

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, 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 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 (COLA: Cost of Living Adjustment) and the mix in enrollment among categories of institutions (EMI: Enrollment Mix Index). The adjustment for interstate cost of living differences is drawn from the Berry index (a study by Berry et al. that provides a single index for each state).¹ While this index 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. The range of values extends from 0.88 to 1.22 among the 48 contiguous states in 2003, the most recent year available for these data.

The Berry index does not provide an estimate of cost of living in Alaska and Hawaii, two states with unique characteristics. Alaska is estimated to have a cost of living consistent with the highest cost of living in the contiguous 48 United States. As a result, in the SHEF analysis, the value of 1.22 (the highest value of the 48 contiguous states) is assigned to Alaska. The cost of living in Hawaii is about 30 percent higher than the average in the 48 contiguous United States².

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:

¹ 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>)

² 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.

1. 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.
2. 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 yields 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.
3. 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 calculation 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 by 5.5 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, 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 1 shows the EMI, COLA, and combined EMI and COLA measures for each state. *Table 2* summarizes results for the SHEF adjustments for interstate cost of living and enrollment mix differences among the states. SHEEO welcomes comments on the utility and limitations of these analytical tools and any suggestions for improvement.

TABLE 1

Enrollment Mix Index and Cost of Living Adjustments by State

State	EMI ¹	COLA ²	EMI & COLA Combined
Alabama	1.022	0.902	0.921
Alaska	1.017	1.218	1.239
Arizona	1.051	0.965	1.014
Arkansas	1.015	0.887	0.900
California	0.940	1.090	1.024
Colorado	1.070	1.048	1.121
Connecticut	1.019	1.202	1.225
Delaware	1.227	0.993	1.218
Florida	1.024	0.921	0.943
Georgia	1.056	0.935	0.987
Hawaii	1.065	1.354	1.442
Idaho	0.965	0.957	0.923
Illinois	0.961	1.051	1.010
Indiana	1.086	1.001	1.088
Iowa	1.084	0.995	1.078
Kansas	1.009	0.999	1.007
Kentucky	1.037	0.905	0.939
Louisiana	1.028	0.901	0.926
Maine	0.947	1.091	1.033
Maryland	0.984	0.999	0.983
Massachusetts	0.987	1.218	1.202
Michigan	1.056	1.027	1.085
Minnesota	1.000	1.051	1.051
Mississippi	0.968	0.883	0.855
Missouri	1.000	0.997	0.997
Montana	1.137	0.951	1.082
Nebraska	1.060	1.011	1.072
Nevada	0.952	1.014	0.965
New Hampshire	0.973	1.152	1.121
New Jersey	0.973	1.194	1.161
New Mexico	1.009	0.955	0.964
New York	0.958	1.146	1.098
North Carolina	0.981	0.929	0.912
North Dakota	1.122	1.002	1.124
Ohio	1.038	1.009	1.048
Oklahoma	1.008	0.886	0.894
Oregon	1.043	1.020	1.064
Pennsylvania	1.048	1.068	1.119
Rhode Island	0.964	1.149	1.107
South Carolina	0.999	0.915	0.914
South Dakota	1.004	1.007	1.011
Tennessee	1.014	0.913	0.926
Texas	0.980	0.886	0.868
Utah	1.070	1.008	1.078
Vermont	1.014	1.122	1.137
Virginia	1.043	0.963	1.004
Washington	0.990	1.045	1.034
West Virginia	0.985	0.892	0.879
Wisconsin	1.010	1.031	1.041
Wyoming	0.905	0.966	0.875
U.S.	1.000	1.000	1.000

NOTES:

- 1) Fall 2012 FTE data and FY 2013 financial data from IPEDS are used to produce Enrollment Mix.
- 2) As of 2003, obtained from Berry, 2003.

TABLE 2

IMPACT OF ENROLLMENT MIX AND COST OF LIVING ADJUSTMENTS BY STATE, FY 2015

State	Total Educational Revenue (Unadjusted)		Adjusted for Enrollment Mix (EMI)		Adjusted for Cost of Living (COLA)		Adjusted for EMI and COLA	
	Dollars per FTE	% of U.S. Average	Dollars per FTE	% of U.S. Average	Dollars per FTE	% of U.S. Average	Dollars per FTE	% of U.S. Average
Alabama	\$14,011	109%	\$13,715	106%	\$15,537	120%	\$15,208	118%
Alaska	\$23,907	185%	\$23,499	182%	\$19,628	152%	\$19,293	149%
Arizona	\$12,511	97%	\$11,903	92%	\$12,972	100%	\$12,341	96%
Arkansas	\$10,762	83%	\$10,606	82%	\$12,132	94%	\$11,955	93%
California	\$11,132	86%	\$11,847	92%	\$10,214	79%	\$10,870	84%
Colorado	\$13,017	101%	\$12,164	94%	\$12,426	96%	\$11,611	90%
Connecticut	\$19,805	153%	\$19,431	151%	\$16,478	128%	\$16,167	125%
Delaware	\$22,580	175%	\$18,407	143%	\$22,734	176%	\$18,533	144%
Florida	\$8,922	69%	\$8,713	68%	\$9,686	75%	\$9,460	73%
Georgia	\$11,690	91%	\$11,072	86%	\$12,507	97%	\$11,846	92%
Hawaii	\$18,146	141%	\$17,033	132%	\$13,402	104%	\$12,580	97%
Idaho	\$10,945	85%	\$11,337	88%	\$11,442	89%	\$11,852	92%
Illinois	\$16,571	128%	\$17,245	134%	\$15,773	122%	\$16,415	127%
Indiana	\$12,875	100%	\$11,854	92%	\$12,857	100%	\$11,838	92%
Iowa	\$14,857	115%	\$13,709	106%	\$14,936	116%	\$13,782	107%
Kansas	\$12,099	94%	\$11,994	93%	\$12,116	94%	\$12,011	93%
Kentucky	\$12,783	99%	\$12,323	95%	\$14,128	109%	\$13,620	106%
Louisiana	\$9,674	75%	\$9,413	73%	\$10,735	83%	\$10,445	81%
Maine	\$15,774	122%	\$16,660	129%	\$14,462	112%	\$15,275	118%
Maryland	\$15,569	121%	\$15,821	123%	\$15,591	121%	\$15,843	123%
Massachusetts	\$14,133	109%	\$14,319	111%	\$11,603	90%	\$11,756	91%
Michigan	\$17,914	139%	\$16,961	131%	\$17,438	135%	\$16,511	128%
Minnesota	\$14,126	109%	\$14,123	109%	\$13,438	104%	\$13,435	104%
Mississippi	\$11,354	88%	\$11,728	91%	\$12,863	100%	\$13,287	103%
Missouri	\$11,961	93%	\$11,965	93%	\$11,993	93%	\$11,998	93%
Montana	\$11,666	90%	\$10,256	79%	\$12,265	95%	\$10,783	84%
Nebraska	\$14,550	113%	\$13,728	106%	\$14,387	111%	\$13,574	105%
Nevada	\$10,457	81%	\$10,985	85%	\$10,310	80%	\$10,831	84%
New Hampshire	\$13,937	108%	\$14,323	111%	\$12,099	94%	\$12,434	96%
New Jersey	\$16,779	130%	\$17,242	134%	\$14,059	109%	\$14,447	112%
New Mexico	\$12,070	94%	\$11,958	93%	\$12,642	98%	\$12,525	97%
New York	\$15,272	118%	\$15,936	123%	\$13,324	103%	\$13,903	108%
North Carolina	\$12,287	95%	\$12,519	97%	\$13,228	102%	\$13,477	104%
North Dakota	\$16,252	126%	\$14,483	112%	\$16,220	126%	\$14,454	112%
Ohio	\$13,472	104%	\$12,973	101%	\$13,351	103%	\$12,857	100%
Oklahoma	\$11,996	93%	\$11,900	92%	\$13,534	105%	\$13,425	104%
Oregon	\$13,285	103%	\$12,735	99%	\$13,019	101%	\$12,481	97%
Pennsylvania	\$14,982	116%	\$14,303	111%	\$14,031	109%	\$13,394	104%
Rhode Island	\$13,945	108%	\$14,473	112%	\$12,137	94%	\$12,596	98%
South Carolina	\$11,205	87%	\$11,216	87%	\$12,244	95%	\$12,256	95%
South Dakota	\$12,638	98%	\$12,586	98%	\$12,553	97%	\$12,501	97%
Tennessee	\$12,242	95%	\$12,074	94%	\$13,402	104%	\$13,219	102%
Texas	\$11,360	88%	\$11,595	90%	\$12,823	99%	\$13,089	101%
Utah	\$11,953	93%	\$11,166	87%	\$11,864	92%	\$11,083	86%
Vermont	\$18,071	140%	\$17,827	138%	\$16,111	125%	\$15,893	123%
Virginia	\$12,888	100%	\$12,358	96%	\$13,390	104%	\$12,839	99%
Washington	\$11,655	90%	\$11,777	91%	\$11,151	86%	\$11,267	87%
West Virginia	\$10,689	83%	\$10,847	84%	\$11,983	93%	\$12,160	94%
Wisconsin	\$11,964	93%	\$11,842	92%	\$11,608	90%	\$11,489	89%
Wyoming	\$17,755	138%	\$19,612	152%	\$18,372	142%	\$20,294	157%
U.S.	\$12,907	100%	\$12,907	100%	\$12,907	100%	\$12,907	100%

SOURCE: State Higher Education Executive Officers