francisco, Economic Letter*

# Because a much larger increase in the wage growth rate for high school graduates than college-educated workers



# Forecast future College Premium

- Hard to forecast especially on the heels of an AI revolution
  - If AI is a substitute for skilled labor, the skill premium will decline
- Fast-growing occupations that pay well and don't require a college degree
- "Between 2020 and 2030, BLS projects that about 60 percent of new jobs in the economy will be in occupations that don't typically require an associate's, bachelor's, or graduate degree."
  - Construction and installation
  - Maintenance and repair
  - Transportation

*Source: BLS Career Outlook, June 2022*

# Declining Wealth Premium to Four-Year Colleges

- The college wealth premium (extra net worth) has declined more noticeably among all cohorts born after 1940.

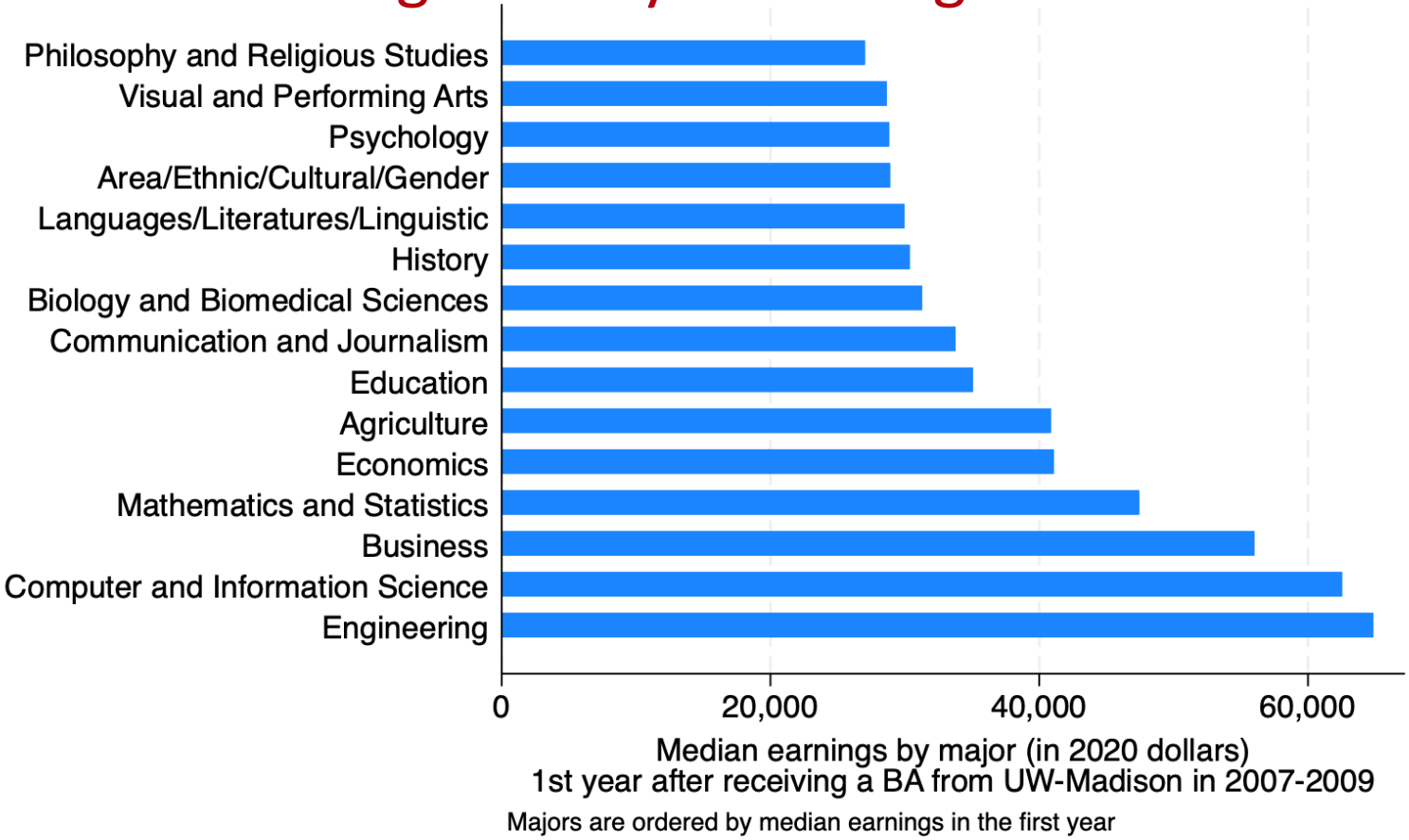
- Among families whose head is White and born in the 1980s, the college wealth premium of a four-year bachelor's degree is at a historic low.

- Among families whose head is any other race and ethnicity born in that decade, the premium is statistically indistinguishable from zero.

*Source: Emmons et al. (2019)*

# Returns to College Major

# UW-Madison grads: 1 year after graduation




*Source: U.S. Census Bureau*

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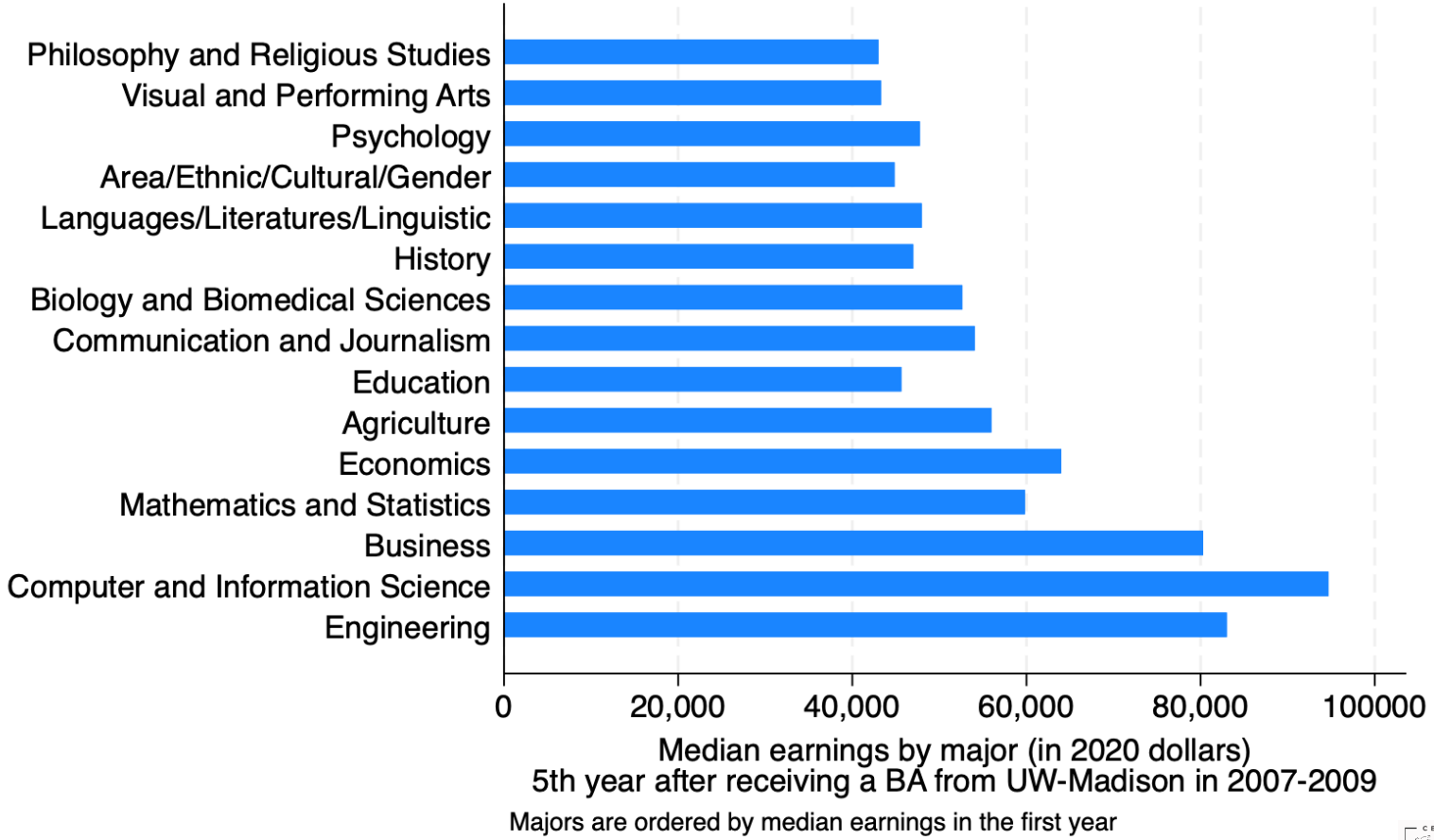
# UW-Madison grads: 5 years after graduation




*Source: U.S. Census Bureau*

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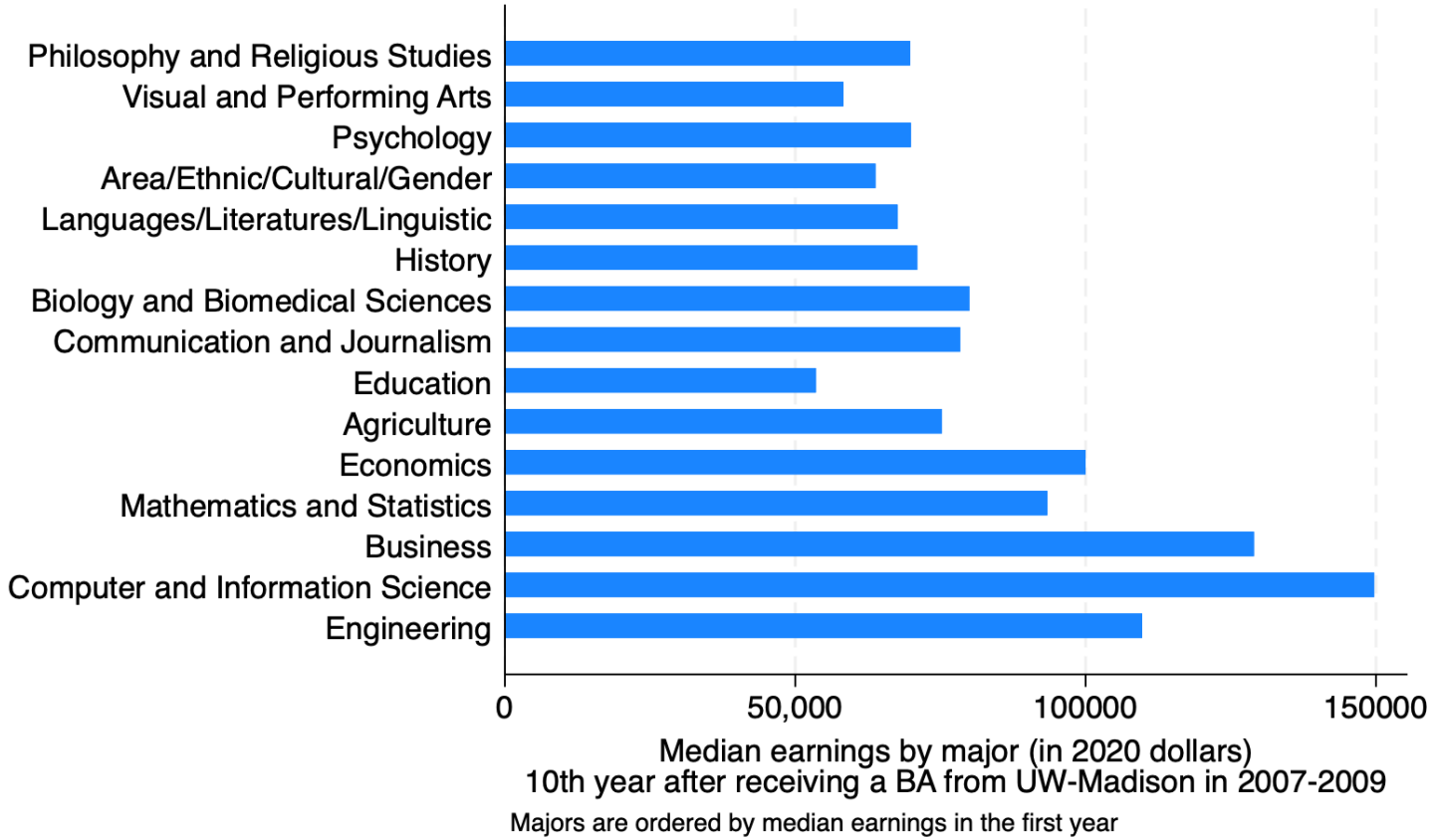
# UW-Madison grads: 10 years after graduation




*Source: U.S. Census Bureau*

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# Returns to college majors

- High-return majors also have lower earnings variability, making them even more desirable to risk-averse students.

- There is a substantial causal effect of major choice on earnings
  - Reflects both instruction and career preparation
  - Major matters since it better prepares for a certain occupation

Returns to college major > return to college quality

*Source: Andrews et al. (2022)*

# Why are students NOT choosing high-return majors?

- Academic preparations before college: students with poor math skills do not do well in STEM majors
- Preferences: Not everyone likes coding
- Information: Many students are unaware of the significant differences in earnings across majors

*Source: Arcidiacono (2004); Wiswall and Zafar (2014)*

# Some important considerations

# 1. College is also a “consumption good”

- Economists have estimated that the “consumption” aspect is about as important as the “investment” aspect
  - Easy access to athletic and entertainment facilities on campus
  - Leisure and entertainment

- The average annual consumption value of college ranges from about $12,000 to about $15,000

- But not everyone finds college to be fun

*Source: Gong et al (2021)*

# 2. Institutional Return: Some lucrative majors are costly to 'produce'

- Engineering involves a much higher instructional cost
  - Lifetime earnings of an Engineering major per $ of instructional cost same as a liberal arts major

*Source: Altonji and Zimmerman (2017)*

# 3. Societal Return: ROI does not capture social value

- Examples of occupations which create positive spillovers
  - Good teachers raise eventual outcomes of students by a lot
  - Benefits from medical research even larger

- Examples of zero sum (profits at expense of others)
  - Litigation
  - Financial traders trying to beat the market

*Source: Lockwood et al (2017)*

# Decline in Social Returns to College?

- Measuring the societal benefits from college investments is difficult
- Between 1980 and 1990, cities with larger increases in the share of college-educated workers also experienced larger increases in average wages
- Over time, this correlation weakened and not statistically different from zero

*Source: Moretti (2004); Sand (2013)*

# 4. The College Debt 'Crisis'?

- Borrowers at for-profit colleges account for a large portion
- The default rate is high among college dropouts
- Earnings crisis: Graduates from for-profit and community colleges earn $22K. Graduates from four year more-selective earn $49K
- A 'selective' crisis affecting non-traditional borrowers and college dropouts

*Source: Looney and Yannelis (2015)*

# 5. Do financial constraints impede college enrollment?

- Net price of attending college is lower for children from poorer families
  - Easy access to loans
- Large body of work. Little evidence that a large number of families are "borrowing constrained"
- Only a small fraction of Americans would like to attend college but are unable to due to financial considerations

# What prevents low-income kids from attending college?

- Not tuition, not access to loans
  - Short-term borrowing constraints don't affect many

- Long-term borrowing constraints matter much more
  - Leading to worse precollege preparation

- Some high achieving low-income students do not apply. When presented with information, they apply, attend and thrive
  - Lack of information

*Source: Heckman Inc, Dynarski et al. (2018)*

# Academic preparation and college enrollment disparities

- Academic preparation in high school explains a substantial portion of socioeconomic, gender, and racial in college enrollment.

- The college enrollment rate is 89% for high school students from families in the top SES quintile and 51% for those in the bottom: gap 38 ppts
  - The gap is only 11 ppts for students with similar academic preparation

- The college enrollment rate is 73% for girls and 64% for boys
  - No gender gap among students with similar academic preparation.

*Source: Reber and Smith (2023), Brookings*

# Academic preparation and college enrollment disparities

- 83% of Asian, 72% of white, 63% of Hispanic, and 62% of Black students enroll in college within 1.5 years of high school graduation

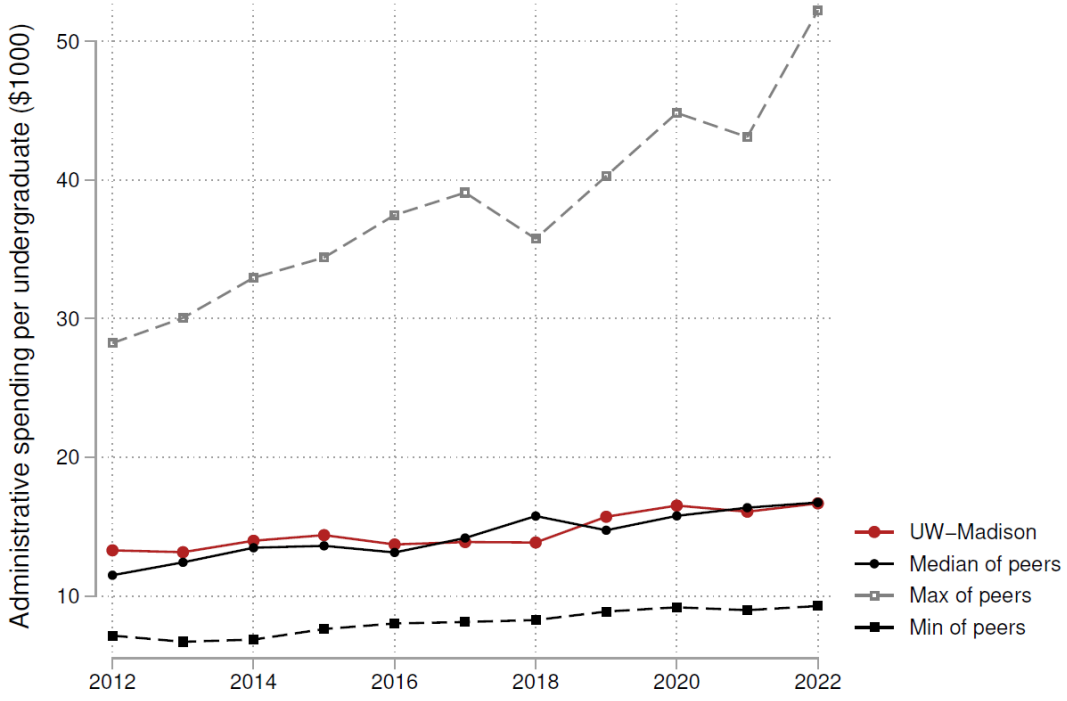
- Among students with the same high school academic preparation, Black, Hispanic, and Asian students enroll in college at about the same rate, which is 5 ppts higher than the rate for white students.

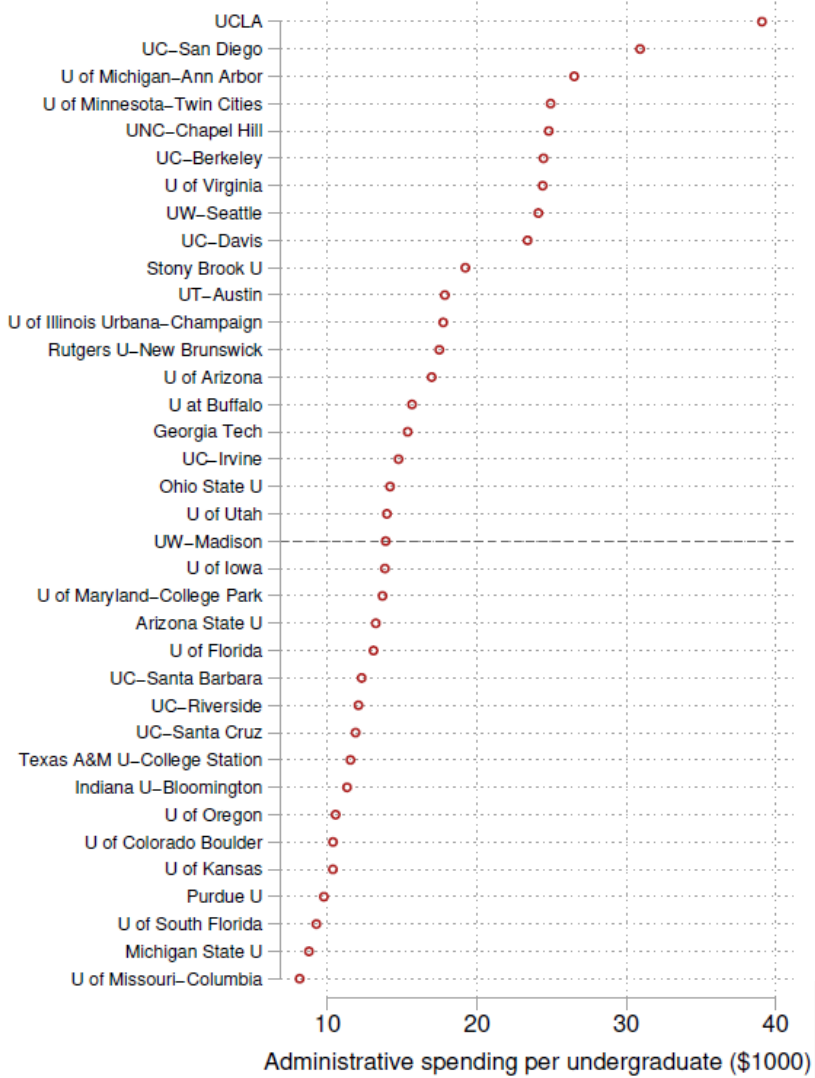
- Closing gaps in academic preparation is crucial for understanding gender and racial gaps in college enrollment.

*Source: Reber and Smith (2023), Brookings*

# Administrative Intensity at UW-Madison

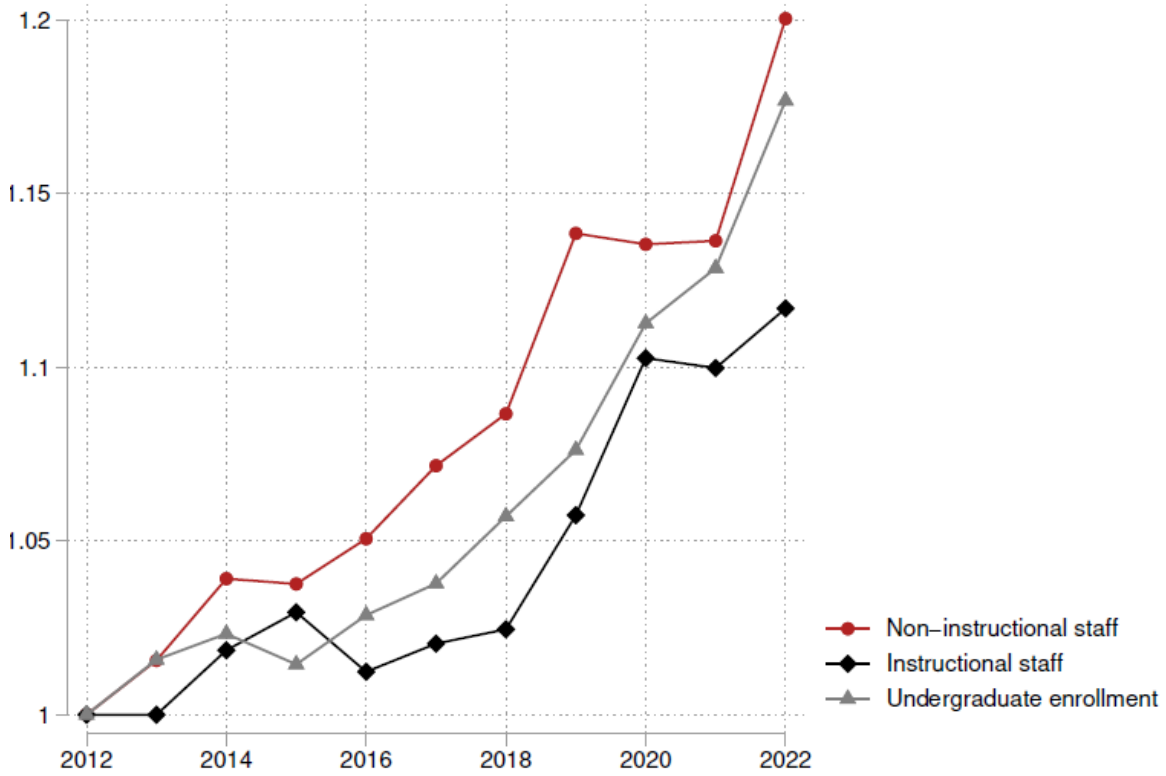
# UW-Madison's Admin spending is comparable with AAU-P peers



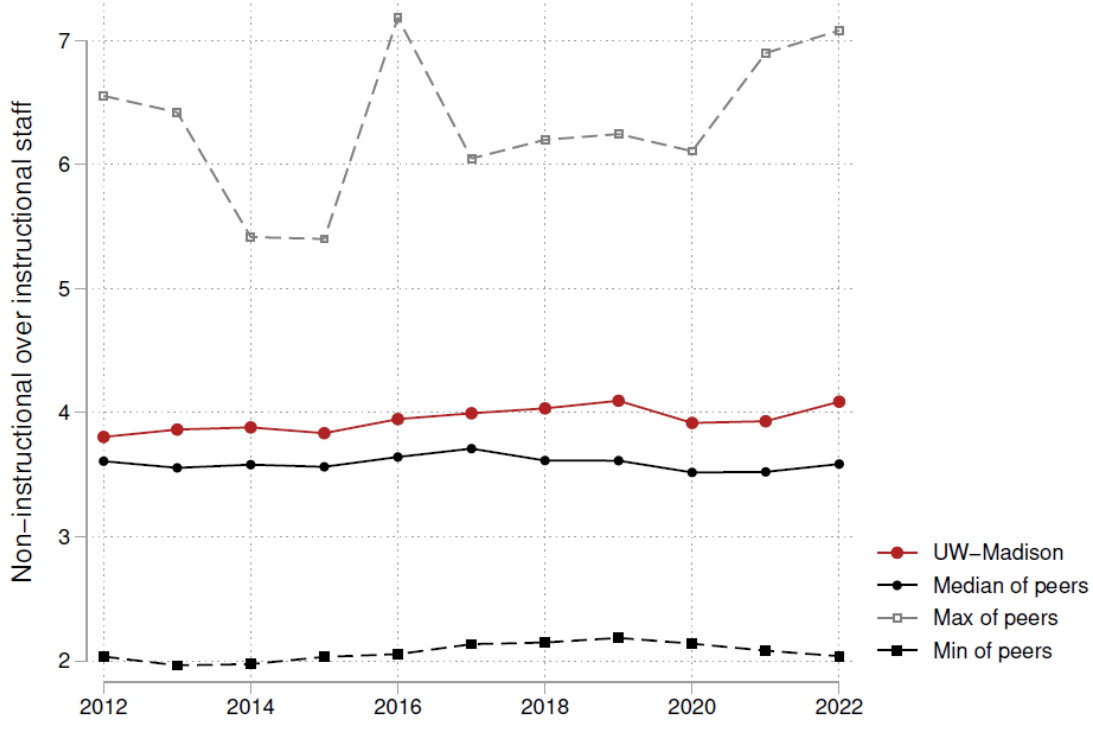

*Source: Own calculation using data from IPEDS*

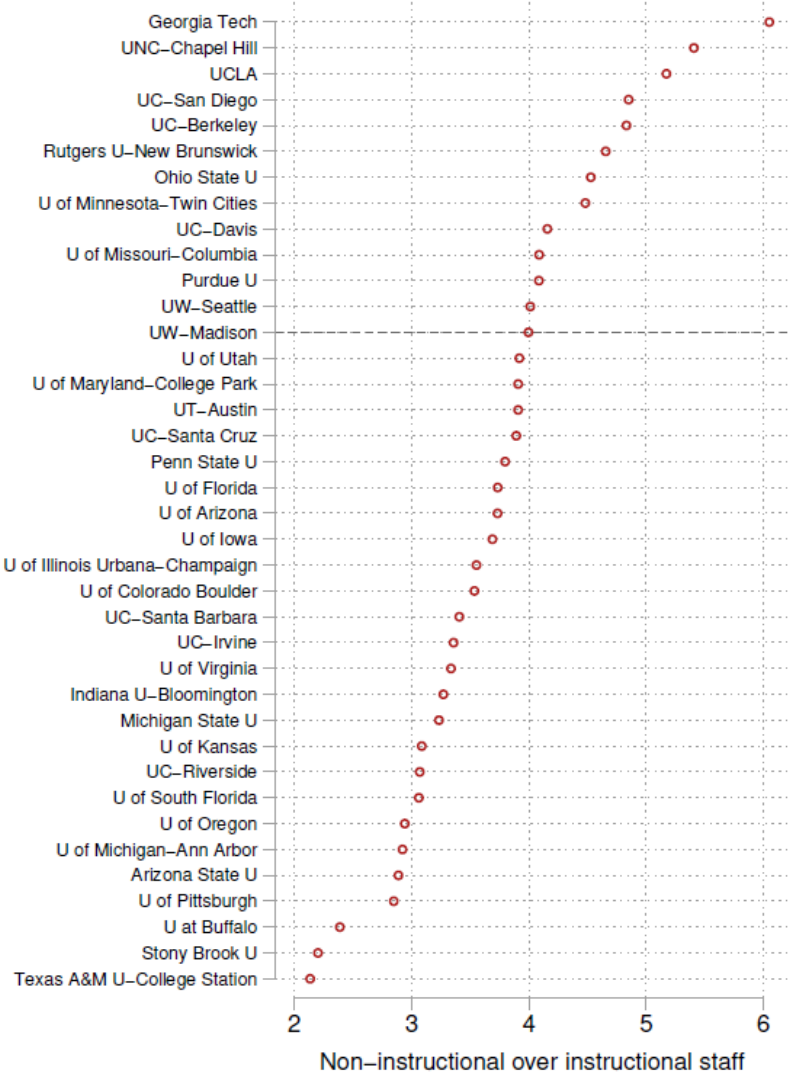
# UW-Madison's non-instructional staff increased by more than instructional staff and undergraduate enrollment




*Source: Own calculation using data from IPEDS*

# UW-Madison's non-instructional staff is larger than AAU-P peers




*Source: Own calculation using data from IPEDS*

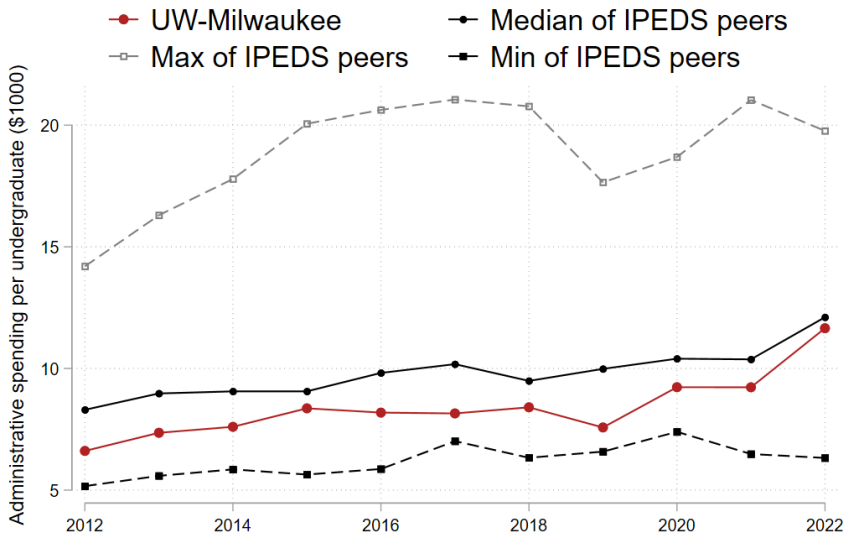
# UW-Madison has more staff in community, social and heath services, and fewer in education services

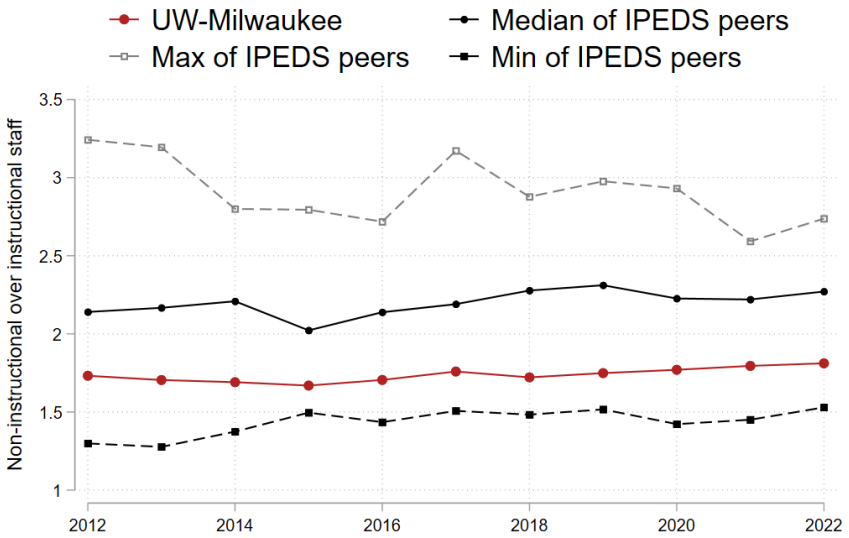
| | Number | Per instructional staff | | |
|---|---|---|---|---|
| | UW-Madison | UW-Madison | Peer | UW-Madison/Peer |
| Instruction | 2,144 | | | |
| Non-instruction | 8,566 | 3.995 | 3.732 | 1.071 |
| | | | | |
| Breakdown of Non-instructional Staff | | | | |
| Public service | 0 | 0.000 | 0.010 | 0.000 |
| Sales and related | 4 | 0.002 | 0.009 | 0.200 |
| Education services | 261 | 0.122 | 0.317 | 0.384 |
| Office and administrative support | 824 | 0.384 | 0.517 | 0.743 |
| Management | 577 | 0.269 | 0.352 | 0.764 |
| Business and financial operations | 978 | 0.456 | 0.488 | 0.935 |
| Construction and maintenance | 455 | 0.212 | 0.186 | 1.140 |
| Service | 1,153 | 0.538 | 0.412 | 1.306 |
| Production and transportation | 149 | 0.069 | 0.053 | 1.320 |
| Research | 728 | 0.340 | 0.225 | 1.508 |
| Computer, engineering and science | 2,097 | 0.978 | 0.590 | 1.656 |
| Community and social service | 957 | 0.446 | 0.219 | 2.039 |
| Healthcare practitioners and technical | 383 | 0.179 | 0.085 | 2.110 |

*Source: Own calculation using data from IPEDS*

# Administration Intensity at Some Other UW Campuses

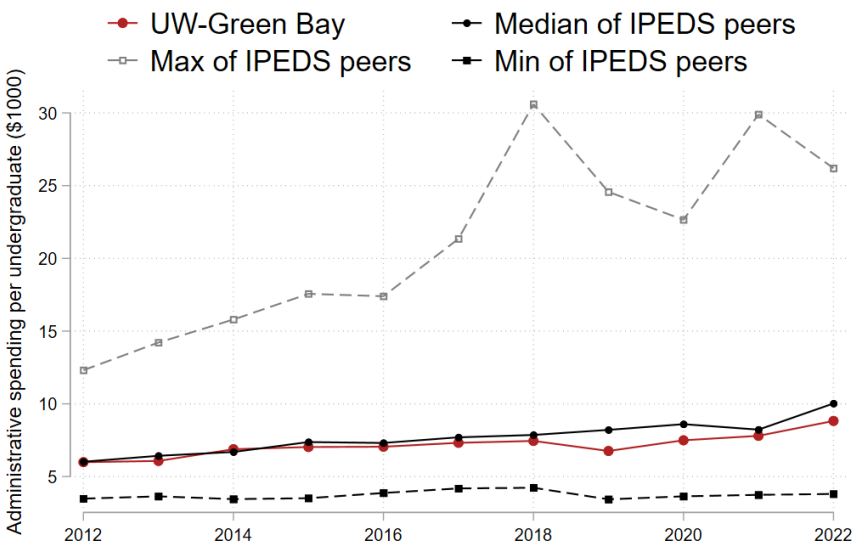
# UW-Milwaukee: Admin spending per FTE undergraduate (left) and noninstructional-to-instructional staff (right)

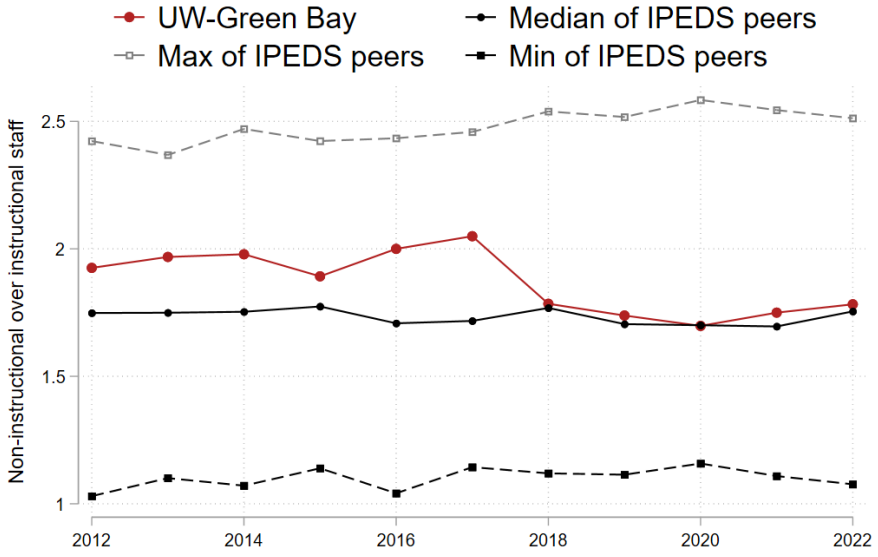



*Source: Own calculation using data from IPEDS*

# UW-Green Bay: Admin spending per FTE undergraduate (left) and noninstructional-to-instructional staff (right)




*Source: Own calculation using data from IPEDS*

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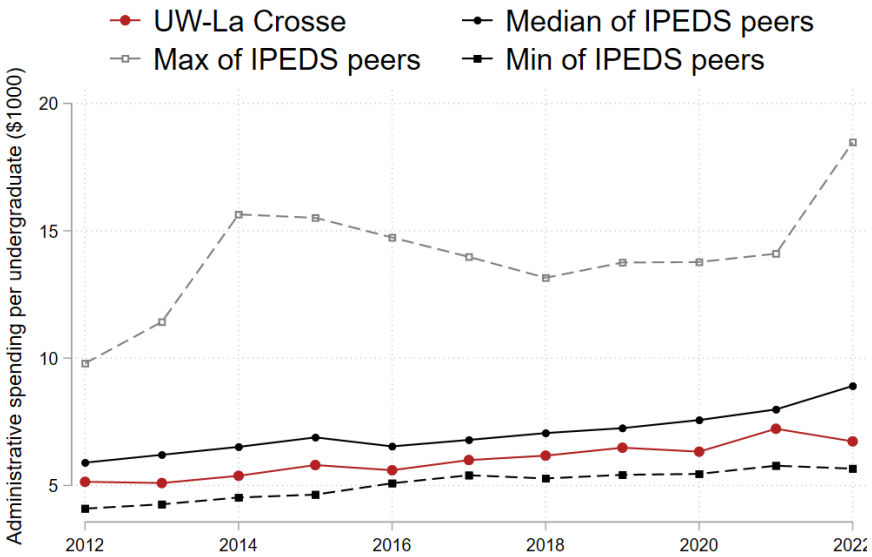
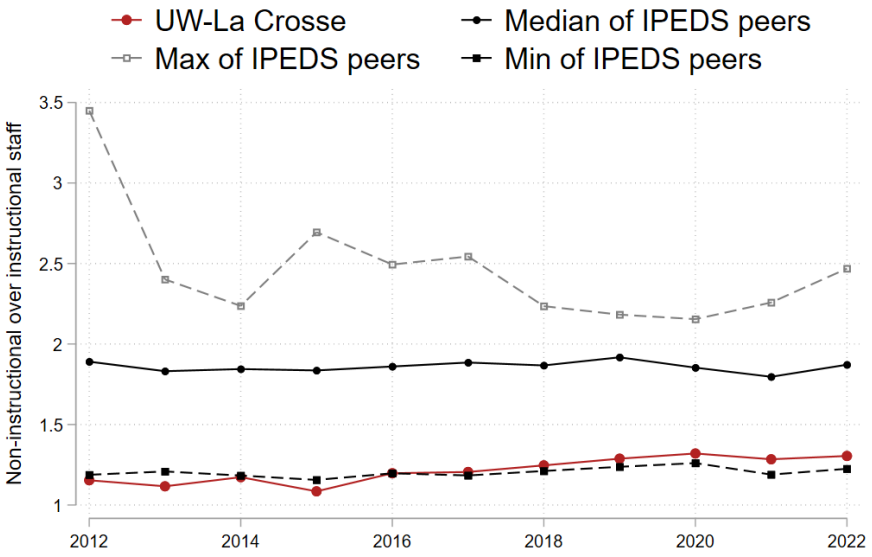
# UW-La Crosse: Admin spending per FTE undergraduate (left) and noninstructional-to-instructional staff (right)




*Source: Own calculation using data from IPEDS*

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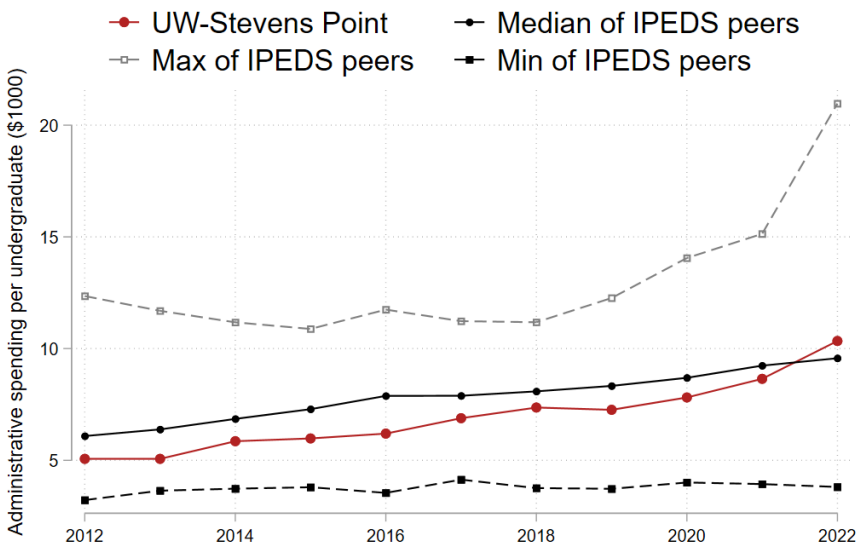
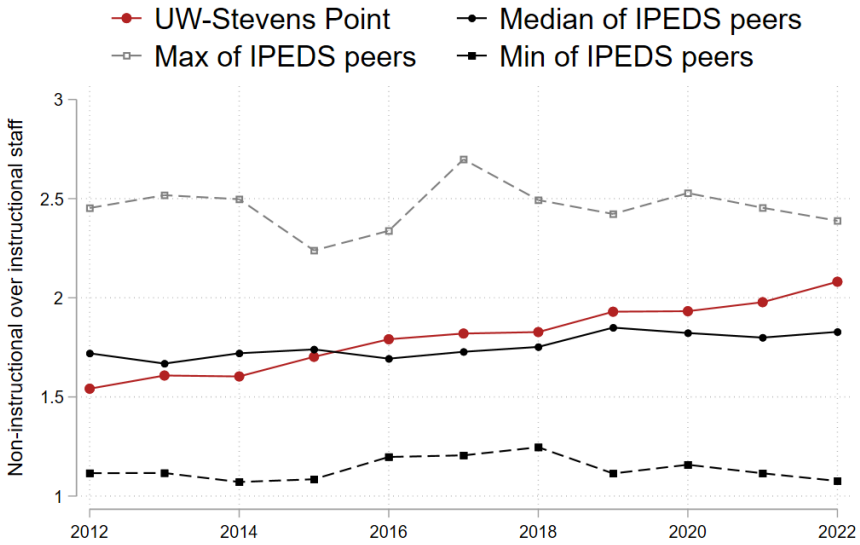
# UW-Stevens Point: Admin spending per undergraduate (left) and noninstructional-to-instructional staff (right)




*Source: Own calculation using data from IPEDS*

# Admin Costs

- Federal regulations - schools now beholden to a wider spectrum of laws concerning the handling of sexual assault & mental health
- Achieving compliance with these laws demands the right type of personnel
- Students demand and pay for more than classroom instruction (career assistance, mental health etc.)
- These roles that were once performed by faculty are now performed by administrators

# Is the Wisconsin Taxpayer Stingy?

## In funding high education in general and UW-Madison in particular

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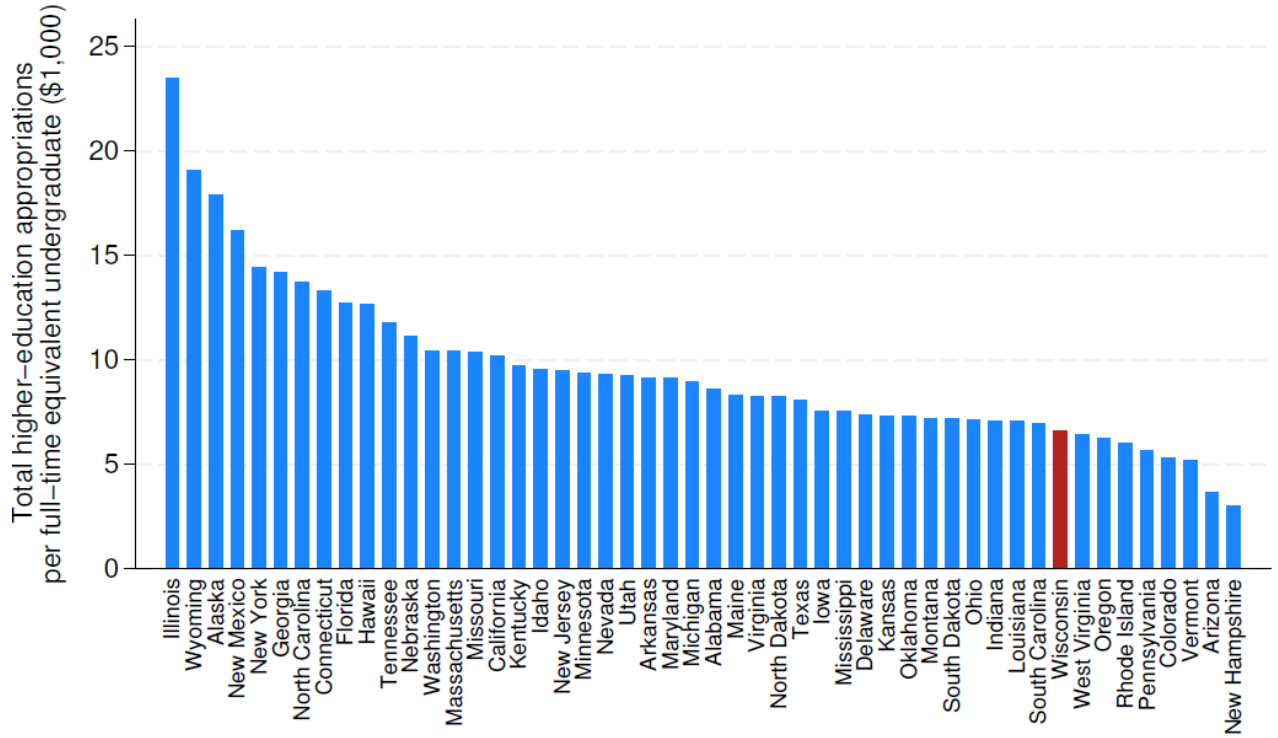
# 42nd in higher-education appropriations per full-time equivalent (FTE) undergraduate: *4-year institutions*




*Source: State Higher Education Executive Officers Association (2023)*

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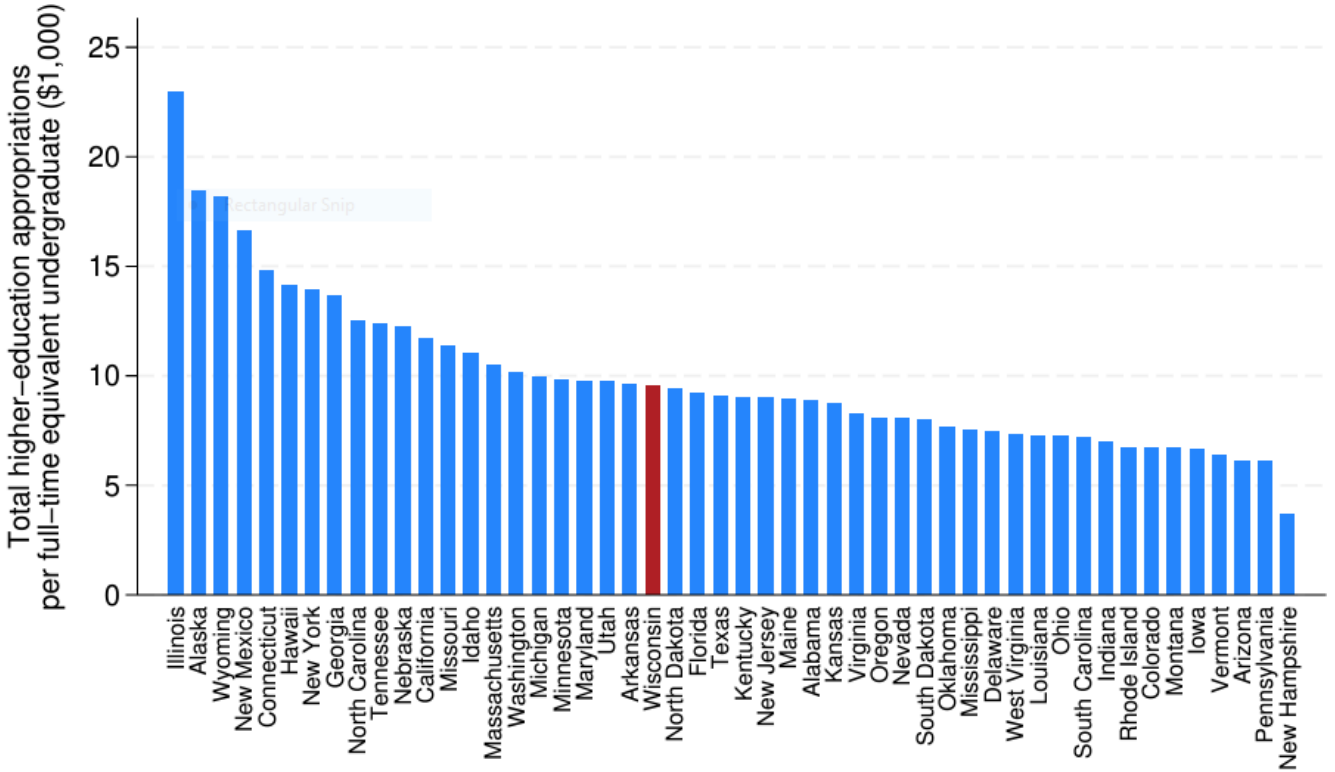
# Some issues with the metric

- It does not include 2-year institutions
- It does not account for income differences across states
- It does not account for quality differences across institutions

# 22nd in higher-education appropriations per FTE undergraduate: *both 2- and 4-year institutions*




*Source: State Higher Education Executive Officers Association (2023)*

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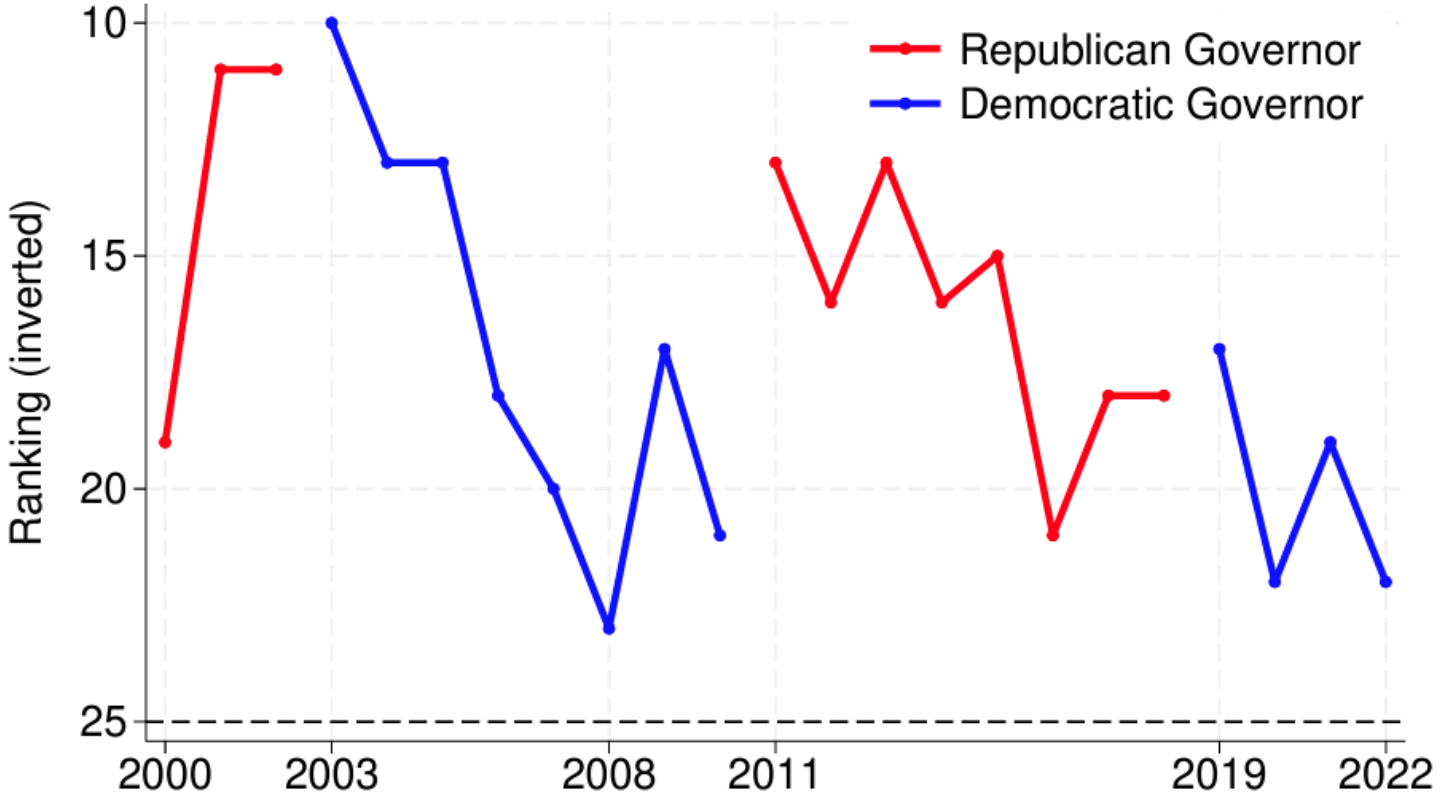
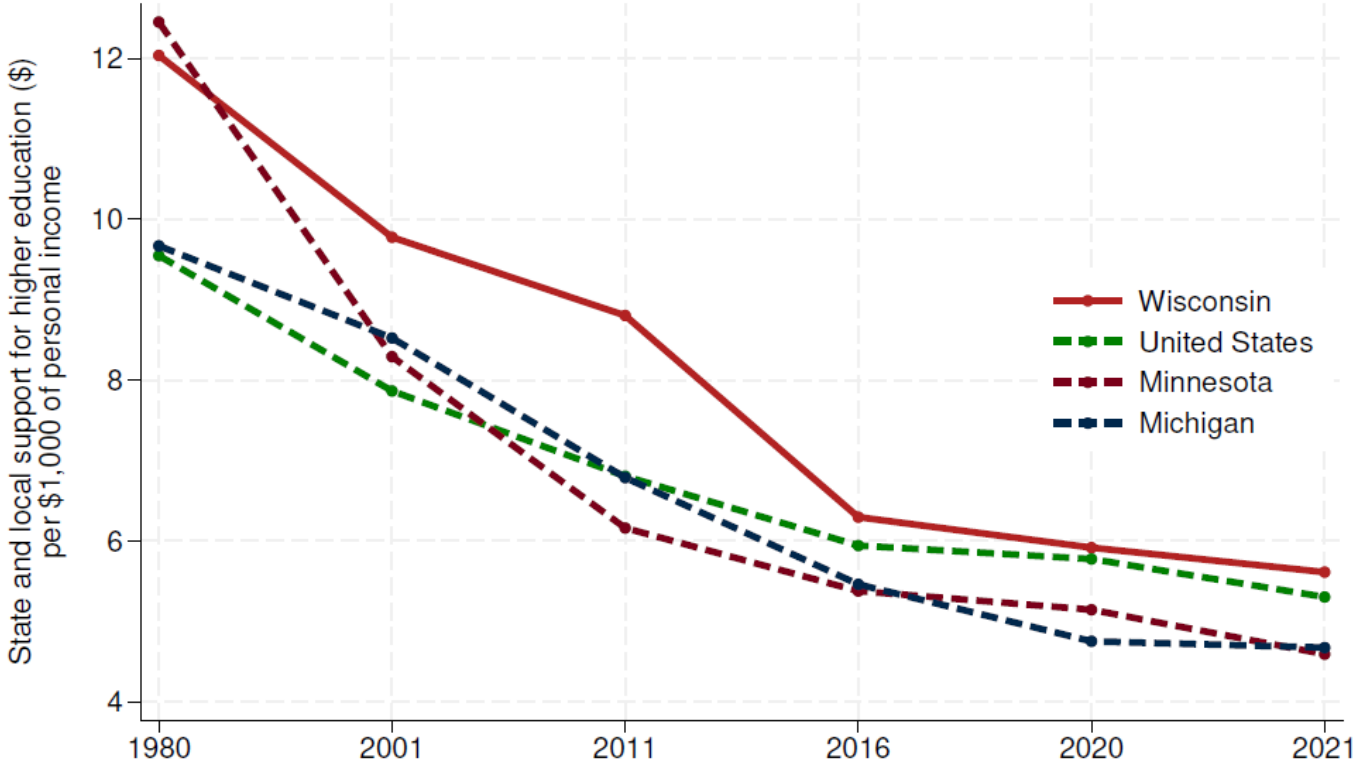
# Wisconsin has always been above the median state in funding both 2- and 4-year institutions



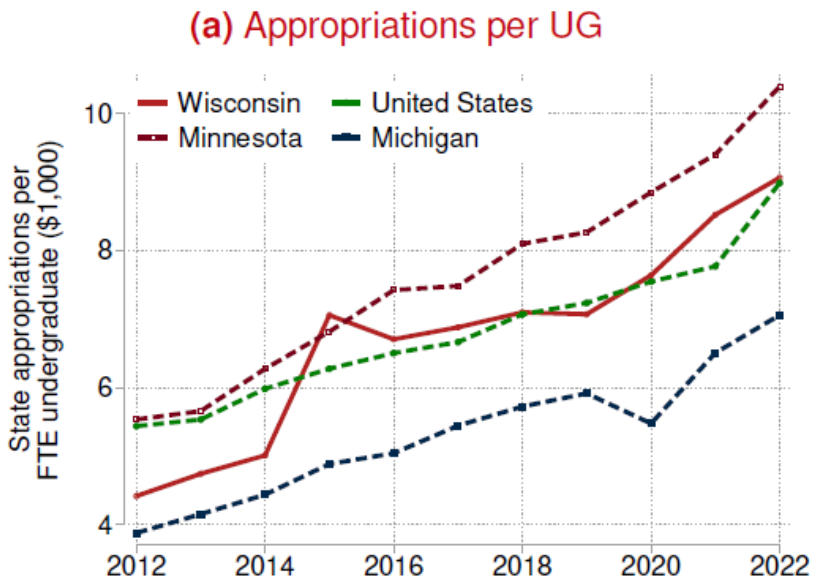

*Source: State Higher Education Executive Officers Association (2023)*

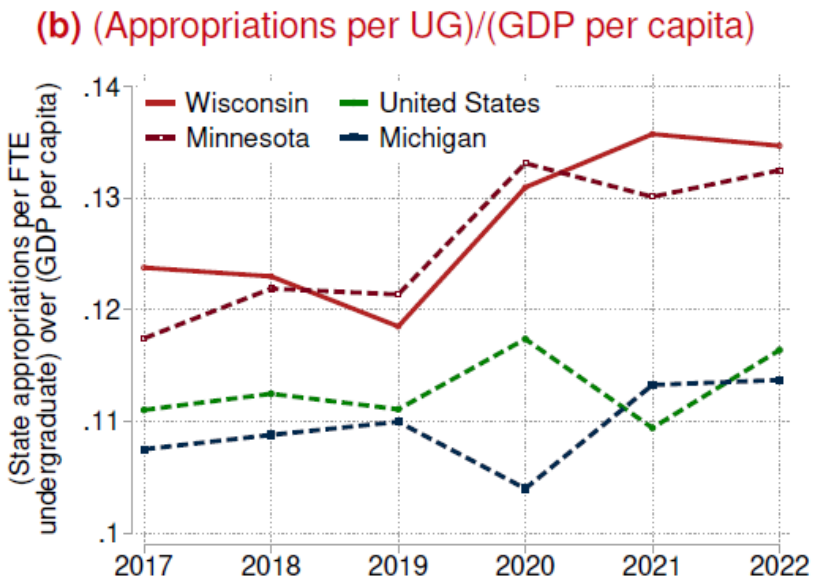
# Adjusting for personal income, Wisconsin's support for higher education is above the national average




*Source: State Higher Education Executive Officers Association (2023)*

# Excluding local support, Wisconsin's state appropriations per FTE undergraduate is close to the national average in level and higher as a fraction of GDP per capita




*Source: Own calculation using data from IPEDS*

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# Why combine 2-year and 4-year institutions?

- They are both important for a state and its residents

- It is meaningful and easier to compare
  - total higher-education spending by taxpayers across states
  - than the efficacy of spending between 2- and 4-year institutions

- Because the organization, governance, funding and quality of higher education differ dramatically across states

# Organization of Higher Ed varies significantly across states

- Very different organizations across states – community colleges, tech colleges, 2-year, 4-year colleges and even 3-year colleges
  - Share of public higher education FTE enrollment at 2-year institutions varies from <15% in Vermont to almost 60% in California
  - Wisconsin is slightly above 30%, the national average is 37.7%

*Source: State Higher Education Executive Officers Association (2023)*

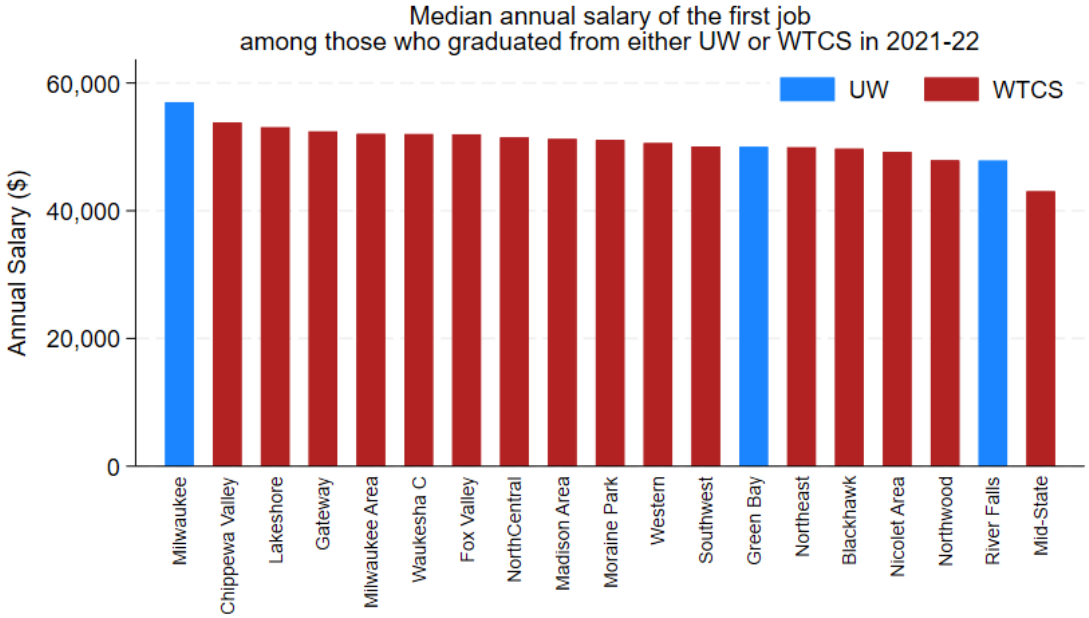
# Organization of Higher Ed varies significantly across states

- No two states have the same underlying governance structure
  - 20 states have a single coordinating board, e.g., Illinois
  - 8 have a single governing board, e.g., Kansas
  - 3 have two or more systemwide coordinating and/or governing board: Mississippi, South Dakota and Wisconsin
  - 11 and DC have admin/service agencies, e.g., Minnesota
- Very different funding structures and tax structures

*Source: Fulton (2019)*

# Why combine 2-year and 4-year institutions?

- There is now a smoother transfer process between WTCS and UW
- The earnings outcomes are comparable across some institutions




*Source: 2022-2023 Fact Book of WTCS; First Destination Survey of UW*

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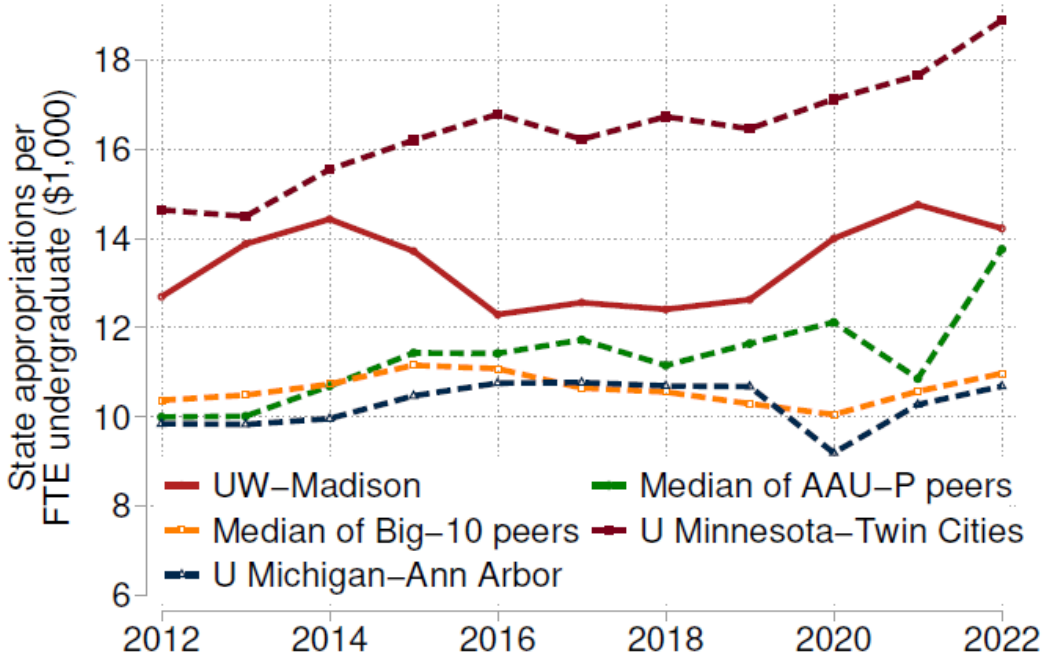
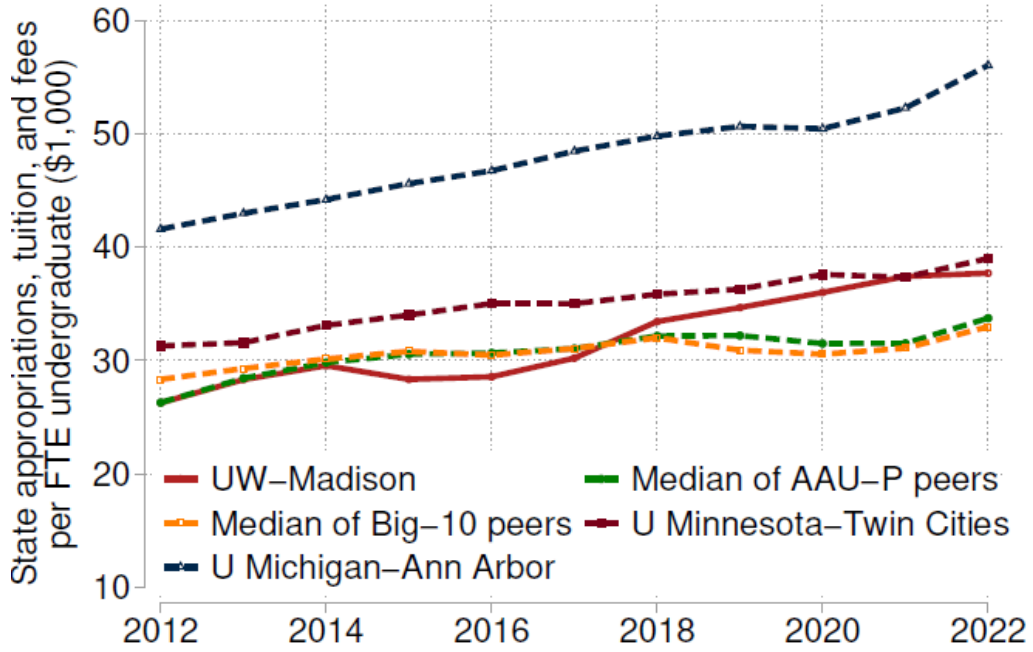
# State appropriations per FTE undergraduate for UW-Madison in line with peers



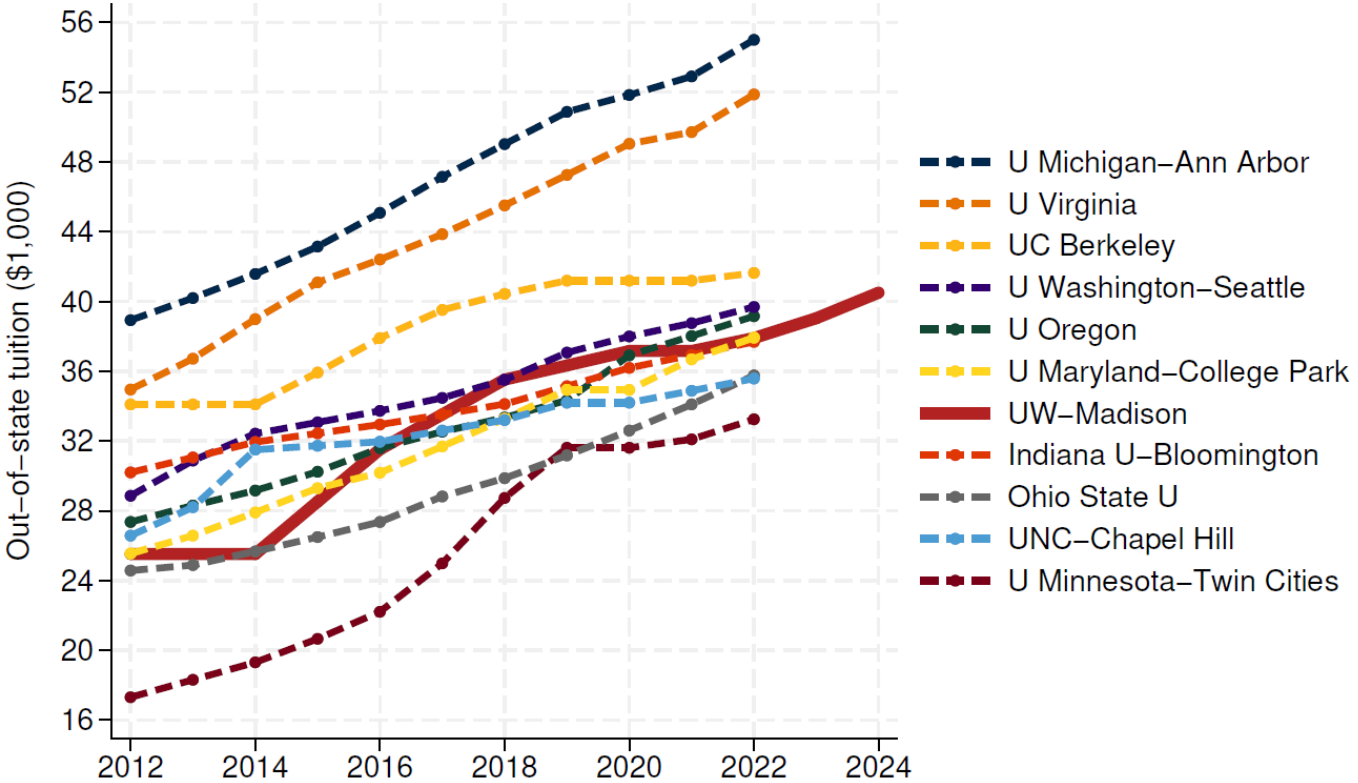

*Source: Own calculation using data from IPEDS*

# With tuition and fees, UW-Madison is comparable with peers



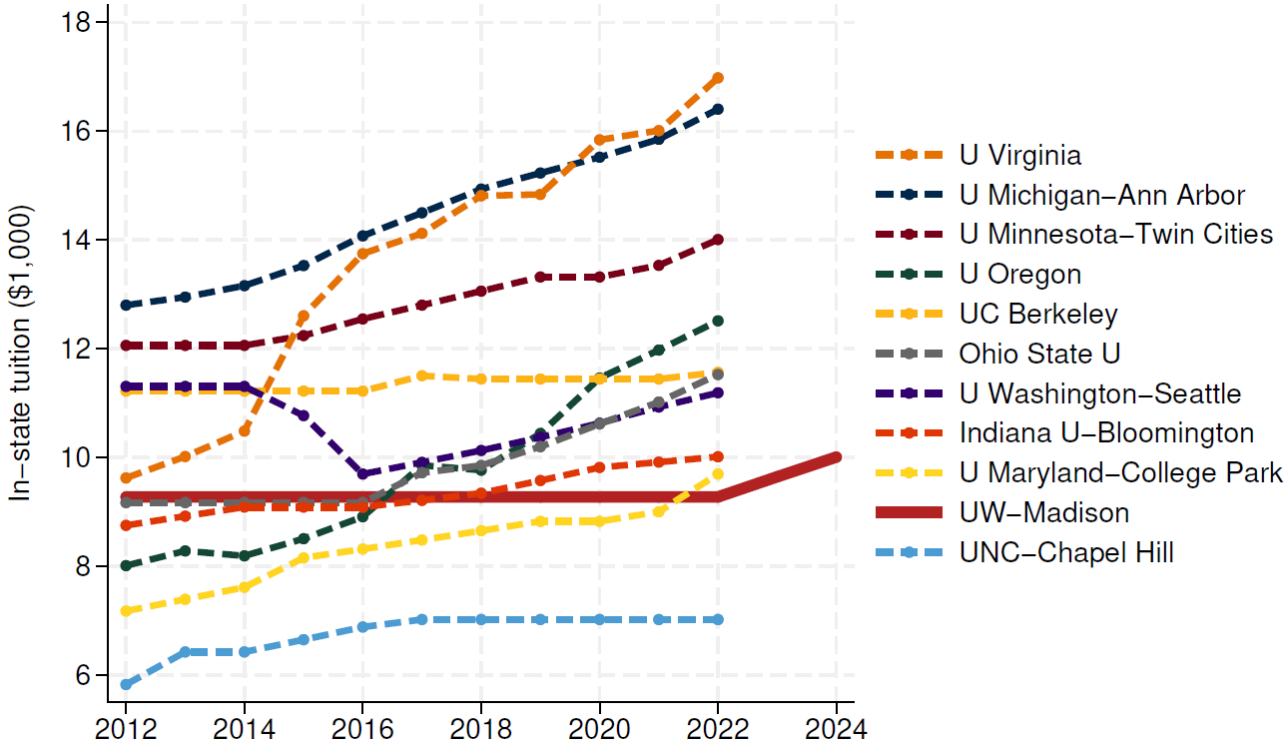

*Source: Own calculation using data from IPEDS*

# UW-Madison's out-of-state tuition increased significantly and is now in the middle of its peers




*Source: Own calculation using data from IPEDS*

# Due to tuition freeze, UW-Madison's in-state tuition is lower than most of its peers




*Source: Own calculation using data from IPEDS*

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# What constrains UW-Madison?

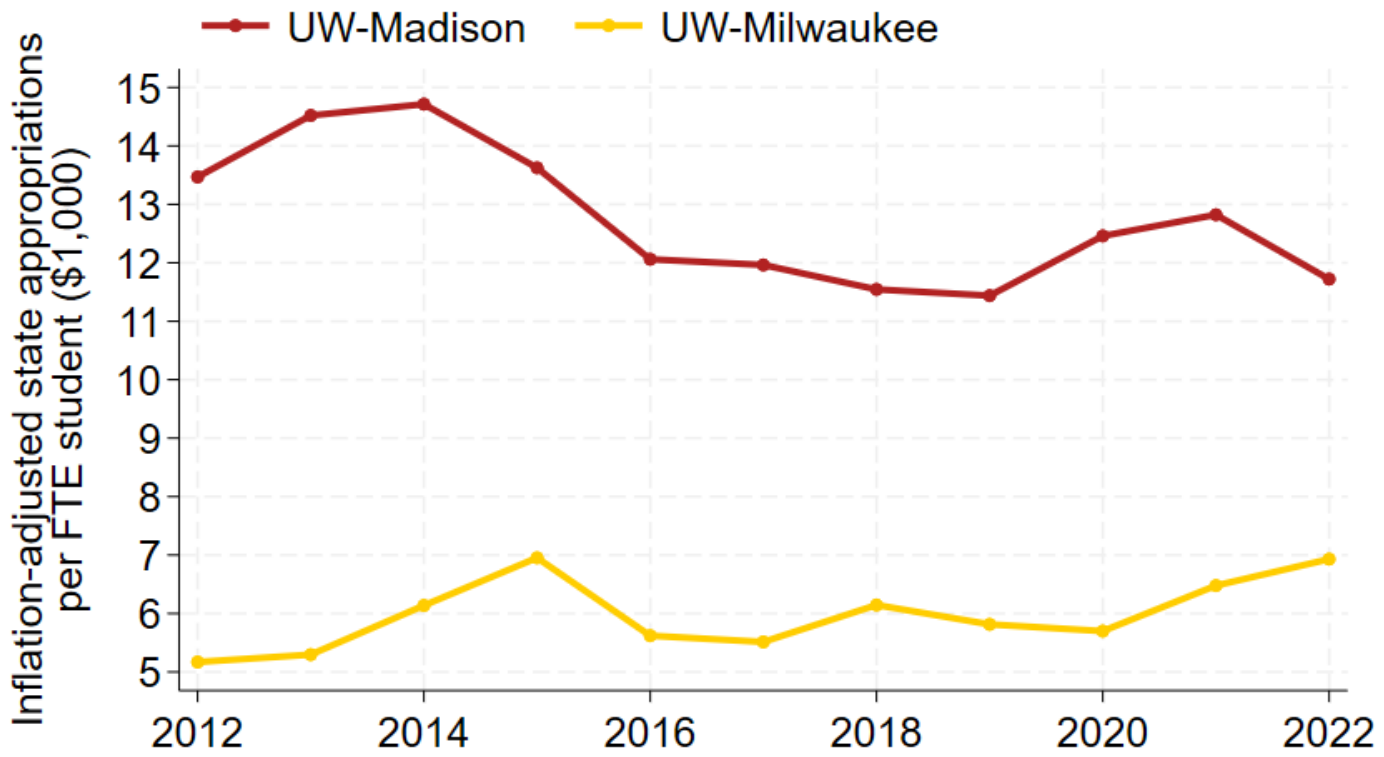
- Price controls
  - Low in-state tuition is neither justified by efficiency or equality of opportunity considerations
- Capital controls
  - Lack of bonding authority and project management flexibility
  - UW-Madison is the only major research university that does not have access to capital markets to issue debt
  - States allow the revenues of every major flagship campuse to serve as the ultimate backstop of university debt

# Caveat on the metric

- State appropriations per FTE is an aggregate metric
- It does not adjust for outcomes
- Nor the efficacy of the allocation of resources
- Different schools have very different missions and outcomes
- Compare UW-Madison and UWM for instance
- Some unique missions of UW-Madison are
    - School of Medicine and Public Health, Vet Met, CALS, Law, School of Pharmacy and UW-Extension

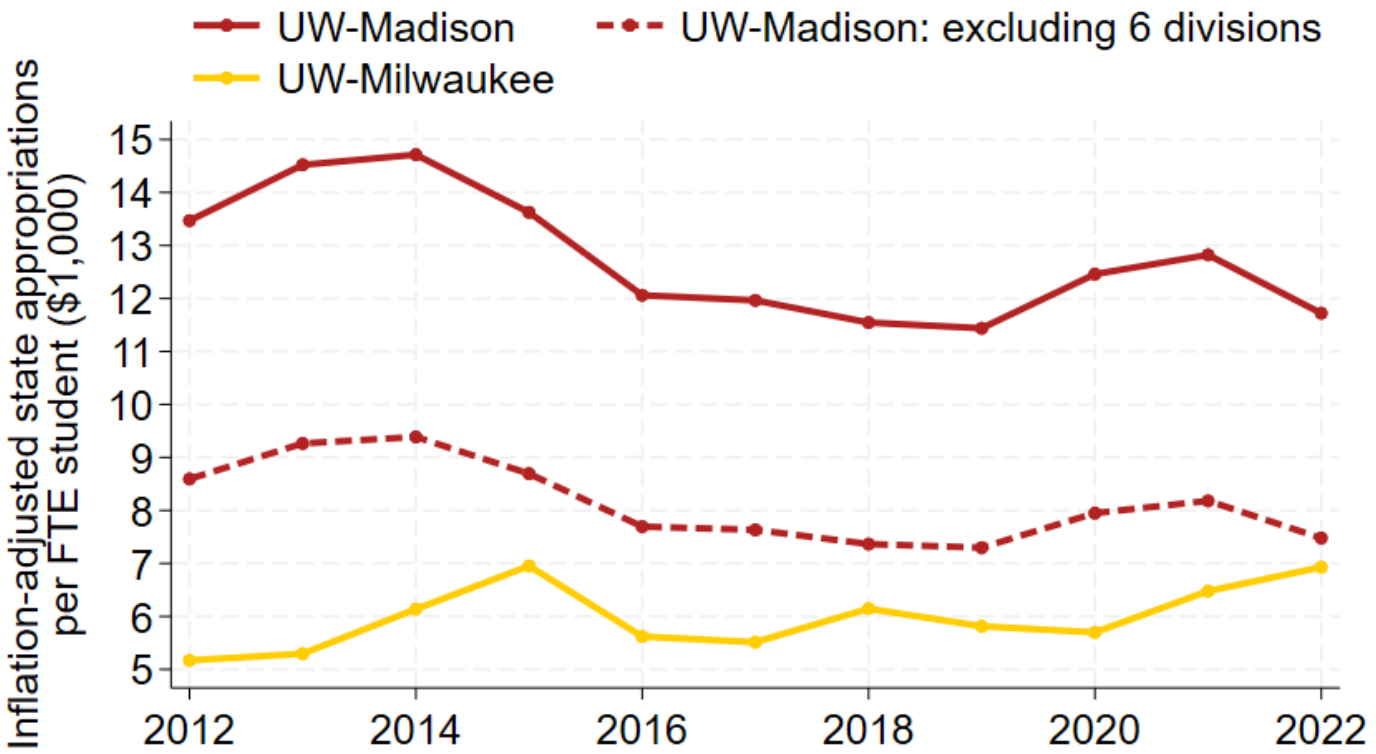
*Source: On the Allocation of Resources between UW-Madison and UWM, Fetzer Initiative on Economic Opportunity Policy Brief, July 2021*

# Inflation-adjusted state appropriations per FTE student: UW-Madison vs UW-Milwaukee




*Source: Own calculation using data from IPEDS*

# Inflation-adjusted state appropriations per FTE student: UW-Madison vs UW-Milwaukee




*Source: Own calculation using data from IPEDS*

# UW-Madison vs UW-Milwaukee

- About 36.2% of the GPR for UW-Madison went to the 6 divisions
- Excluding GPR to the six divisions, UW-Madison's state appropriations per student are much closer to that of UWM and the difference is getting smaller over time
- Most of the differences in state appropriations per student between UW-Madison and UWM can be accounted for by differences in their missions.

*Source: On the Allocation of Resources between UW-Madison and UWM, Fetzer Initiative on Economic Opportunity Policy Brief, July 2021*

# Beyond Funding - Allocation of resources at UW System

- Moving beyond $$/FTE, how are resources allocated?
- A well-functioning enterprise should align budgets with mission and priorities. Budgets should respond to changes in student demand.
- UW System operates on a legacy budget model.
- The formula used to allocate resources across system campuses has been essentially unchanged for the last five decades.
    - Very small fraction allocated based on outcomes-based funding

*Source: UW System Testimony, Assembly Bill 1108: Allocation of funding for University of Wisconsin System Institutions, April 6, 2022*

# Beyond Funding - Budget model at UW-Madison

Resource allocation decisions are not transparently connected with academic outcomes. For traditional programs, there are few incentives for improvement, innovation or to engage in financial planning.

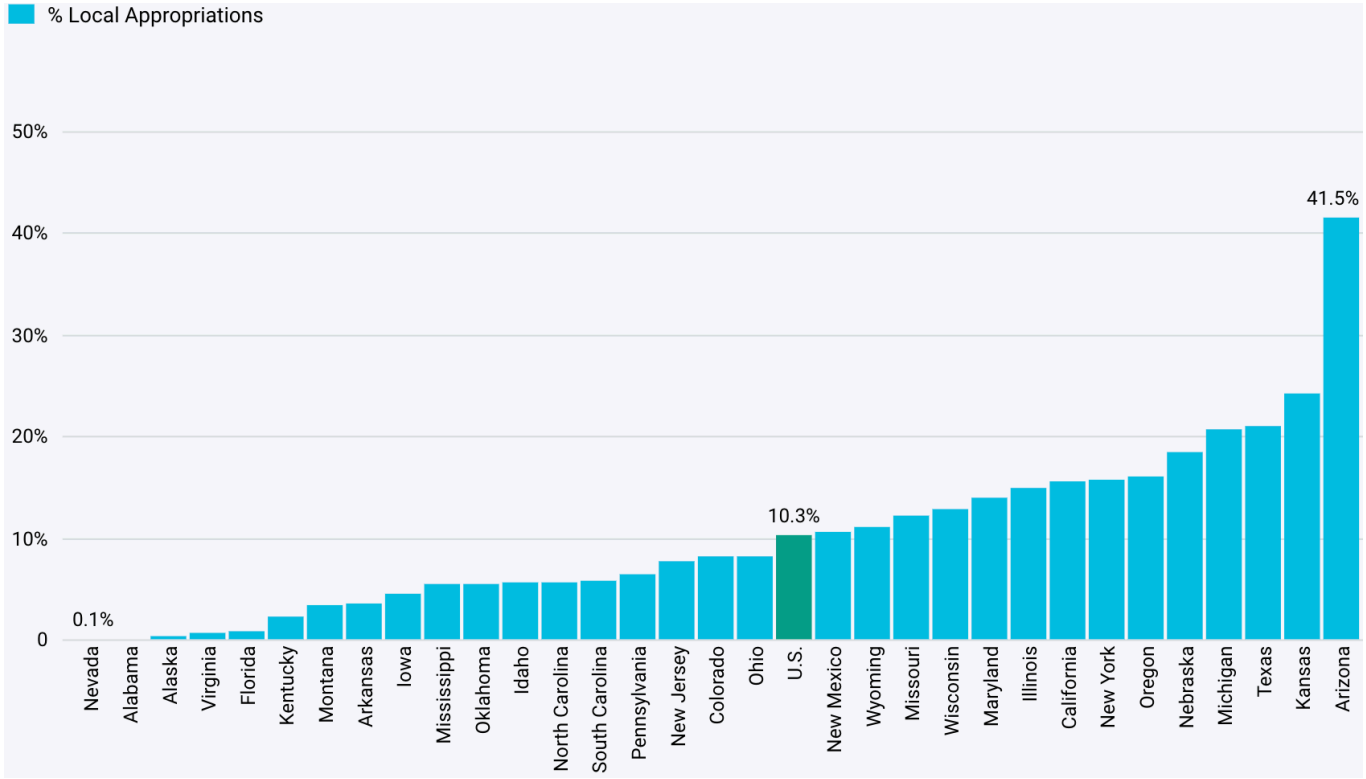
A committee in 2014 made three conclusions about the current model:

1. “The current budget model does not align resources to activity, and therefore responding to shifts in educational demand is difficult.
2. The current model allocates core funds on the basis of history, not productivity or centrality to mission.
3. The current model lacks transparency and does not objectively allocate core funds based on program quality.”

*Source: University of Wisconsin-Madison Budget Allocation Model. Past, Present and Possibilities. White Paper prepared by the Budget Model Review Committee (2014)*

# Thank you

# Local Appropriations as a Share of a State's Total Support to Higher Education: Wisconsin 12.8%; US 10.3%




*Source: State Higher Education Executive Officers Association (2024)*

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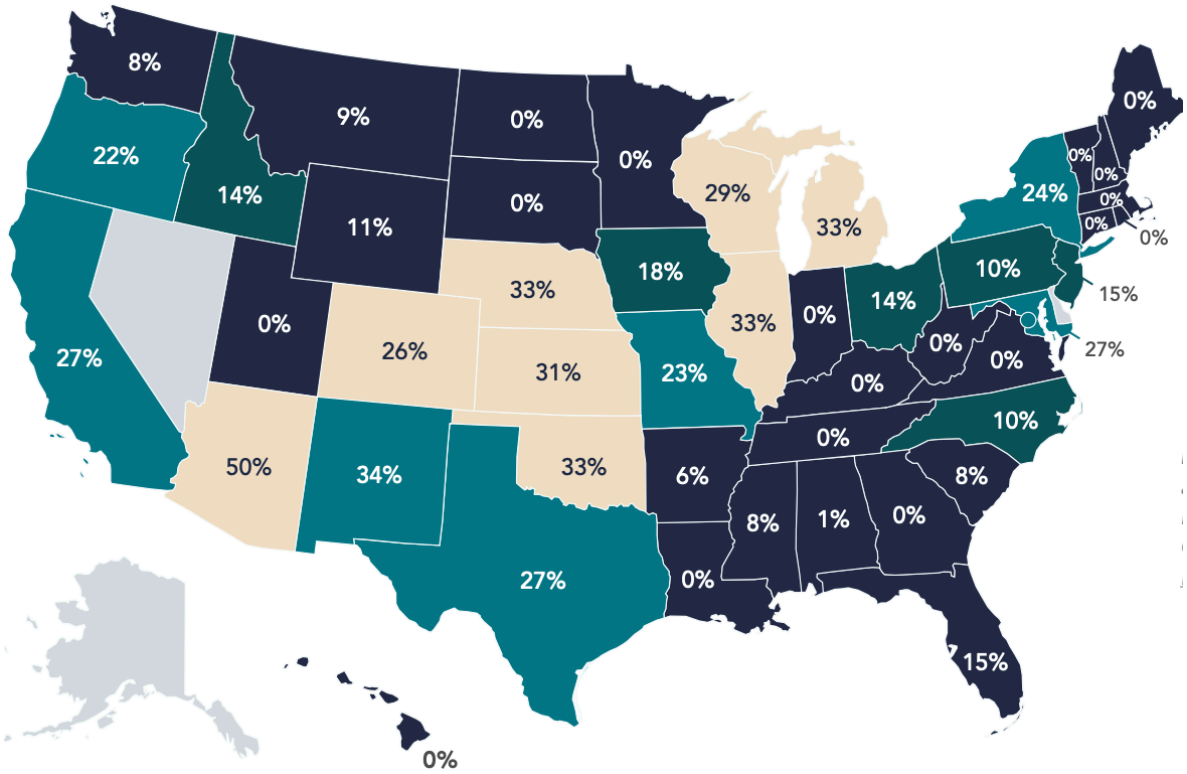
# Local funding as a percentage of the total revenue of public 2-year colleges: National average=20%




Source: [Bellwether (2024)] for FY2022