Falling Behind? State and Local Government Employee Compensation Since the Great Recession

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Disclaimer

- Disclaimer: The analysis and conclusions set forth are those of the authors and do not indicate concurrence by other members of the research staff of the Federal Reserve or the Board of Governors of the Federal Reserve.

Topic

- Topic: How does state and local government worker compensation compare to the private sector

- Question: How has state and local government pay evolved relative to the pay of observationally-equivalent private-sector peers?

Motivation

- Government capacity is importantly a function of the quality of the public sector workforce.

- Relatively low pay may reduce state capacity
  - Flint water crisis
  - High infrastructure costs (Liscow, Slattery, and Nober 2025)
  - Hawaii Dept. of Taxation unable to modernize tax administration (Wood 2016)

- Alternatively, reducing public sector compensation might yield budget savings and efficiency gains (e.g. Biggs 2012)

Three Principal Contributions

1. We bring the literature up to date
   - Work in late 80s and early 90s – e.g. Poterba and Rueben (1994), Katz and Krueger (1991)
   - Topic received much attention around 2010, when tight budgets raised questions about S&L compensation
     - Researchers disagreed over value of benefits
   - The issue hasn't been studied much since
2. Methodological contributions aimed at proper measurement of benefits
   - Standard datasets omit some benefits or have measurement deficiencies
   - Accrual-based measurement of pensions and retiree health benefits and valuation of job stability
     - Using publicly available data sources
   - We document
     - Accrual-based pension measurement in the NIPA understates value of pension benefits when interest rates are low
     - The Employment Cost Index's use of cash accounting for pensions significantly distorts measurement of public-sector compensation over last 15 years

Three Principal Contributions

3. We break out relative S&L pay premium along various dimensions: education, unionization status, age, and by state

Preview our findings

- S&L relative compensation down around 10-15 percent since 2011
  - Relative S&L wages, benefits, and job stability all declined
- On average, S&L workers now earn 5% less than comparable private workers
- College educated workers now earn 15% less than comparable private sector workers, high school educated workers earn 17% more.
- Decline is relative compensation is pervasive – all 50 states

Limitations

- Many caveats and assumptions involved in aggregating data sources

- Our results cannot establish whether or not public employees are earning rents – i.e. if they are "overpaid" or "underpaid"

1. Unobservable worker quality likely reflects relative pay
   - E.g. As relative pay falls, the unobservable quality of the public sector workforce may decline

2. Beyond job stability, we do not consider non-compensation amenities
   - E.g. flexible scheduling, dignity at work, etc. (Mas 2025)
   - Assuming workers value benefits at cost of providing them, our results could be interpreted as the difference in amenities required for workers to be indifferent between public and private sectors

Limitations (cont.)

- Tsao (2025) provides helpful illustration of these limitations
  - Examines K-12 teachers in Kentucky
  - Paid more than observationally equivalent non-teachers
  - But when comparing to pay in their own next-best employment opportunity—holds observable and unobservable characteristics fixed—find that
    - Inexperienced teachers were paid more than offered by next-best job
    - But higher pay was offset by poorer working conditions -> no rents

Our findings in context of limitations

- Magnitude, breadth, and duration of the relative compensation decline almost surely associated with important shifts in the public labor market
- Consistent with several, non-mutually exclusive, changes
  - Public workforce could be shifting to lower unobservable quality
  - Public sector rents could be decreasing
  - Value of non-wage amenities in the public sector could be increasing
- Our paper is a starting point
  - Need more research focused on particular sectors of public employment
    - Teachers, public safety, etc.

Background

- Public sector differs significantly from private sector

row		Private	State and Local Government
	A. Employee Demographics		
1	Age	40.6	44.1
2	Married	0.51	0.60
3	Female	0.47	0.61
4	White	0.60	0.65
5	Black	0.11	0.13
6	Hispanic	0.20	0.15
7	High School	0.26	0.14
8	Some College	0.26	0.22
9	4-year College or More	0.40	0.62
10	Managers and Professionals	0.37	0.59
11	Precision Production, Craft and Repair	0.09	0.03
12	Operators, Fabricators and Laborers	0.13	0.04
	B. Share of Total Employee Compensation		
13	Wages	0.85	0.70
14	Benefits	0.15	0.30
15	Defined Benefit Pension (accrual basis)	0.01	0.13
16	Retiree Health Care (accrual basis)	.	0.01
17	Other Benefits	0.15	0.16

Source. Panel A: 2024 Current Population Survey; Panel B: 2023 National Income and Product Accounts and author's calculations for defined benefit pensions and retiree health care.

Data

- BLS's Employment Cost Index (ECI) – changes in compensation
  - Measure compensation inflation
  - Holds composition of workforce and jobs constant at very granular level
  - We use unpublished ECI data for DB pensions provided by the BLS
  - No information on level of compensation, problematic measurement of pensions, omits retiree healthcare
  - Does not permit analysis of sub-groups
- BLS's Current Population Survey (CPS) – level of compensation
  - Can examine subgroups – e.g. by education status
  - Measurement of job stability
  - Lacks information on benefits
- Supplemental data sources for benefits
  - NIPA, ECEC, NCS, governmental financial reports

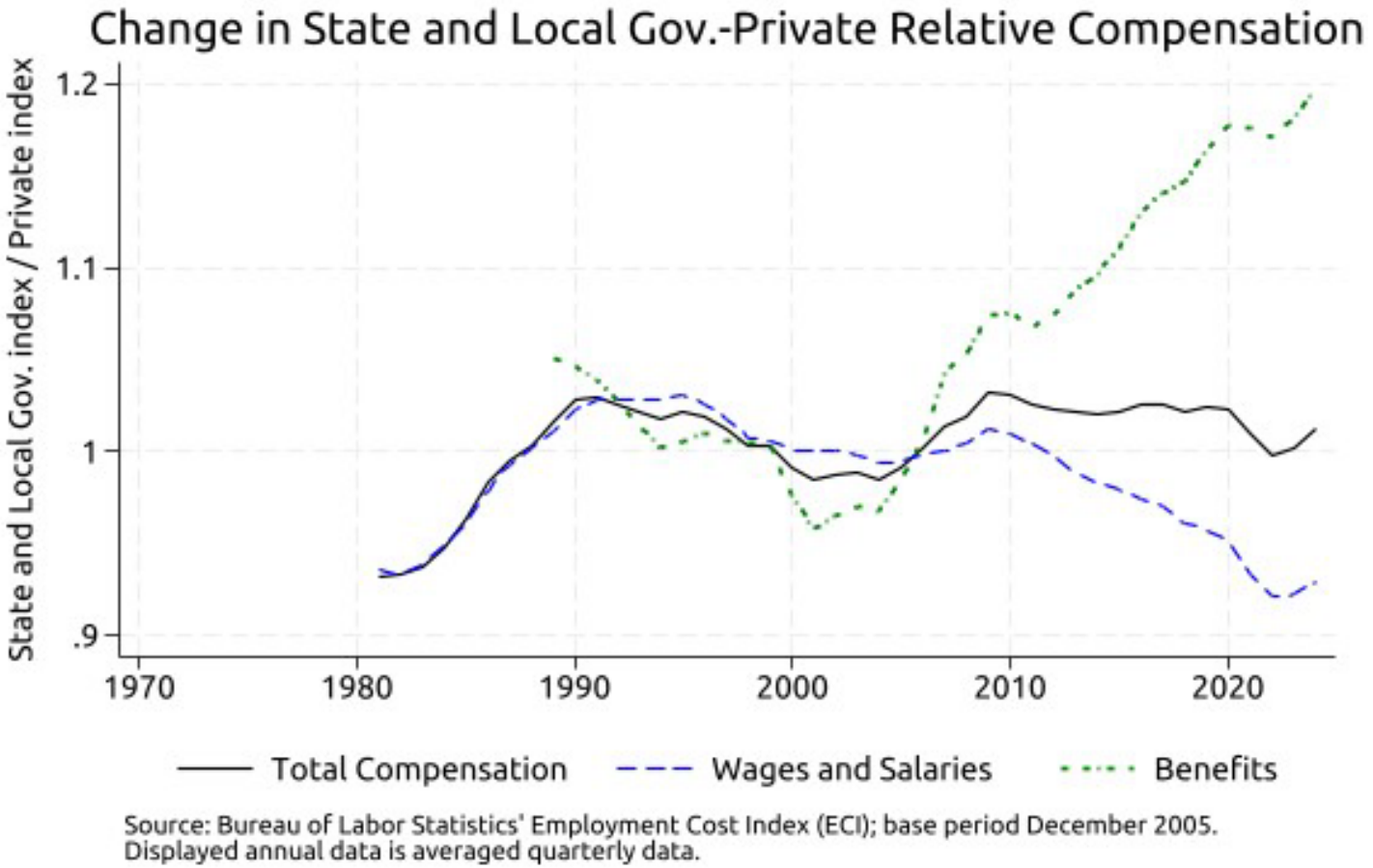
ECI shows roughly flat S&L relative compensation over time

- Change in the relative compensation of state and local workers =

  Δ(S&L ECI index / Private ECI index)

- Relative compensation flat since 2010

- Reflects almost 10% fall in relative wages since 2005 offset by 20% rise in benefits.



Wages

- S&L workers differ significantly from private workers – e.g. higher educational attainment

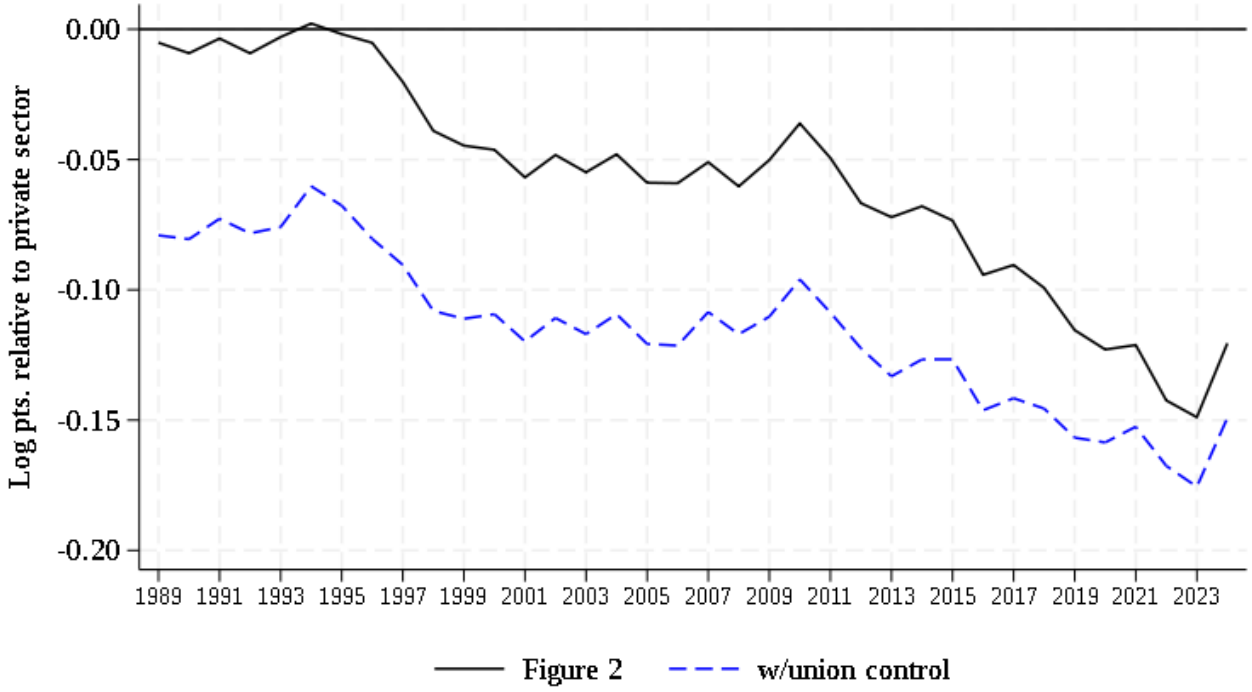
- We use Mincer-style regressions to calculate S&L wage premium using the Current Population Survey
  - Control for quartic in age, marital status, education, region-metro, race-gender, major occupation
  - Results very similar to ECI, which holds worker composition fixed.

- S&L government pay has been <u>lower</u> since 1995 and has declined consistently the Great Recession

- Currently about -12%, down 8 ppt since 2010

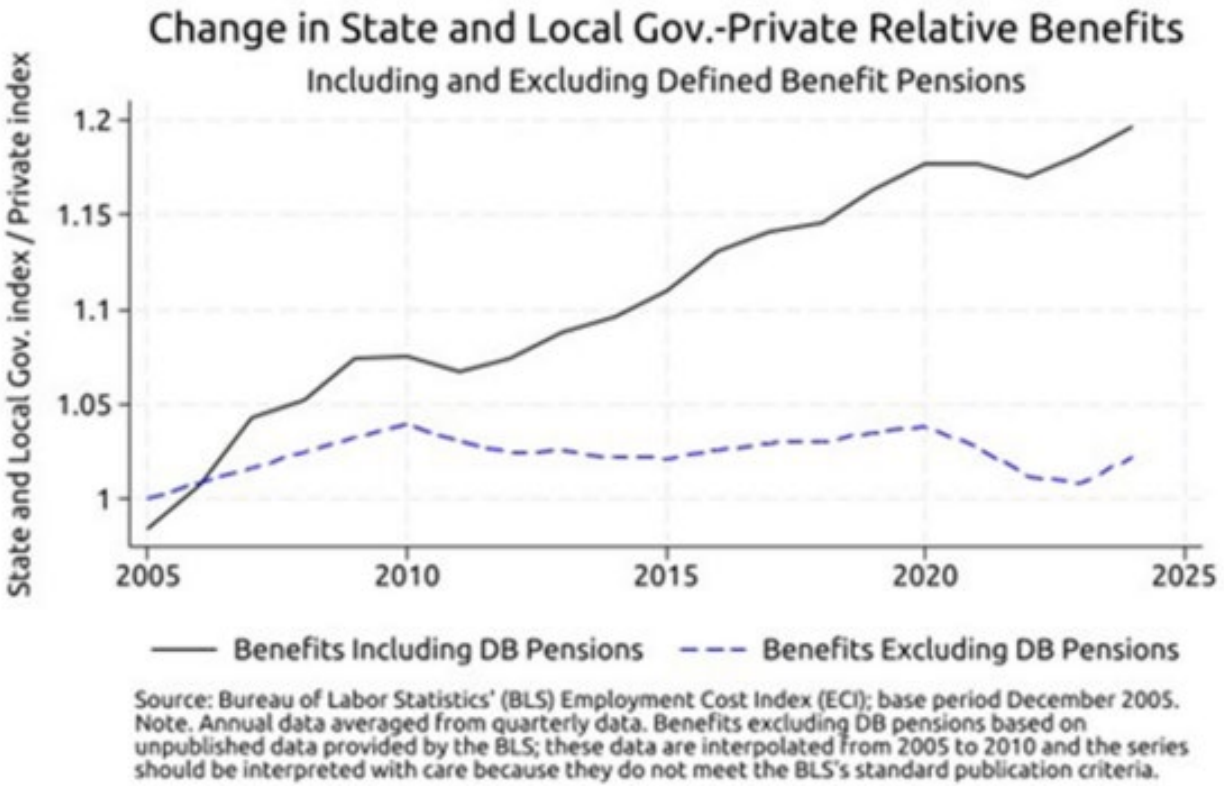
Wages (cont.)

- We omit union status from controls, judging it to be an attribute of the S&L sector
- Including union status lowers public pay premium
- Overall, we have attempted to be conservative – i.e. lean toward a higher public premium where choices are debatable



Gap in wages for S&L workers relative to private. Regressions are weighted and control for quartic in age, four education groups, metro status interacted with Census division, race interacted with gender, marital status, and major occupation. Dashed line regression includes baseline controls in Figure 2 plus a control for union status.

Benefits: ECI



- ECI S&L benefits have increased 20% more than private since 2005.
- Unpublished ECI tabulations remove defined benefit (DB) pensions
- Increase in benefits solely attributable to DB pensions

Defined Benefit Pensions

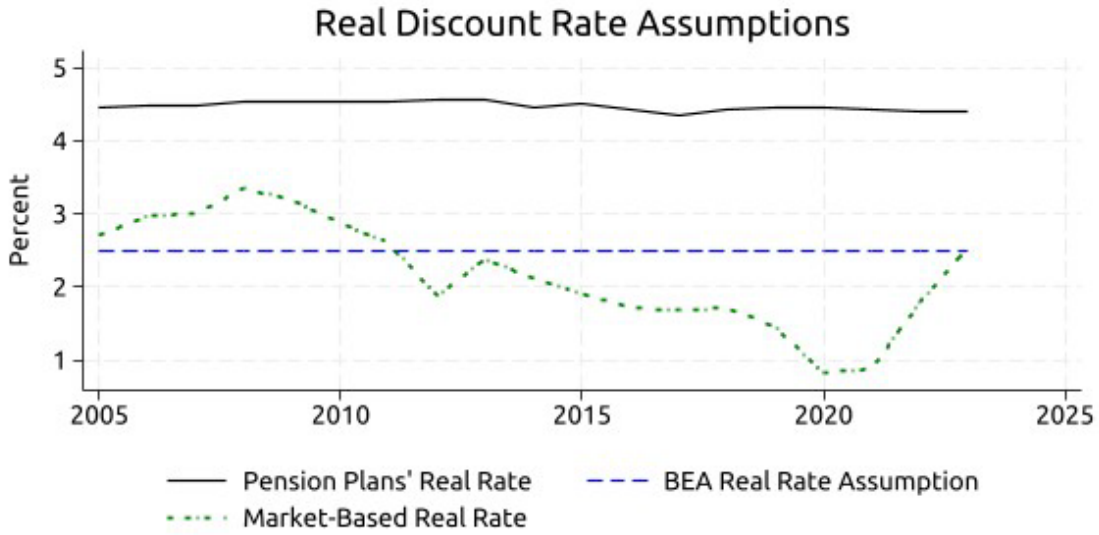
- The proper measure of the annual compensation value of DB pensions is the accrual value: the change in the present value of benefits from a year of service.
- The ECI uses employer contributions to pension plans to measure pension benefits.
  - S&L govs. often underfund pensions, making cash contributions less than accruals
  - But in recent years, public employers have been increasing contributions to address past underfunding
  - Simultaneously lowering actual benefits, particularly for new workers (Abashidze, Clark, and Craig 2021; Aubry and Crawford 2016; Lenney, Lutz, Schule, and Sheiner 2021)
    - Reduced COLAs, less generous benefits for new workers, increased employee contributions
- Cash and accrual accounting trending very differently → use of cash accounting very problematic

Defined Benefit Pensions Methodology

- S&L pension plans publish the value of pension benefits earned (or accrued) annually in financial reports
- Plans discount future liabilities at rates that reflect expected return on their assets.
- Finance theory perspective: liabilities should be discounted at rate that reflects their *risk*
- Because pension benefits have strong legal protections, finance/economics literature suggests discount rate should be lower (e.g. Novy-Marx and Rauh 2009)
- A lower discount rate raises the value of pension accruals

BEA: Defined Benefit Pensions Methodology

- Possible Alternative Data Source: BEA uses an accrual method to value annual DB pension benefits in the NIPA
- However, BEA accrued pension benefits' sensitivity to changes in the discount rate is substantially below what is suggested by standard actuarial rules of thumb
- At least partly due to implicit use of a fixed 2.5% real interest rate
- Causes measured BEA pension accruals to be too low during period of low interest rates

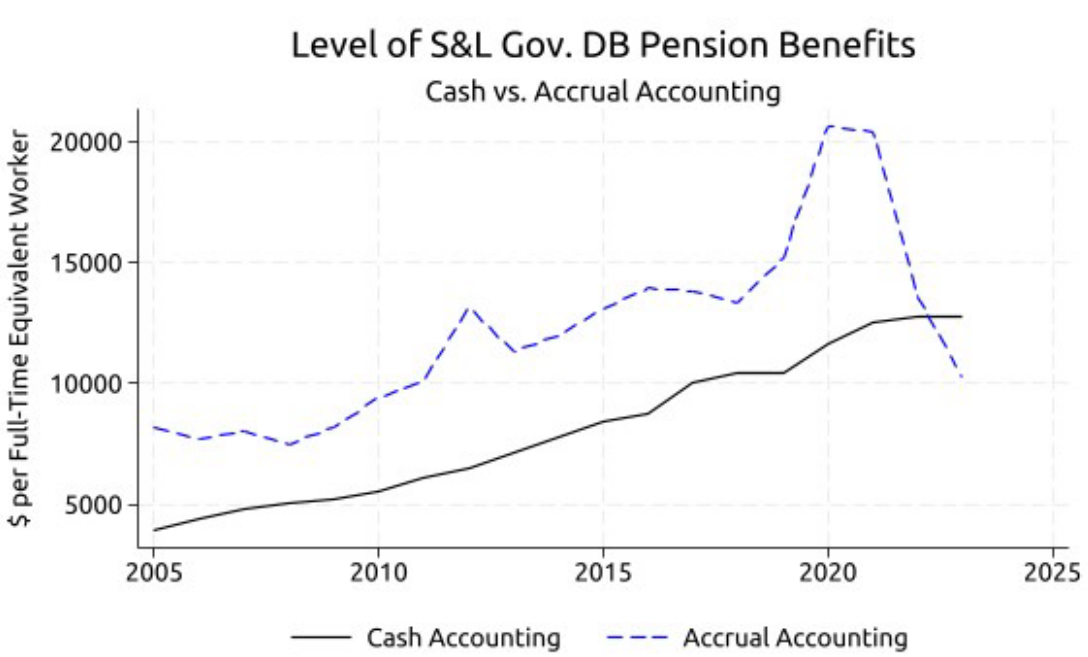


Source. Public Plans Data: Center for Retirement Research at Boston College, MissionSquare Research Institute, National Association of State Retirement Administrators, and the Government Finance Officers Association. Bureau of Economic Analysis (BEA). Moodys Investor Service. Cleveland Federal Reserve Bank. Author's calculations.
Note. Pension plans' real rate assumption equals the weighted average of each plan's nominal discount rate minus their assumed inflation, with weights equal to total plan normal cost. The market-based real rate equals Moody's Seasoned Aaa Coporate Bond Yield minus 20-year expected inflation rates.

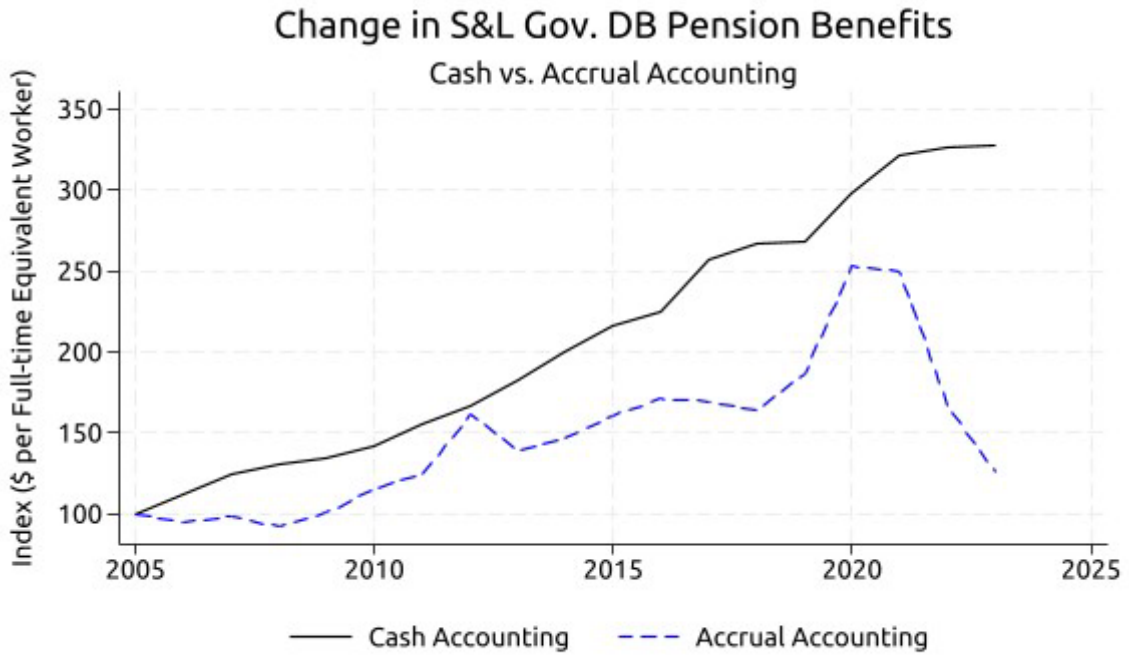
Defined Benefit Pensions Methodology

- We calculate accruals, using
  - Large data base of pension plans (Boston College Retirement Center)
  - Simple actuarial model of a standard pension that helps us gauge how assumptions about interest rates and inflation affect accruals.
- We use the rate on AAA 20-year bonds as the discount rate and the Cleveland Fed's 10-year expected inflation
- Our S&L pension accruals are substantially larger than BEA's from 2015-2020
  - But little different at start (2010) and end (2023) of our sample period

DB: Accrual vs. cash accounting



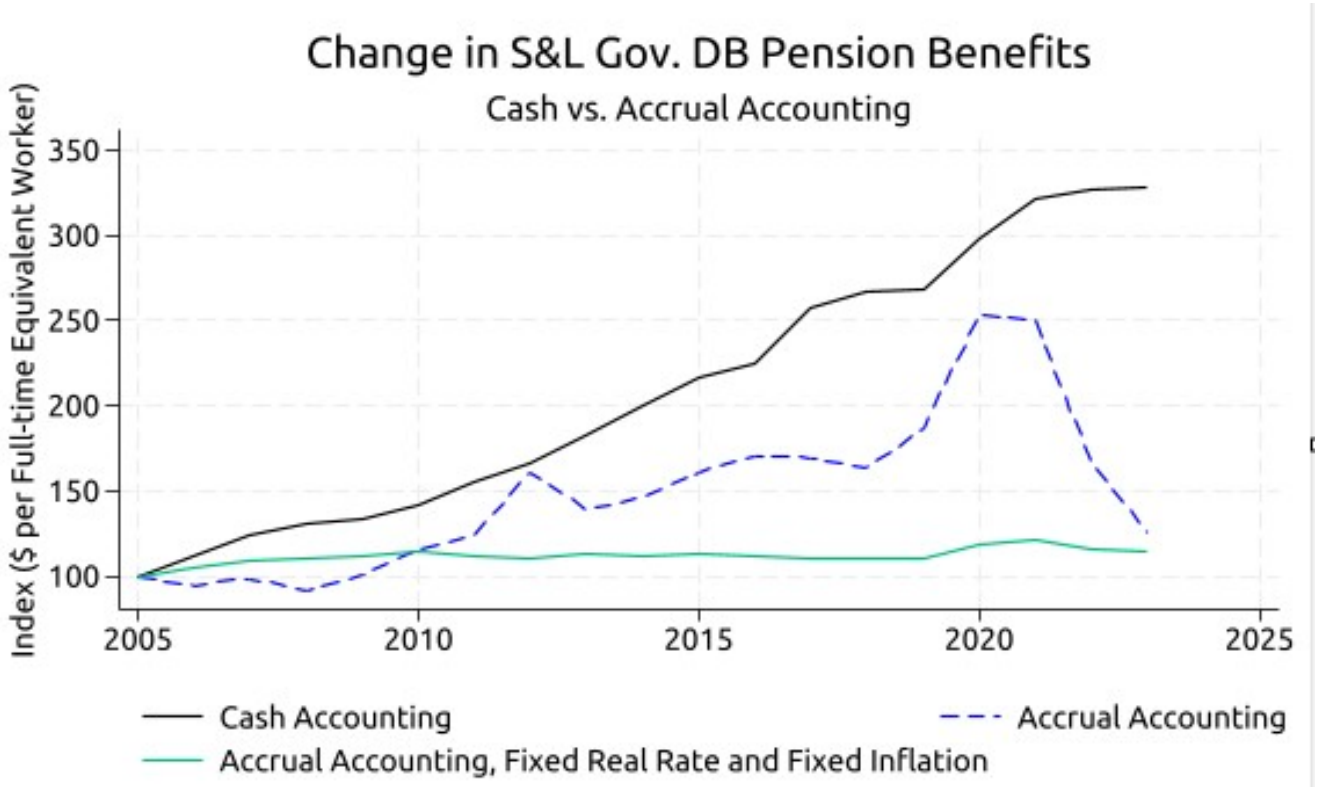
Source: Bureau of Economic Analysis's (BEA) National Income and Product Accounts (NIPA). Public Plans Data. Author's calculations.



Source: Bureau of Economic Analysis's (BEA) National Income and Product Accounts (NIPA). Public Plans Data. Author's calculations.

Accruals > Cash until very recently
But cash accounting overstates **growth** in DB benefits by nearly 200 ppt

Rise in pension accruals through 2021 owes entirely to declining interest rates

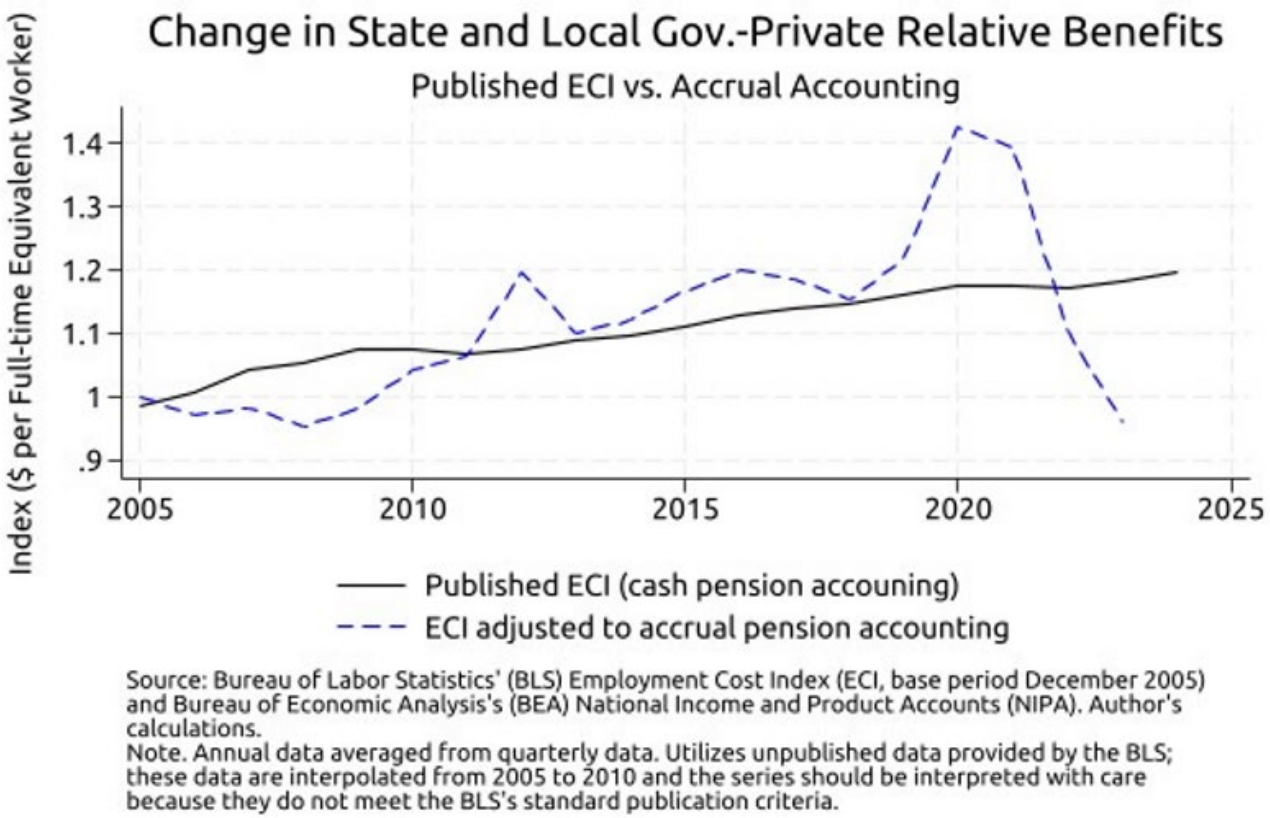


- Without changes in interest rates, no increase in nominal accrual value of pensions per FTE.
  - Sharp rise from 2019 to 2020 entirely because of decline in rates.
- Pension accruals would have been declining share of wages if not for interest rates.
- Accords with literature showing governments have been making plans less generous, particularly for new hires.

Aggregation of ECI-based estimates

- Aggregate the ECI index for wages and non-pension benefits with our estimate of DB pensions accruals index
- Use 2005 level of wages and benefits in the NIPA as aggregation weights
- Requires assuming that change in DB pension accruals do not reflect change in industry-occupation cells or changes within these cells

Change in SL-Private Relative benefits



Source: Bureau of Labor Statistics' (BLS) Employment Cost Index (ECI, base period December 2005) and Bureau of Economic Analysis's (BEA) National Income and Product Accounts (NIPA). Author's calculations.
Note. Annual data averaged from quarterly data. Utilizes unpublished data provided by the BLS; these data are interpolated from 2005 to 2010 and the series should be interpreted with care because they do not meet the BLS's standard publication criteria.

- Similar growth rates until 2019, diverge significantly thereafter
- Through 2019, the more rapid growth in the cash accounting measure is offset by its smaller size in 2005 – the year which defines the aggregation weights

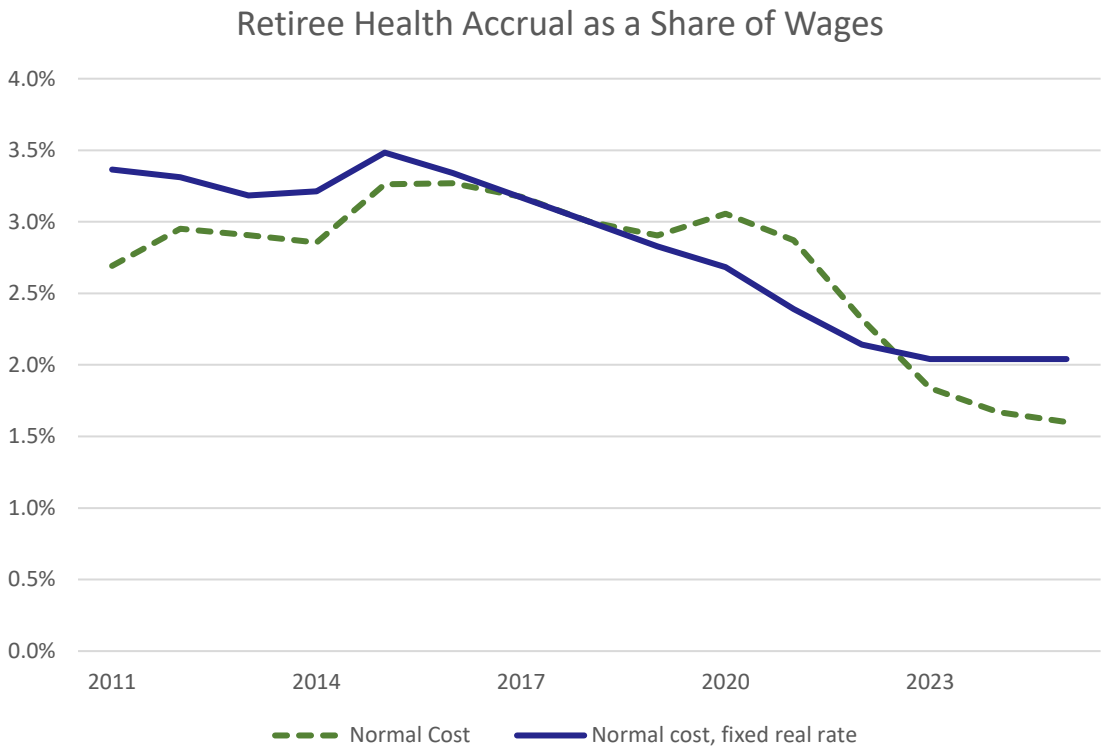
Retiree health insurance

- In 2024, about 65% of S&L workers had access to retiree health insurance (OPEB); just 14% of private workers did
- Huge variation in generosity across governments—with just 12 states accounting for 80% of the liabilities (Pew, 2021)
- Mostly unfunded – governments simply cover the cost of retiree health care on annual basis
- As these are payments to retirees who are no longer employees, it is not captured by ECI

Retiree health insurance: our methodology

- Easier to get data for recent years (2017 on) because of changes in accounting standards.
- Difficult to get data from earlier years.
- We use data from a large set of plans (173) from Pew 2019 to anchor the accrual value of benefit in 2018.
- We use changes in this accrual value for a subset of plans from 2011 to 2022 to estimate aggregate accruals in other years.
- We adjust published accrual values for differences in the discount rate.
  - Plans can and do change plan generosity and benefit generally lacks legal protections → we use a discount rate that is 1 percentage point higher than the one we use for pensions.

Retiree health insurance: what we find



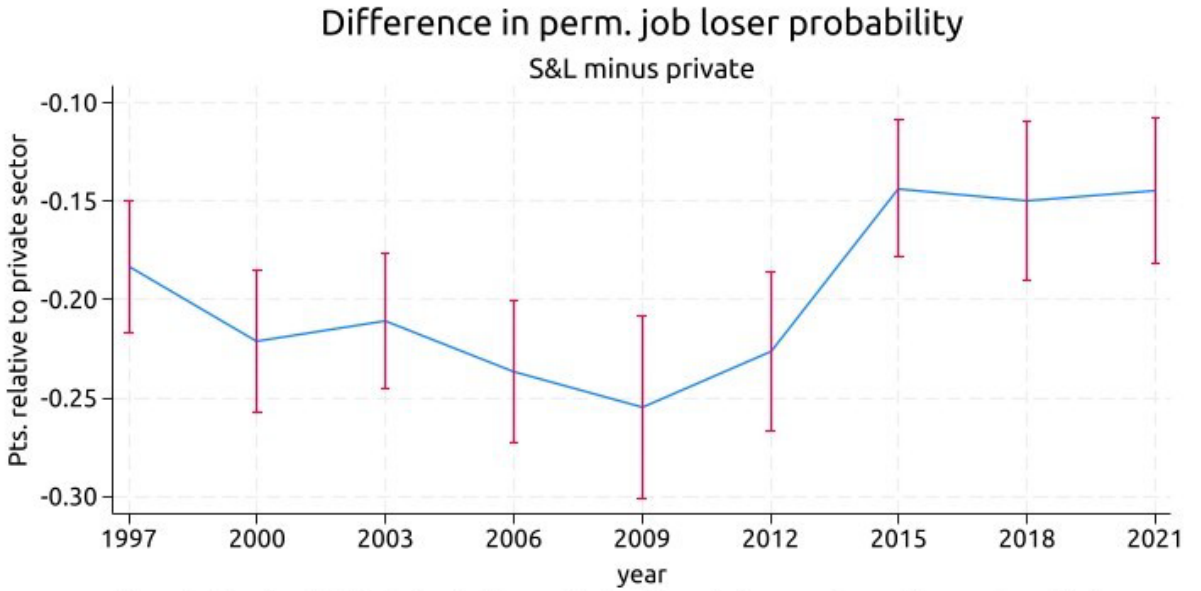
- Accrual value as a share of wages roughly flat from 2011 to 2020, before declining as interest rates rose.
- But holding interest rates fixed, accrual value fell from 2015 through 2022, reflecting both decreasing generosity of plans and lower than expected health cost growth.

Job stability

- Widely recognized that public sector offers greater job stability
- Little past research which quantifies and no (?) work on how it has evolved over time
- Longitudinally-linked CPS data used to calculate probabilities of transition from employment to permanent unemployment for private and S&L workers, controlling for same characteristics as in our wage equation.
  - Linear probability model

Job stability

- S&L workers have greater job stability, but advantage has decreased over time:
  - In 2009, S&L monthly probability of permanent job loss .25 ppt less than private—3 percentage points at an annual rate.
  - In 2015, S&L workers only 1.8 ppts less likely to lose their job permanently each year.



Job stability: How to value?

- Simple model grounded in literature showing job loss causes persistent earnings declines
- Present discount value of job, V, can be written as

$$V_t = w_t + \beta[\delta U_{t+1} + (1-\delta)V_{t+1}],$$

w=real wage, $\beta = \frac{1+g}{1+r}$, g=real wage growth, r=real discount rate, δ=odds of job loss

- U is value of outside option after job loss

$$U_{t+1} \equiv (1-\alpha)V_{t+1}$$

$\alpha =$ cost of job loss as percent of job value

- Iterating forward

$$V_t = w_t \frac{(1-\beta^T(1-\delta\alpha)^T)}{1-\beta(1-\delta\alpha)}$$

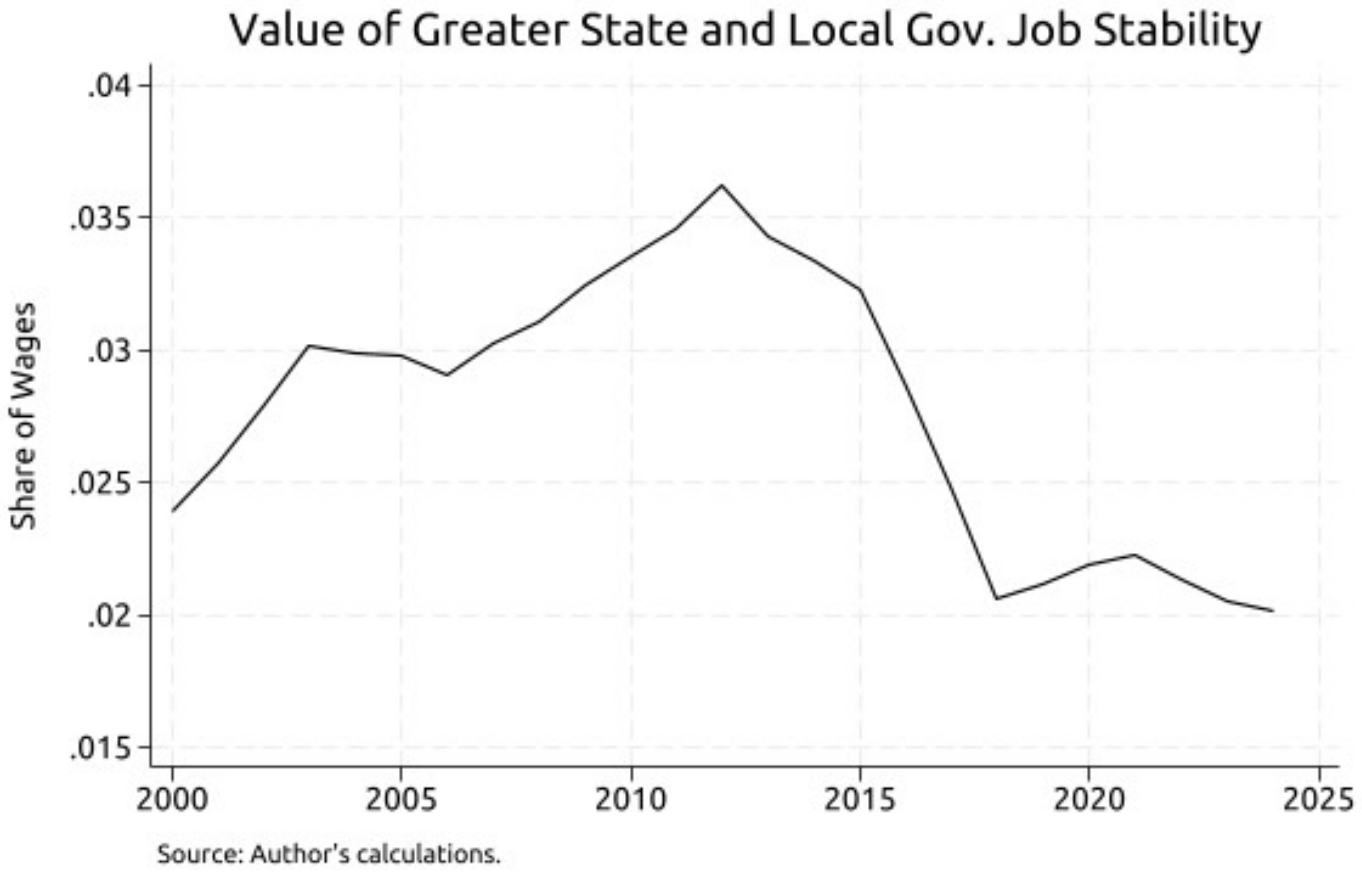
Job stability: How to value?

- Change in wage required to compensate for a change in job loss probability

$$\left.\frac{dlnw}{d\delta}\right|_{dV=0} = \left(\frac{\beta\alpha}{1-\beta(1-\delta\alpha)} - \frac{\alpha T\beta^{T}(1-\delta\alpha)^{T-1}}{(1-\beta^{T}(1-\delta\alpha)^{T})}\right)$$

- Assumptions
  - T=20 years, g=.02, r=market-based, δ=CPS-job loss probability estimates
  - α=12%
    - Davis and von Watcher (2011) estimate job displacement reduces PDV of future earnings by 12%

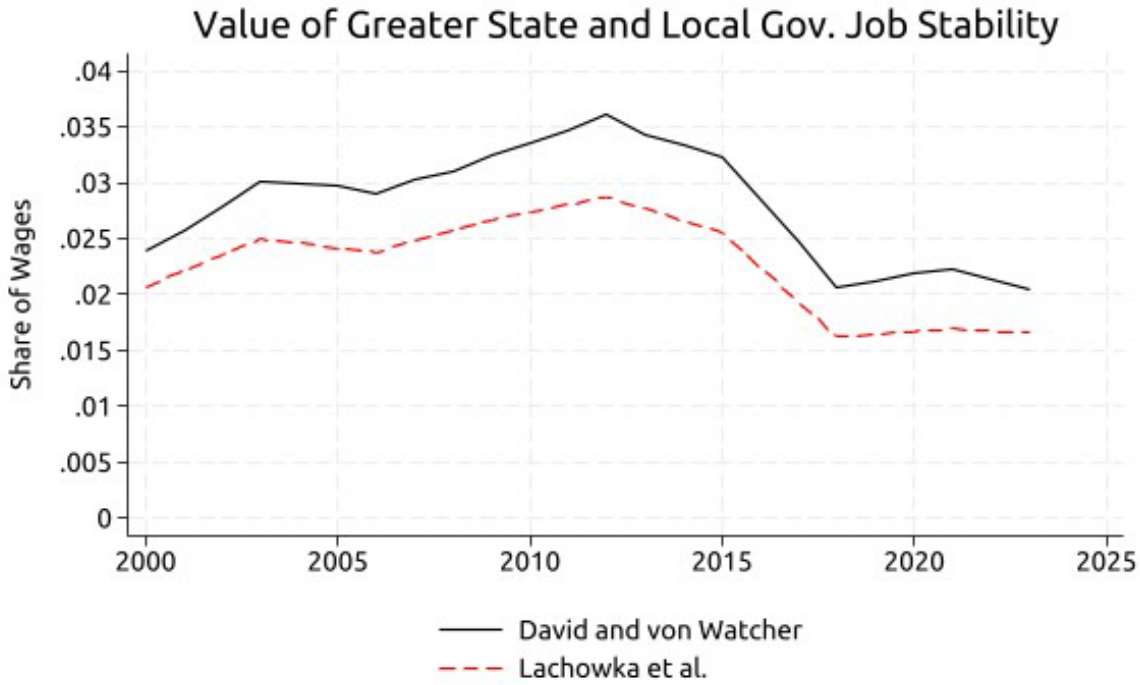
Value of job stability



- Higher job stability of the state and local sector worth about 2% of wages in 2024.
- Down from 3.5% of wages at the peak value of job stability in 2012.

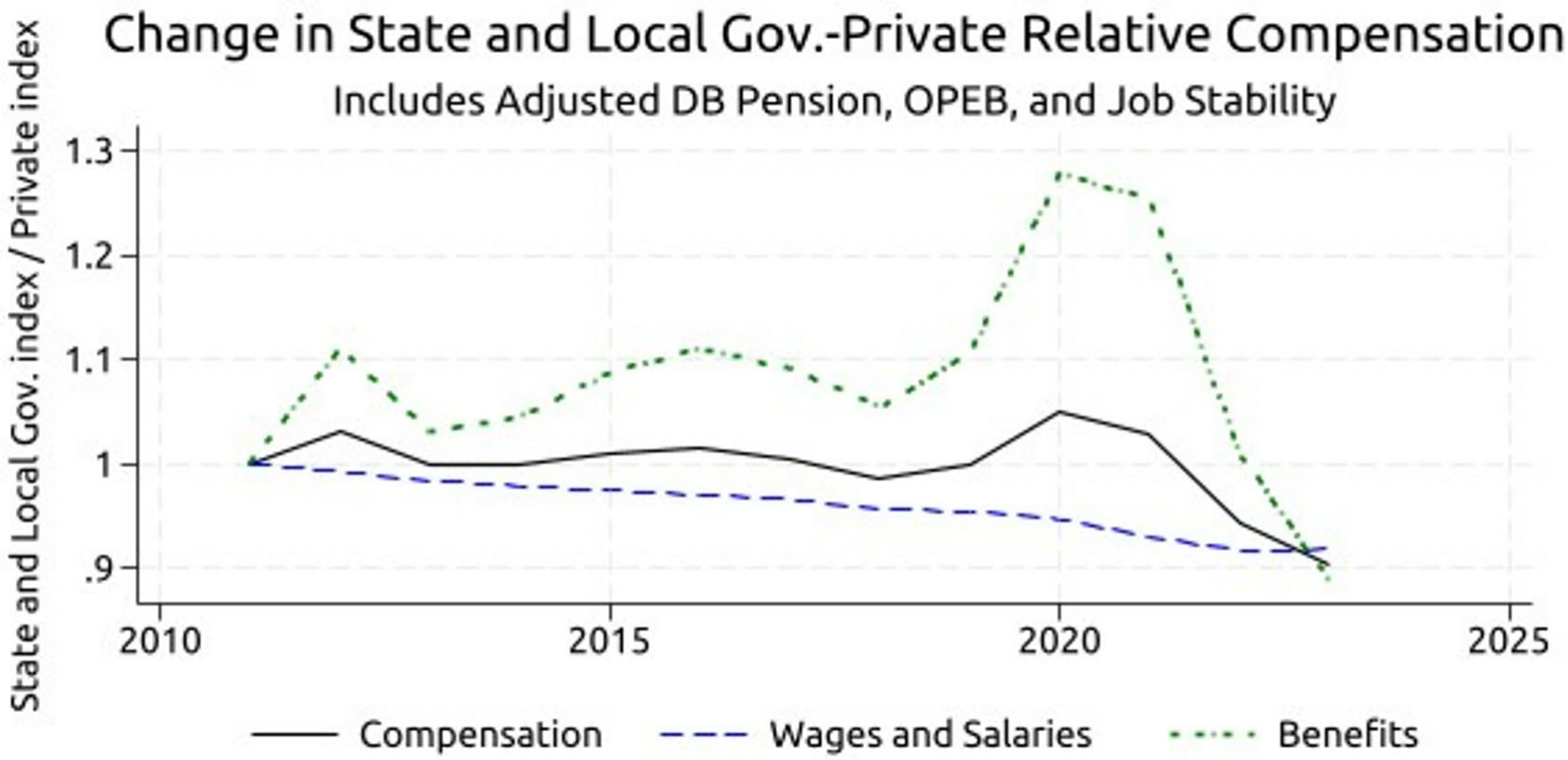
Value of job stability: Alternative approach

- Lachowska, Mas, Saggio and Woodbury (2025) estimate revealed preference utility rank of employers (following Sorkin 2018)
- Find that a 1ppt increase in two-quarter job loss rate equivalent to 1.9 decrease increase in wages
- Remarkably similar valuation to that implied by our calibration using Davis and von Wachter (2011)



Source: Author's calculations.

ECI adjusted for pensions, retiree health, and job stability



- Aggregate unpublished ECI index ex. DB pensions with our indices for DB pensions, retiree health, and job stability
- 10 percent decline in relative public pay

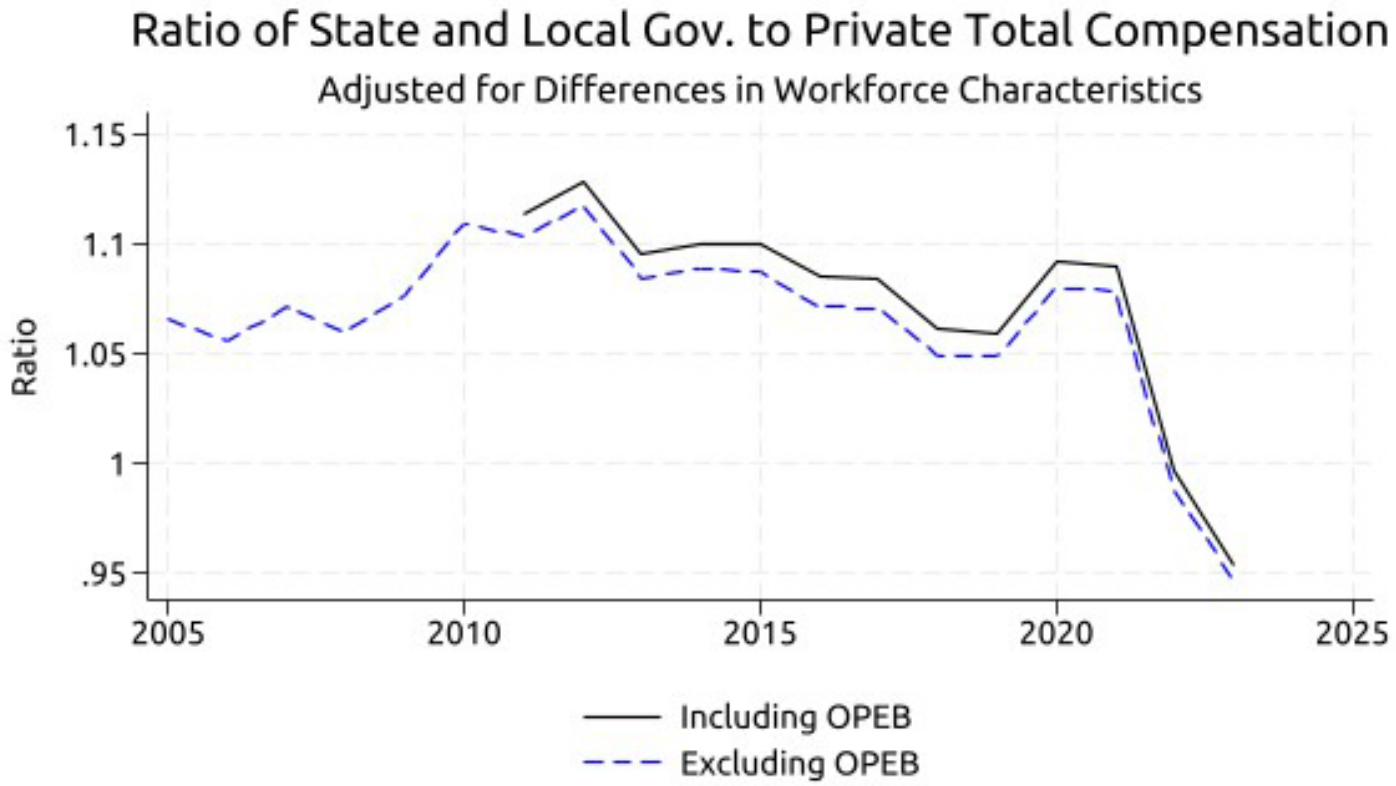
Estimates of level of relative compensation

- Use CPS-based approach

$$\frac{TC_{SL}}{TC_{Private}} = \frac{W_{SL}}{w_{Private}} * \frac{(1 + benshare_{SL})}{(1 + benshare_{private})}$$

- $\frac{W_{SL}}{w_{Private}}$ = CPS Mincer wage differentials (holding observables fixed)
- $benshare_{SL}$ = benefits as share of wages
- Pension normal costs, OPEB normal costs, job stability → our estimates
  - Other benefits (e.g. health insurance) = ECEC hourly benefits as share of hourly wages

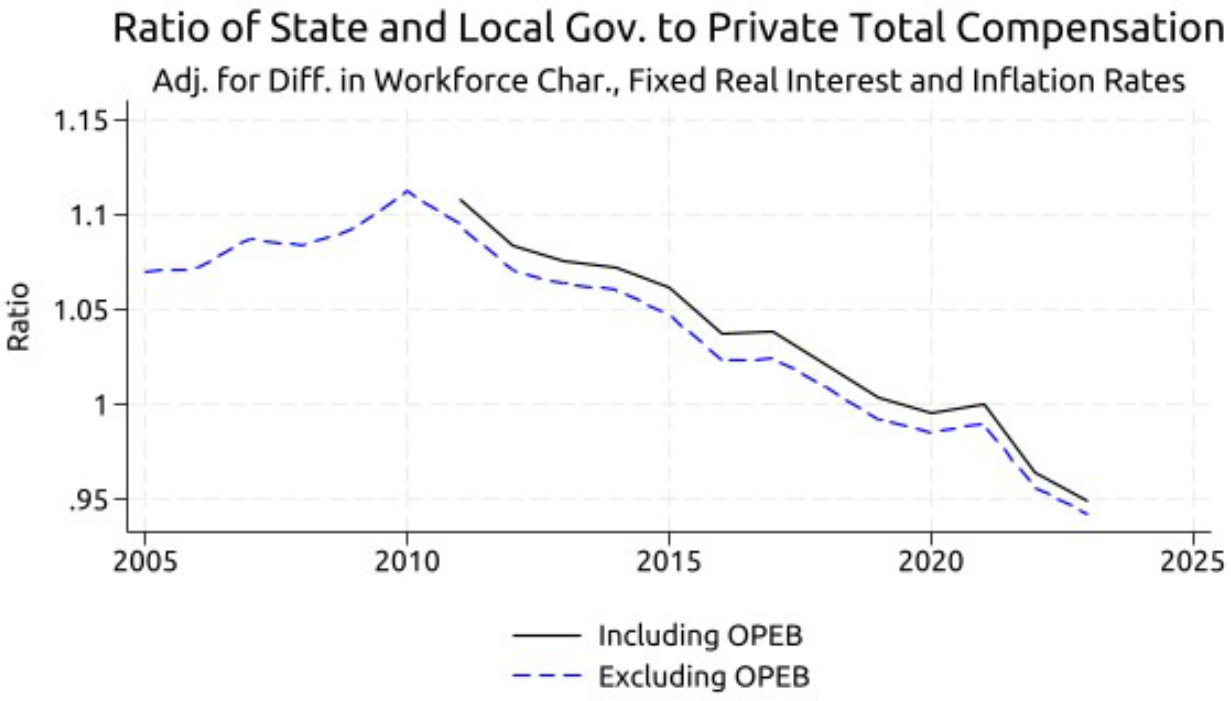
CPS adding in pensions, retiree health, and job stability



Source: Current Population Survey, Employment Costs for Employee Compensation, National Income and Product Accounts (NIPA), Pew (2023), Public Plans Data, and author's calculations.

- Compensation premium of over 10% in 2011.
- Turned into a 5% penalty by 2024.

Putting it all together holding interest rates fixed

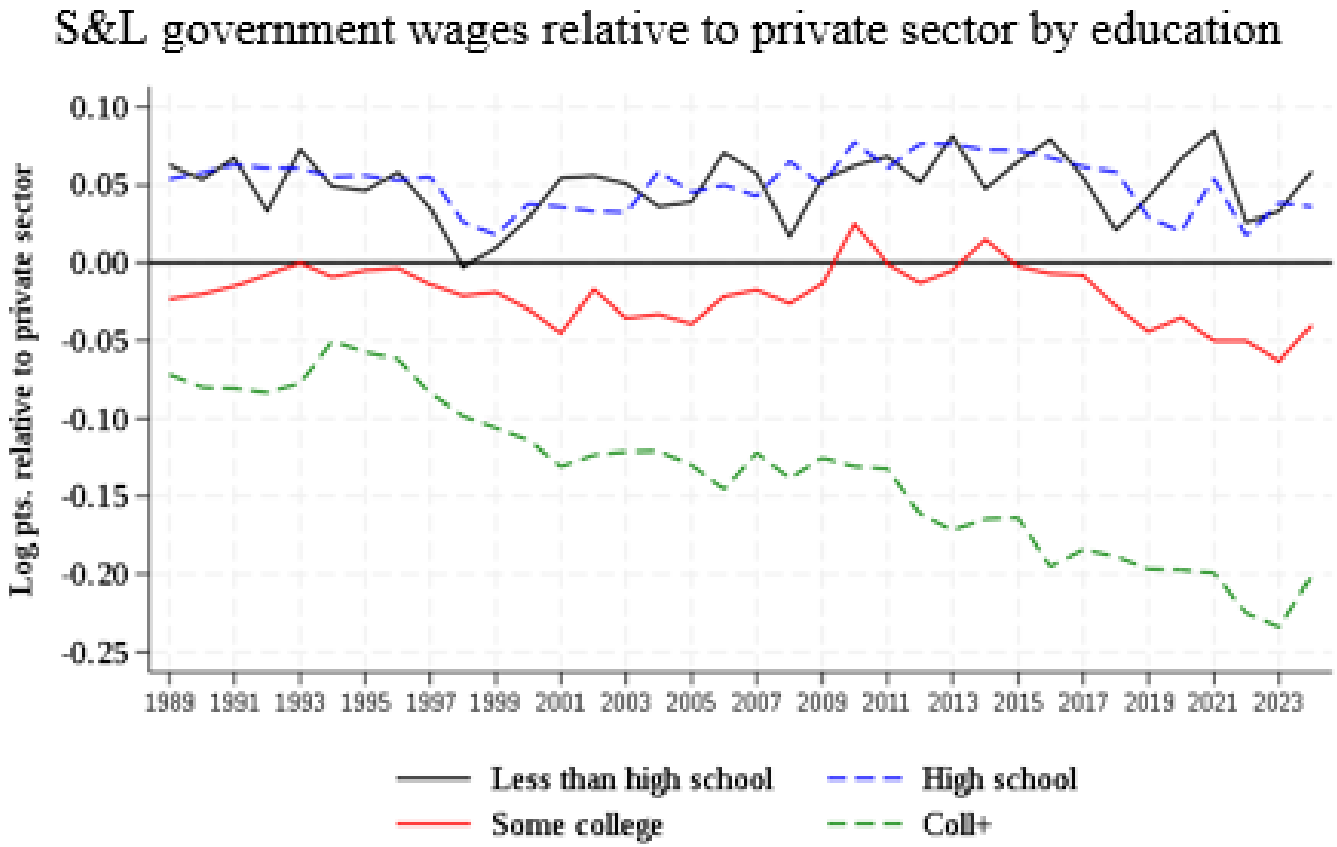


Source: Current Population Survey, Employment Costs for Employee Compensation, National Income and Product Accounts (NIPA), Pew (2023), Public Plans Data, and author's calculations.

- Holding real rates and inflation fixed, compensation in the state and local sector has declined steadily since 2010.
- The very low rates of interest in years prior to post-pandemic boosted the value of pensions, retiree health, and job stability.
  - Do state and local workers really do this type of calculation?
  - Will current higher interest rates persist, or will they return to pre-pandemic lows?

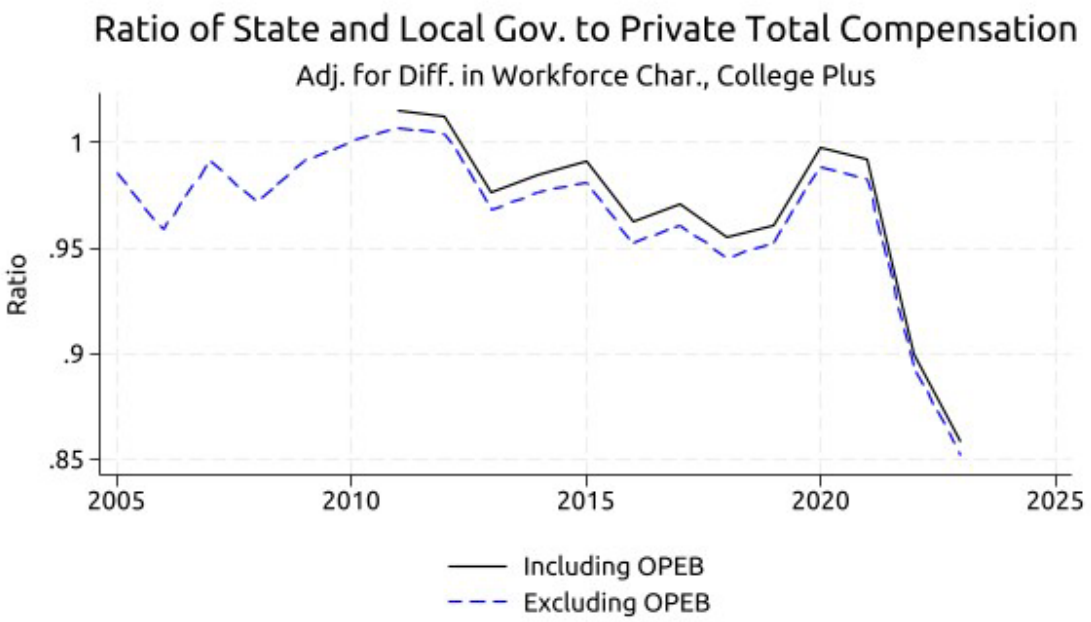
Wages: by education attainment

- Decline in wages since 2010 only for workers with at least some college
- Wage penalty for those with college degree now about 20%



Gap in wages for S&L workers relative to private. Regressions are run separately for each education group and are weighted and control for a quadratic in age, metro status interacted with nine Census divisions, race interacted with gender, marital status, and major occupation.

Total compensation by education



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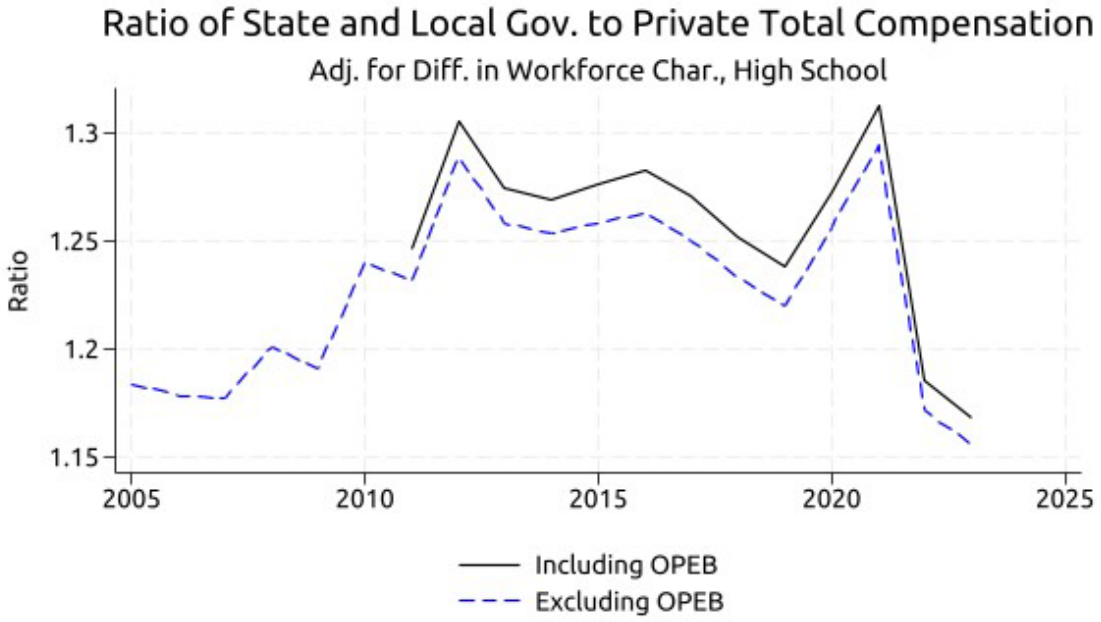
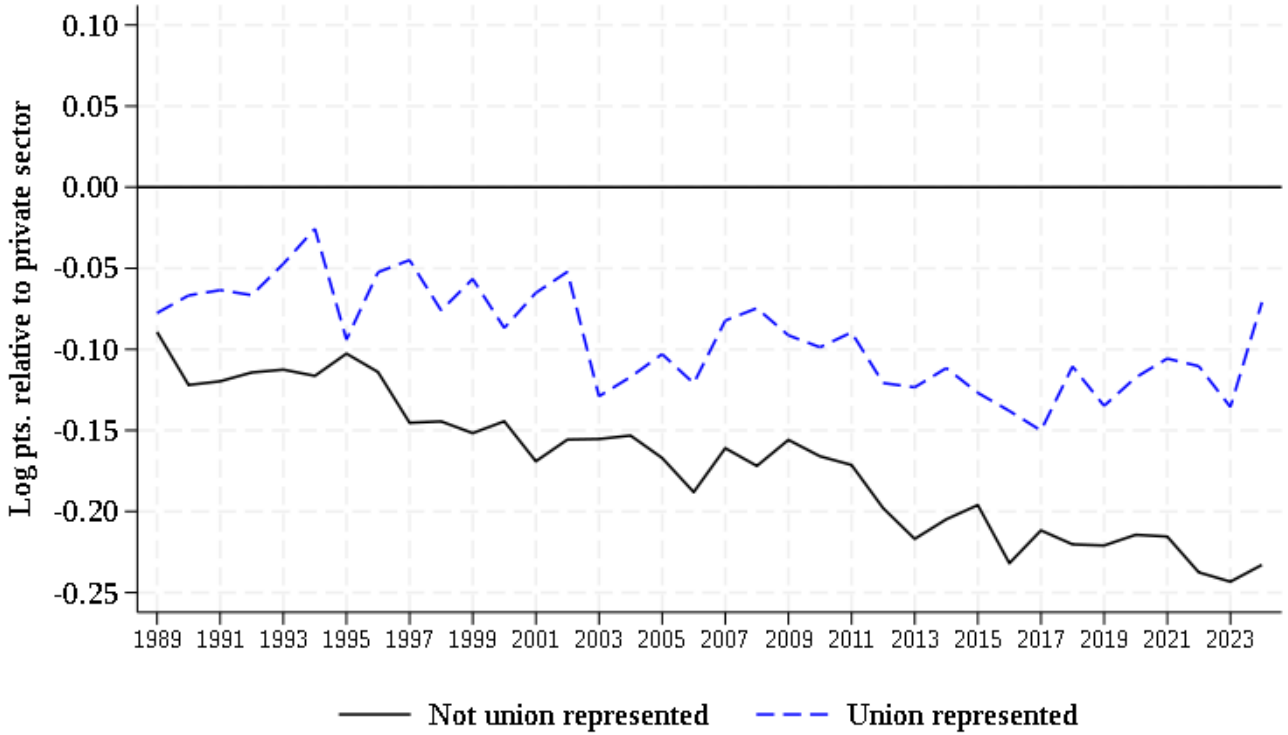


Source: Current Population Survey, Employment Costs for Employee Compensation, National Income and Product Accounts (NIPA), Pew (2023), Public Plans Data, and author's calculations.

S&L workers with college+ education face 15% compensation penalty in 2023, down from 2% premium in 2011

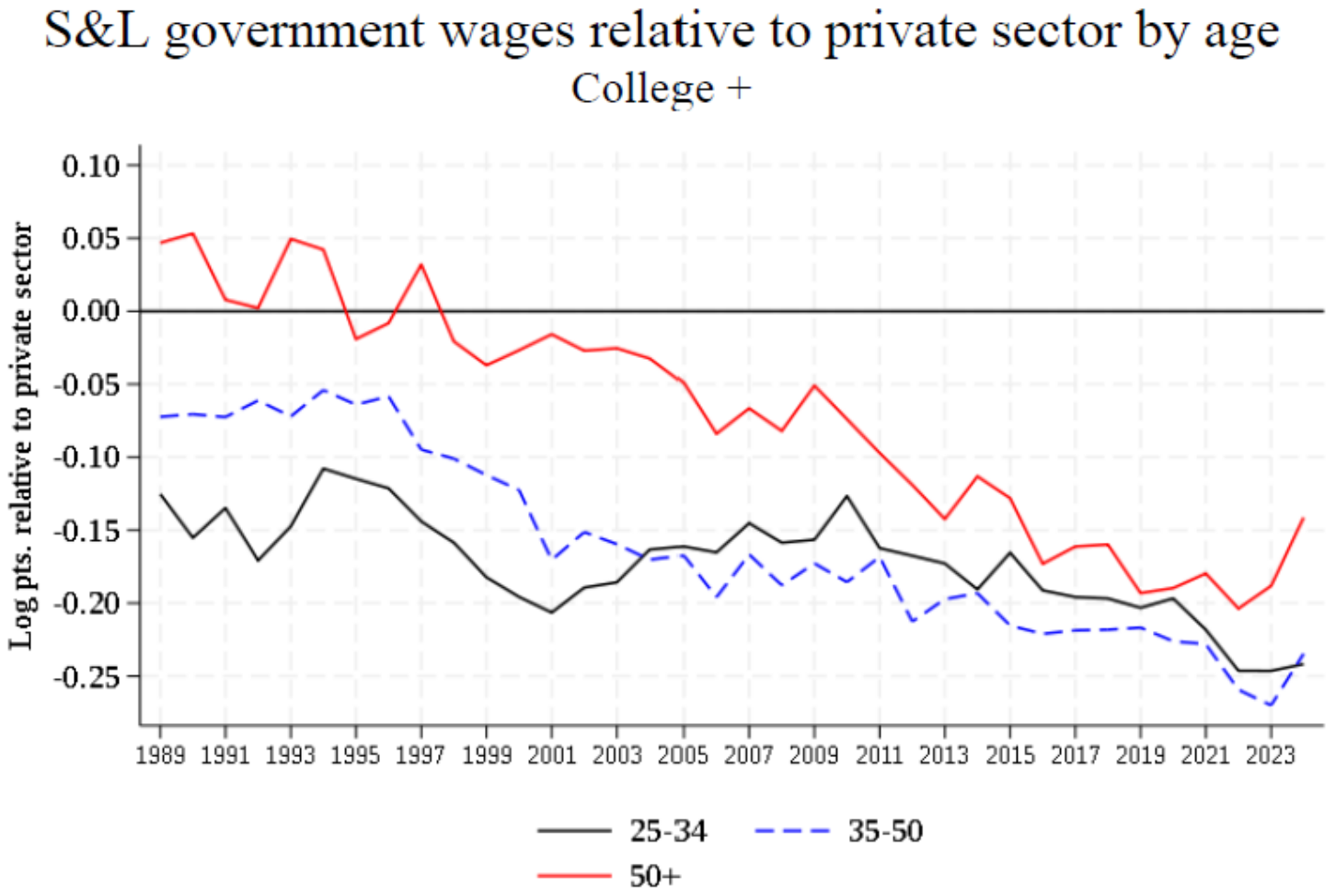
S&L workers with only high school education enjoy 17% bonus, down from 25% in 2011.

College: Relative wage decline only for non-union jobs



Gap in wages for S&L workers relative to private among those with at least a college degree. Regressions are run separately for each age group and are weighted and control for a quadratic in age, metro status interacted with nine Census divisions, race interacted with gender, marital status, and major occupation.

Relative wage decline steepest for older workers

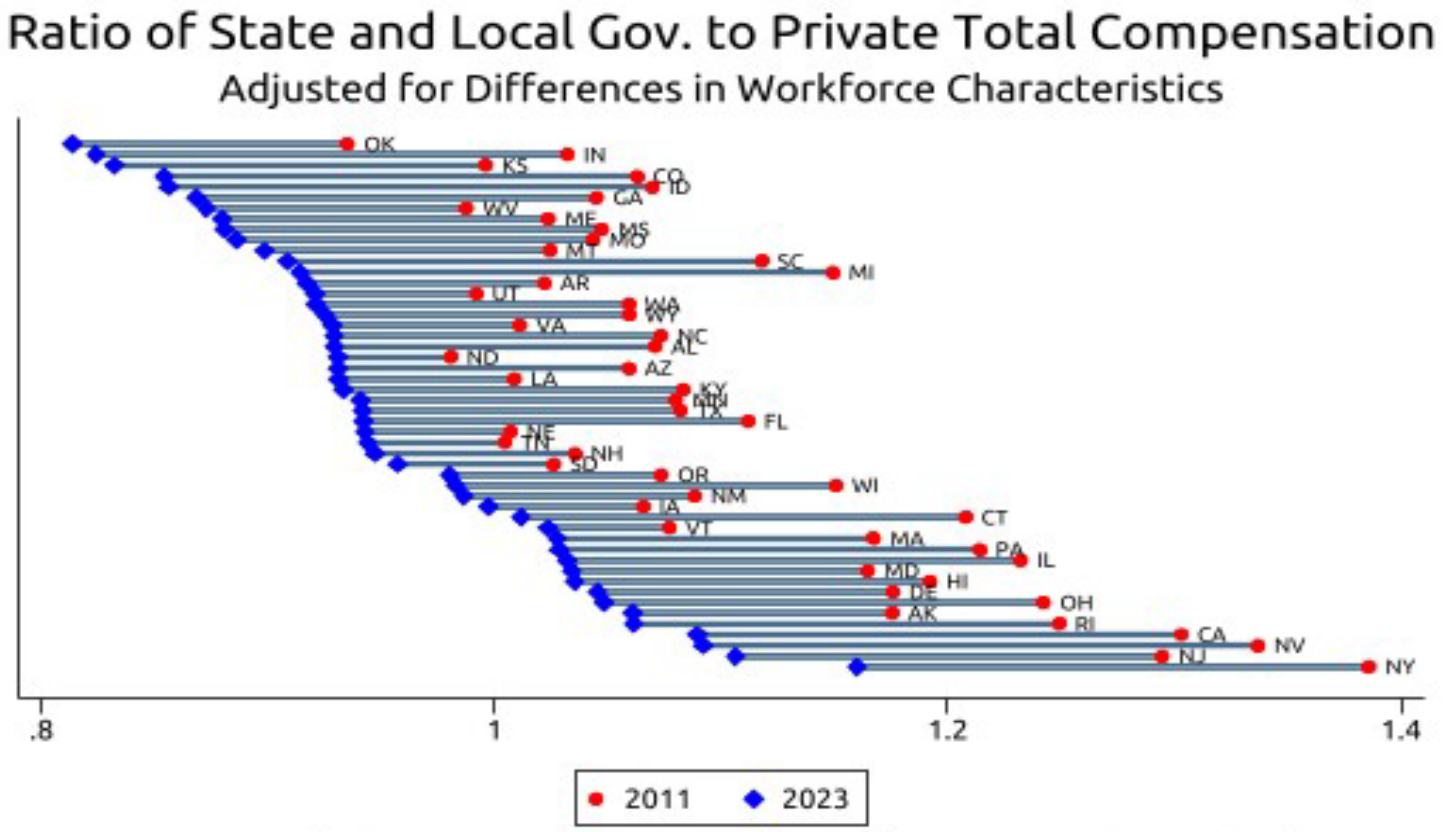


Gap in wages for S&L workers relative to private among those with at least a college degree. Regressions are run separately for each age group and are weighted and control for a linear term in age, metro status interacted with nine Census divisions, race interacted with gender, marital status, and major occupation.

State-Level Analysis

- CPS-based
- Extra limitations relative to national estimates
  - Small state-year sample sizes → smooth relative wage estimates by using 3-year backward moving average
  - Other than pension and retiree health care, benefits as share of wages set to national value
    - No state-level data
    - Other than health insurance, these other benefits tend to vary less across employers than pensions and retiree health care

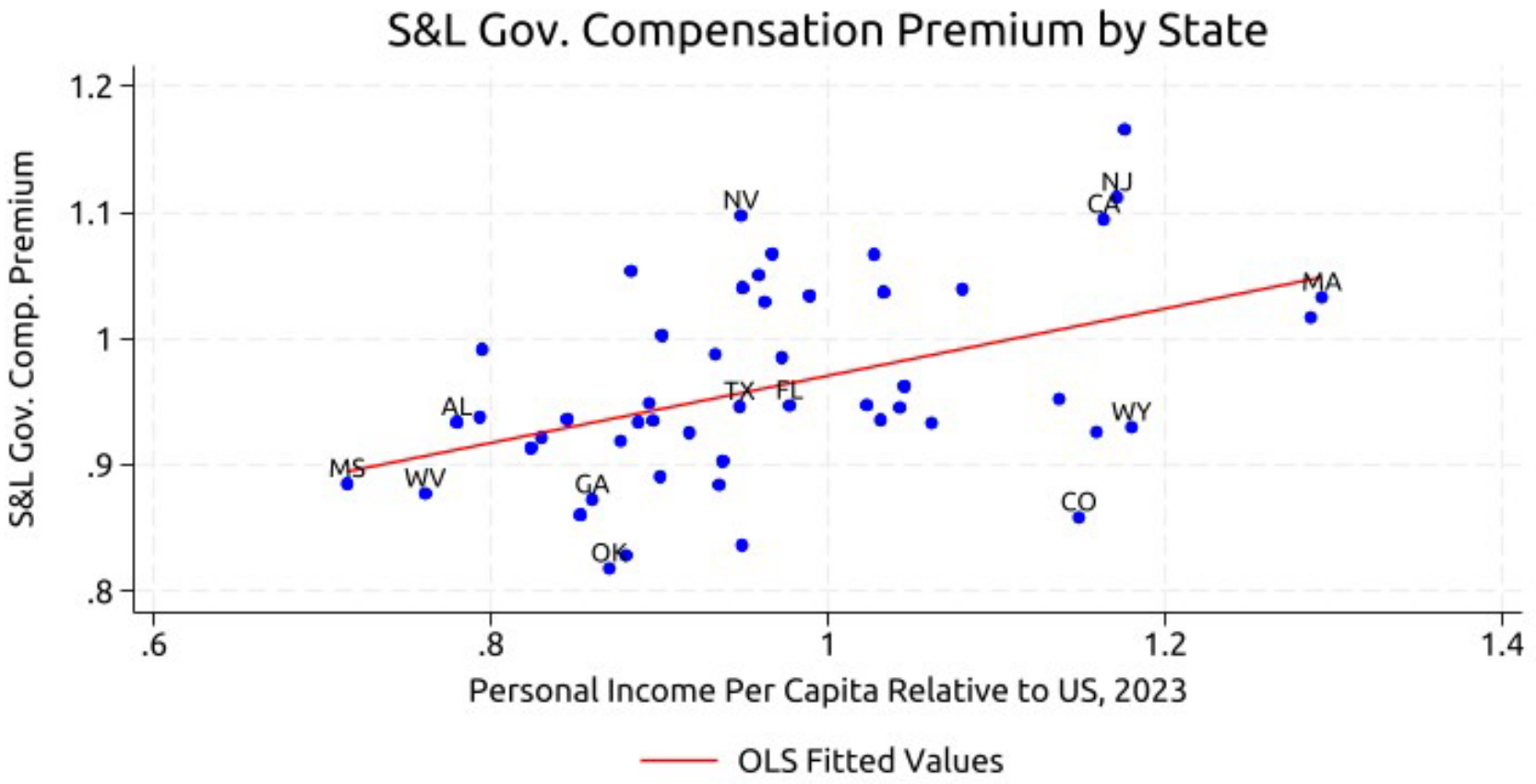
State-Level Analysis



Source: Current Population Survey, Employment Costs for Employee Compensation, National Income and Product Accounts (NIPA), Pew (2023), Public Plans Data, and author's calculations.

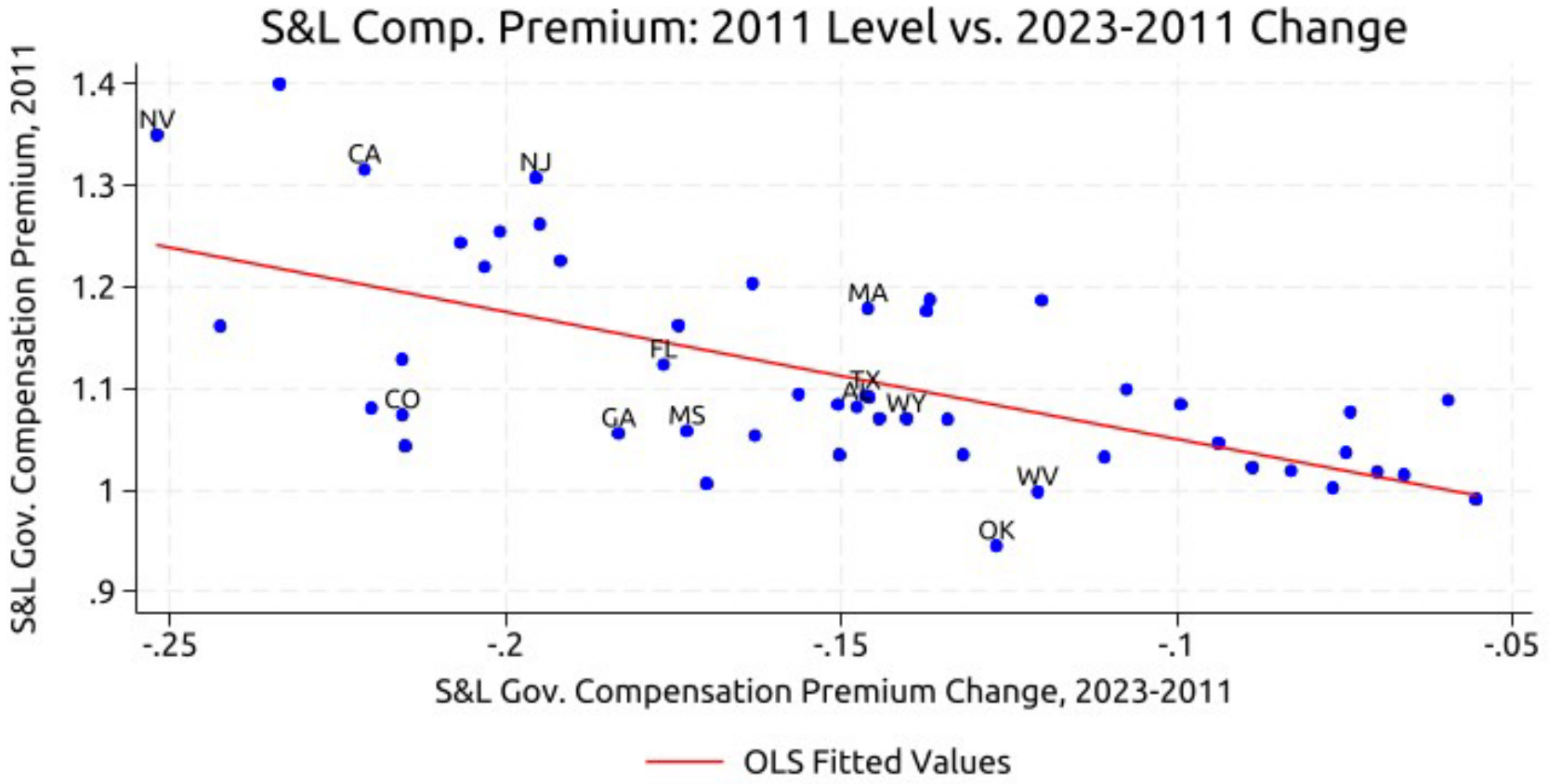
- Significant heterogeneity in public sector compensation premium
- Decline in public sector compensation premium is pervasive
  - Fell in all 50 states

Higher income states have higher public pay premium



Source: Current Population Survey, Employment Costs for Employee Compensation, National Income and Product Accounts (NIPA), Pew (2023), Public Plans Data, and author's calculations.

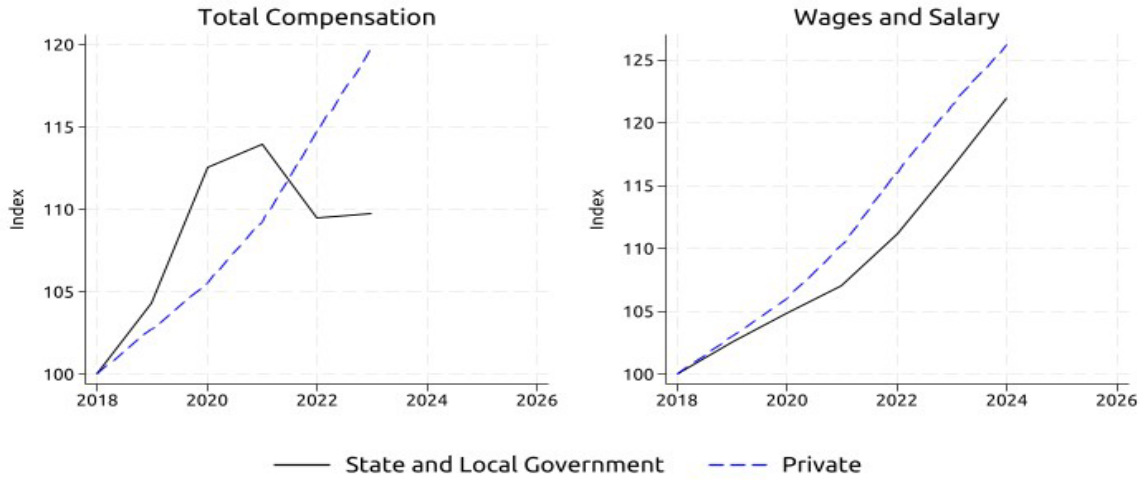
Highest public premium states saw largest decline



Source: Current Population Survey, Employment Costs for Employee Compensation, National Income and Product Accounts (NIPA), Pew (2023), Public Plans Data, and author's calculations.

Has decline in relative compensation hurt recruitment and retention?

- More research needed
- Two pieces of suggestive evidence
- Post pandemic public wages fell behind private
- Private payrolls recovered to pre-pandemic levels much faster than public payrolls (Cashin et al 2023)
  - Despite public budgets being historically strong



Source: Bureau of Labor Statistics' (BLS) Employment Cost Index (ECI) and Bureau of Economic Analysis's (BEA) National Income and Product Accounts (NIPA). Author's calculations.
Note. Annual data averaged from quarterly data and re-indexed to equal 100 in 2018. The left panel utilizes unpublished data provided by the BLS; these data should be interpreted with care because they do not meet the BLS's standard publication criteria.

Has decline in relative compensation hurt recruitment and retention?

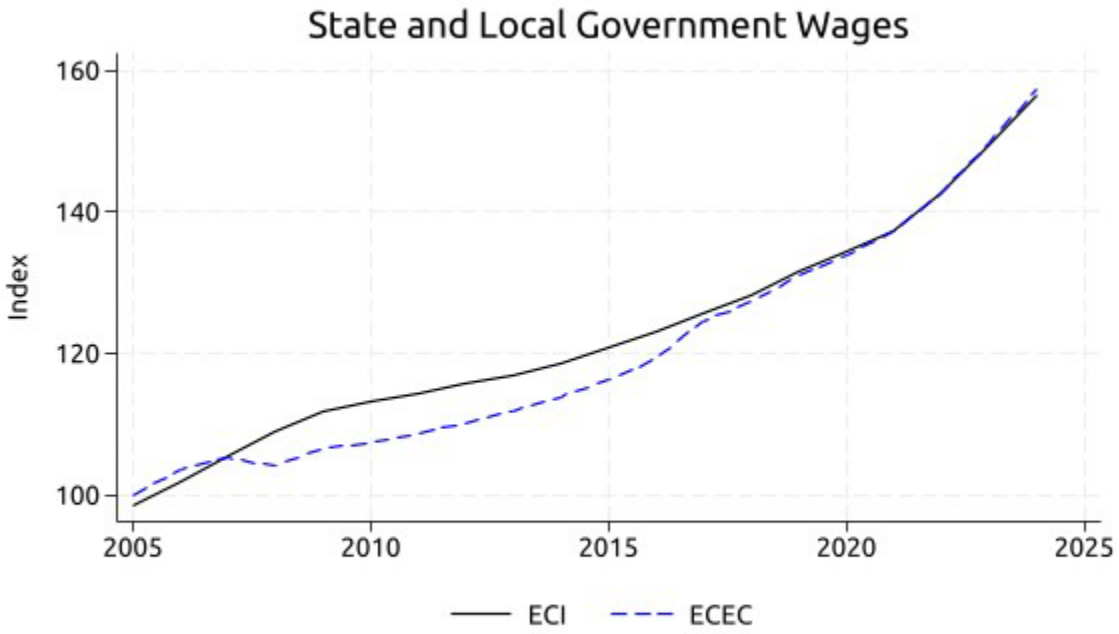
- Labor market for K-12 teachers shows lots of strain
- Surge in teacher strikes (Lyon, Kraft, Steinberg 2024)
- Share of novice teachers has increased (Garcia and Weiss 2019)
- Occupational prestige, # of individuals preparing to enter profession, and on-the-job satisfaction began sustained decline around 2010 (Kraft and Lyon 2024)
  - same period relative public sector compensation was falling

Conclusions

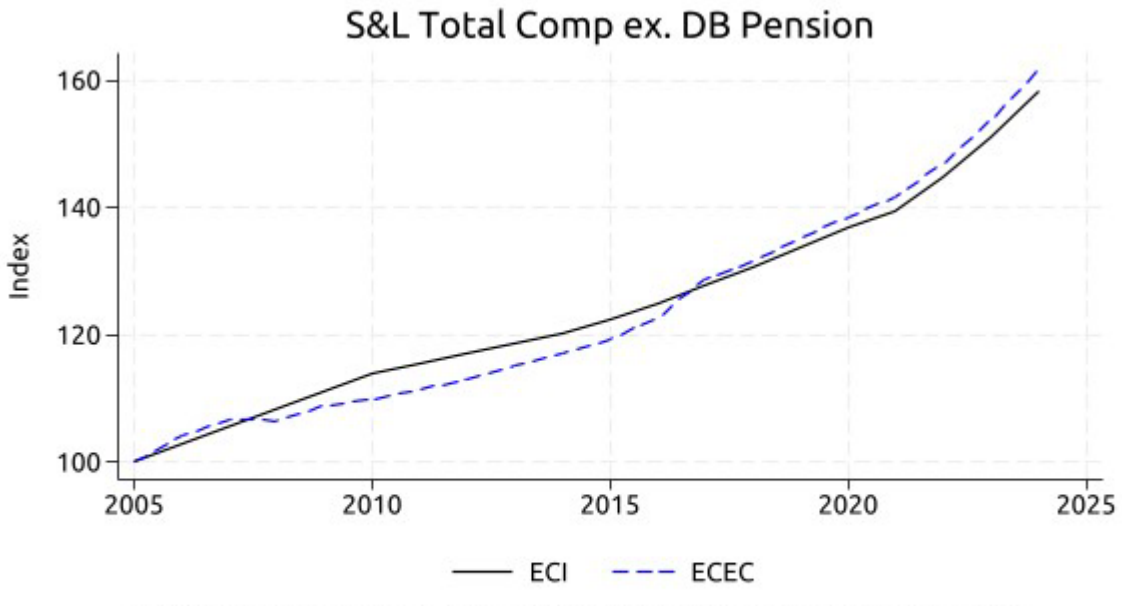
- Significant erosion in S&L compensation relative to private over past 15 years.
  - What was a premium looks to be a small penalty now.
  - For college-educated workers, there is now a very large penalty.
- Non-accrual measurement of pension benefits in the ECI masks this decline.
- Wages are well below the private sector.
  - How much do new hires understand/value benefits like pensions and retiree health?
- More research needed to understand implications of these pay changes for quality of S&L workforce.
  - Lower unobservable quality, reduced rents, or higher non-wage amenities in public sector relative to private?
  - Some evidence that pay decline hurts recruitment—low pay during pandemic made vacancies hard to fill, educational attainment of new teachers has declined, morale among teachers very low.

APPENDIX SLIDES

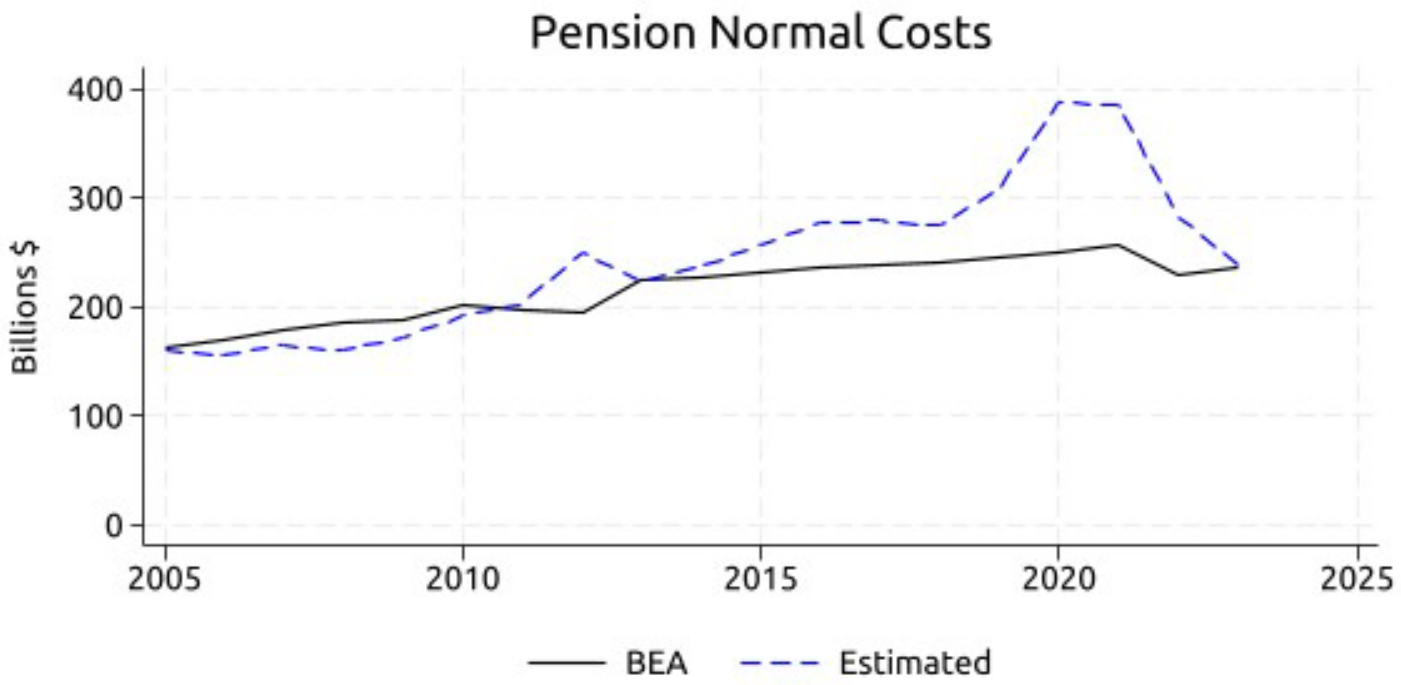
Little evidence of compositional effects



Source: Bureau of Labor Statistics' (BLS) Employment Cost Index (ECI) and Employee Costs for Employee Compensation (ECEC).
Note. Annual data averaged from quarterly data.



Source: Bureau of Labor Statistics' (BLS) Employment Cost Index (ECI) and Employee Costs for Employee Compensation (ECEC).
Note. Annual data averaged from quarterly data. Utilizes unpublished data provided by the BLS; these data are interpolated from 2005 to 2010 and the series should be interpreted with care because they do not meet the BLS's standard publication criteria.



Source: Bureau of Economic Analysis's (BEA) National Income and Product Accounts (NIPA). Public Plans Data. 2001-2023: Center for Retirement Research at Boston College, MissionSquare Research Institute, National Association of State Retirement Administrators, and the Government Finance Officers Association. Author's calculations.
Note. BEA line represents the published normal cost in the NIPA. The Estimated line is our calculation of the aggregate normal cost based on PPD data, market-based assumptions for inflation and real interest rates, and an annual calibration factor.

Challenges to Measuring Relative S&L Pay

Two principal challenges to measuring relative public sector pay

1. S&L workers have very different profile from private sector workers
   - Demographic differences – e.g. public sector has higher average educational attainment
   - Public sector workers receive higher fraction of compensation in form of benefits – 30 percent vs. 15 percent

2. Measuring the value of public sector benefits is methodologically challenging
   - Standard data sources on worker compensation don't measure some benefits or suffer important measurement deficiencies

Retiree health insurance: our methodology (cont.)

- We gather information on changes to this benefit – almost all benefit reductions
  - Increased contributions from employees, tighter eligibility rules, reduced value of subsidy
  - Health care costs have generally come in lower than expected over the past 15 years -> lowers estimated cost of providing benefit

- Limitations

  - We overstate relative public sector compensation difference as we assume no private sector workers receive it

  - Data from 2011 – 2015—used to estimate the growth rate of this benefit—is based on the small subset of retiree health care plans that published accounting information