SHEF Technical Paper B

Adjusting for Interstate Differences in Cost of Living and Enrollment Mix

It is difficult to compare interstate higher education unit costs. The analytical tools available are, at best, blunt instruments for measuring differences. Nevertheless, blunt instruments can be better than no instruments at all. This technical paper briefly describes two approaches for assessing the relative significance of two factors—cost of living and the enrollment mix among institutions.

The cost of living varies greatly across the 50 states. The most significant difference is in median housing values. In the 2016 American Community Survey census, median housing value was $205,500 for the nation, but ranged from $113,900 to $592,000 across different regions and states.[1]

Enrollment mix also poses a challenge for interstate financial comparisons. Each level of higher education, from the lowest undergraduate work through doctoral studies, is progressively more expensive. A state or institution with a large proportion of enrollment in graduate programs will normally have a higher cost per FTE than a state or institution with a larger proportion of enrollment in undergraduate and two-year degree programs.

SHEF Adjustments for Cost of Living and Enrollment Mix

The SHEF report provides separate analytical adjustments for differences among the states in the cost of living (COLI: Cost of Living Index) and the mix in enrollment among categories of institutions (EMI: Enrollment Mix Index).

1. Cost of Living Index

- While a cost of living adjustment does not solve the problem of differing intrastate costs of living, it offers a way to get a rough estimate of these differences for adjusting interstate unit cost data.
- In 2016, the SHEF report adopted a new Cost of Living Index (COLI).[2] The new index is applied to all prior-year data in the FY 2016 SHEF report. This index is based on county-level data collected by the Council for Community and Economic Research. A state index is calculated based on the weighted average of all the counties in each state. COLI is referenced in the Census Bureau's Statistical Abstract of the U.S., and has also been used by the U.S. Bureau of Labor Statistics and the President's Council of Economic Advisors, among others. The data is updated yearly, includes Alaska and Hawaii, and has publicly available methods.[3]
- Prior to FY 2016, the adjustment for interstate cost of living differences was drawn from the Berry index (a study by Berry et al. that provides a single index for each state).[4] The primary reason to adopt a new index was the age of the Berry index; many states have seen significant change in cost of living since 2003. Additionally, the Berry index did not provide an estimate of cost of living in Alaska and Hawaii, two states with unique characteristics. In the past, Alaska was assigned the highest value of the 48 contiguous states and Hawaii was assigned a value 30 percent higher than the average in the 48 contiguous United States.

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[1] U.S. Census Bureau, 2016 American Community Survey, Geographic Comparison Tables. Table name: MEDIAN HOUSING VALUE OF OWNER-OCCUPIED HOUSING UNITS (DOLLARS) United States, https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

[2] The 2017 State Level Index is available at http://coli.org/products.

[3] Council for Community and Economic Research. (2016). *Cost of Living Index Manual.* Arlington, VA. (Available at http://coli.org/wp-content/uploads/2016/06/2016-COLI-Manual.pdf)

[4] Berry, W.D., R.C. Fording, and R.L. Hanson. *Cost of Living Index for the American States*, 1960-2003. (Available at ICPSR Publication-Related Archive, study # 1275 http://www.icpsr.umich.edu/icpsrweb/DSDR/studies/1275)

Table 1 highlights the differences between the old measure (COLA) and the new measure (COLI).

TABLE 1

	COLA 2003	COLI 2017
HAWAII (HIGHEST)	1.354	1.349
MISSISSIPPI (LOWEST)	0.883	0.825

2. Enrollment Mix Index

- SHEEO developed an adjustment for interstate enrollment mix differences based on the proportion of enrollment in each state compared to the national proportions of enrollment by Carnegie Classification for FY 2015 (the most recent finance data available at the time of data collection and analysis). The essential steps are as follows:
- Integrated Postsecondary Education Data System (IPEDS) data were used to develop a national average cost per fall FTE for each of the Carnegie Classifications of institutions. This calculation used financial information from FY 2015 and fall 2014 FTE data.
- The proportion of each state's FTE in each of the Carnegie Classifications was calculated for fall 2014, and then multiplied by the national average cost per FTE in FY 2015 for each respective Classification. For each state, the products for each Classification were summed, which yielded the state's enrollment mix unit cost for the year.
- If the state has relatively more enrollment in higher-cost Carnegie Classifications (e.g., research universities), the enrollment mix unit cost will surpass the aggregated national unit cost. If the state has relatively more enrollment in lower-cost Carnegie Classifications (e.g., community colleges), the enrollment mix unit cost will be less than the aggregated national unit cost.
- The ratio of enrollment mix unit cost to aggregated national unit cost constitutes each state's enrollment mix "index." For example, the enrollment mix index for California in FY 2015 equals 0.93 because California has a large community college system. This calculation illustrates that if unit costs in each sector are at the national average, the statewide cost per FTE will be lower than the aggregated national unit cost by 7 percent.

Each SHEF adjustment is expressed in index values where the national average equals 1.00. Hence, actual expenditures per FTE are divided by the SHEF adjustment in order to obtain the adjusted value. For example, presume that State X has an actual expenditure per FTE of $8,000. If the **cost of living index** for State X equals 1.05, its expenditure per FTE, adjusted for differences in the cost of living, will be $7,619 ($8,000/1.05). If State X has an **enrollment mix index** of 0.98, its expenditure per FTE, adjusted for differences in enrollment mix, will be $8,163 ($8,000/.98). When both adjustments are made, State X will have an adjusted expenditure per FTE of $7,775 ($8,000/1.05/.98).

Table 2 shows the EMI, COLI, and combined EMI and COLI measures for each state. SHEEO welcomes comments on the utility and limitations of these analytical tools and any suggestions for improvement.

TABLE 2

ENROLLMENT MIX INDEX AND COST OF LIVING ADJUSTMENTS BY STATE, FY 2017

	EMI[1]	COLI[2]	EMI & COLI COMBINED
ALABAMA	0.971	0.876	0.851
ALASKA	0.977	1.232	1.204
ARIZONA	1.050	0.996	1.046
ARKANSAS	0.996	0.861	0.857
CALIFORNIA	0.930	1.292	1.202
COLORADO	1.049	0.999	1.048
CONNECTICUT	1.015	1.250	1.269
DELAWARE	1.297	1.000	1.296
FLORIDA	1.043	0.963	1.004
GEORGIA	1.043	0.906	0.945
HAWAII	1.053	1.349	1.422
IDAHO	0.969	0.870	0.843
ILLINOIS	0.952	1.012	0.963
INDIANA	1.072	0.872	0.936
IOWA	1.083	0.896	0.970
KANSAS	1.052	0.909	0.957
KENTUCKY	1.020	0.850	0.868
LOUISIANA	1.003	0.907	0.910
MAINE	0.919	1.114	1.023
MARYLAND	0.971	1.157	1.124
MASSACHUSETTS	0.974	1.241	1.209
MICHIGAN	1.047	0.874	0.915
MINNESOTA	0.983	0.960	0.943
MISSISSIPPI	0.971	0.825	0.801
MISSOURI	0.982	0.887	0.871
MONTANA	0.992	0.936	0.929
NEBRASKA	1.051	0.900	0.946
NEVADA	0.934	1.006	0.940
NEW HAMPSHIRE	0.944	1.160	1.095
NEW JERSEY	0.968	1.147	1.110
NEW MEXICO	1.000	0.956	0.956
NEW YORK	0.934	1.318	1.231
NORTH CAROLINA	0.970	0.908	0.881
NORTH DAKOTA	0.980	0.959	0.940
OHIO	1.032	0.894	0.923
OKLAHOMA	0.988	0.871	0.860
OREGON	1.039	1.052	1.093
PENNSYLVANIA	1.062	1.012	1.075
RHODE ISLAND	0.942	1.156	1.089
SOUTH CAROLINA	1.029	0.936	0.963
SOUTH DAKOTA	0.977	0.959	0.938
TENNESSEE	1.005	0.872	0.877
TEXAS	1.019	0.920	0.938
UTAH	1.043	0.935	0.975
VERMONT	0.986	1.135	1.119
VIRGINIA	1.061	0.988	1.048
WASHINGTON	0.979	1.068	1.045
WEST VIRGINIA	1.098	0.904	0.993
WISCONSIN	1.028	0.941	0.967
WYOMING	0.898	0.967	0.868
U.S.	**1.000**	**1.000**	**1.000**

SOURCES: *Fall 2014 FTE data and FY 2015 financial data from IPEDS are used to produce Enrollment Mix. COLI from the Council for Community and Economic Research (C2ER)'s 2017 State Level Cost of Living Index.*