

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 2005 American Community Survey census, the median housing value was \$167,500 for the nation, but ranged from \$84,400 to \$477,000 across different regions and states.

Enrollment mix also poses a challenge for interstate financial comparison. 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 costs of living within a state, it offers a way to get a rough estimate of these differences between states.
- ◆ In 2016, the SHEF report adopted a new Cost of Living Index (COLI)¹. 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 United States*, 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 publically available methods².
- ◆ 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).³ 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 States⁴.

¹ The 2016 State Level Index is available at <http://coli.org/products>.

² Council for Community and Economic Research. (2015). *Cost of Living Index Manual*. Arlington, VA. (Available at <http://coli.org/wp-content/uploads/2016/06/2016-COLI-Manual.pdf>)

³ 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>)

⁴ An examination of city-based cost of living adjustment factors resulted in assigning Hawaii a cost of living adjustment factor of 1.35. This is comparable to Boston's ACCRA cost of living adjustment, but lower than Honolulu's adjustment of 1.64. Honolulu's adjustment factor would not be appropriate because, while most of Hawaii's higher education is concentrated there, it is a disproportionately high cost area.

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

TABLE 1

	COLA 2003	COLI 2016
HAWAII (HIGHEST)	1.354	1.579
MISSISSIPPI (LOWEST)	0.883	0.909
RANGE	0.471	0.670
VARIANCE	1.04%	2.23%

2. Enrollment Mix Index

- ◆ SHEEO has developed an adjustment for interstate enrollment mix differences based on the proportion of enrollment in each state compared with the national proportions of enrollment by Carnegie Classification for FY 2013 (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 2013 and fall 2012 FTE data.
 - ◆ The proportion of each state's FTE in each of the Carnegie Classifications was calculated for fall 2012, and then multiplied by the national average cost per FTE in FY 2013 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 2013 equals 0.94 because California has a large community college system. This illustrates that if unit costs in each sector were at the national average, the statewide cost per FTE would be lower than the aggregated national unit cost.

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, would 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, would be \$8,163 ($\$8,000 / .98$). When both adjustments are made, State X would 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. Table 3 compares the previously used cost of living adjustment (COLA) to the new index (COLI) used for the first time in 2016. 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

	EMI ¹	COLI ²	EMI & COLI COMBINED
ALABAMA	1.022	0.957	0.978
ALASKA	1.017	1.356	1.380
ARIZONA	1.051	1.082	1.138
ARKANSAS	1.015	0.951	0.965
CALIFORNIA	0.940	1.399	1.314
COLORADO	1.070	1.094	1.171
CONNECTICUT	1.019	1.361	1.387
DELAWARE	1.227	1.083	1.328
FLORIDA	1.024	1.058	1.084
GEORGIA	1.056	1.004	1.060
HAWAII	1.065	1.579	1.682
IDAHO	0.965	0.970	0.936
ILLINOIS	0.961	1.121	1.078
INDIANA	1.086	0.973	1.057
IOWA	1.084	0.990	1.072
KANSAS	1.009	1.003	1.012
KENTUCKY	1.037	0.939	0.974
LOUISIANA	1.028	0.996	1.023
MAINE	0.947	1.225	1.160
MARYLAND	0.984	1.207	1.188
MASSACHUSETTS	0.987	1.333	1.315
MICHIGAN	1.056	0.985	1.040
MINNESOTA	1.000	1.054	1.054
MISSISSIPPI	0.968	0.909	0.880
MISSOURI	1.000	0.988	0.987
MONTANA	1.137	1.041	1.184
NEBRASKA	1.060	1.002	1.062
NEVADA	0.952	1.098	1.045
NEW HAMPSHIRE	0.973	1.265	1.231
NEW JERSEY	0.973	1.257	1.223
NEW MEXICO	1.009	1.049	1.059
NEW YORK	0.958	1.488	1.426
NORTH CAROLINA	0.981	1.012	0.993
NORTH DAKOTA	1.122	1.052	1.181
OHIO	1.038	0.980	1.017
OKLAHOMA	1.008	0.965	0.973
OREGON	1.043	1.143	1.192
PENNSYLVANIA	1.048	1.129	1.183
RHODE ISLAND	0.964	1.279	1.233
SOUTH CAROLINA	0.999	1.016	1.015
SOUTH DAKOTA	1.004	1.019	1.023
TENNESSEE	1.014	0.959	0.973
TEXAS	0.980	1.020	1.000
UTAH	1.070	1.026	1.098
VERMONT	1.014	1.245	1.262
VIRGINIA	1.043	1.078	1.124
WASHINGTON	0.990	1.148	1.136
WEST VIRGINIA	0.985	0.994	0.979
WISCONSIN	1.010	1.031	1.041
WYOMING	0.905	1.076	0.974
U.S.	1.000	1.000	1.000

SOURCES:

1. EMI is produced by SHEEO using fall 2012 FTE data and FY 2013 financial data from IPEDS.
2. COLI comes from the Council for Community and Economic Research (C2ER) 2016 State Level Cost of Living Index.

TABLE 3
COMPARISON OF COST OF LIVING ADJUSTMENT (COLA 2003) AND COST OF LIVING INDEX (COLI 2016)

	COLA 2003	COLI 2016	% DIFFERENCE
ALABAMA	0.902	0.957	6%
ALASKA	1.218	1.356	11%
ARIZONA	0.965	1.082	12%
ARKANSAS	0.887	0.951	7%
CALIFORNIA	1.090	1.399	28%
COLORADO	1.048	1.094	4%
CONNECTICUT	1.202	1.361	13%
DELAWARE	0.993	1.083	9%
FLORIDA	0.921	1.058	15%
GEORGIA	0.935	1.004	7%
HAWAII	1.354	1.579	17%
IDAHO	0.957	0.970	1%
ILLINOIS	1.051	1.121	7%
INDIANA	1.001	0.973	-3%
IOWA	0.995	0.990	-1%
KANSAS	0.999	1.003	0%
KENTUCKY	0.905	0.939	4%
LOUISIANA	0.901	0.996	10%
MAINE	1.091	1.225	12%
MARYLAND	0.999	1.207	21%
MASSACHUSETTS	1.218	1.333	9%
MICHIGAN	1.027	0.985	-4%
MINNESOTA	1.051	1.054	0%
MISSISSIPPI	0.883	0.909	3%
MISSOURI	0.997	0.988	-1%
MONTANA	0.951	1.041	9%
NEBRASKA	1.011	1.002	-1%
NEVADA	1.014	1.098	8%
NEW HAMPSHIRE	1.152	1.265	10%
NEW JERSEY	1.194	1.257	5%
NEW MEXICO	0.955	1.049	10%
NEW YORK	1.146	1.488	30%
NORTH CAROLINA	0.929	1.012	9%
NORTH DAKOTA	1.002	1.052	5%
OHIO	1.009	0.980	-3%
OKLAHOMA	0.886	0.965	9%
OREGON	1.020	1.143	12%
PENNSYLVANIA	1.068	1.129	6%
RHODE ISLAND	1.149	1.279	11%
SOUTH CAROLINA	0.915	1.016	11%
SOUTH DAKOTA	1.007	1.019	1%
TENNESSEE	0.913	0.959	5%
TEXAS	0.886	1.020	15%
UTAH	1.008	1.026	2%
VERMONT	1.122	1.245	11%
VIRGINIA	0.963	1.078	12%
WASHINGTON	1.045	1.148	10%
WEST VIRGINIA	0.892	0.994	11%
WISCONSIN	1.031	1.031	0%
WYOMING	0.966	1.076	11%
U.S.	1.000	1.000	0%

SOURCES: COLA is from Berry 2003, *Cost of Living Index for the American States*, and COLI is from the Council for Community and Economic Research (C2ER) 2016 State Level Cost of Living Index.