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ABSTRACT

This study examined faculty salaries at 50 higher education institutions using methods to adjust salaries for geographic differences, cost of living, and tax burdens so that comparisons were based on real rather than nominal value of salaries. The study sample consisted of one public doctorate granting institution from each state and used salary data from the 1991-92 annual survey by the American Association of University Professors. The analysis was limited to the salaries of full professors, since individuals at the senior level were assumed to be full participants in the local economy. The study used the American Chamber of Commerce Researchers Association (ACCRA) index for cost of living and an individual tax model created for the study to estimate tax adjustments. The main finding of the study was that rankings of faculty salaries among institutions differ substantially when adjustments are made for both cost of living and taxation differences. Rankings were more affected by cost of living differences than taxation though taxation was also an important factor for institutions in states with either very high or very low rates of taxation. The findings suggested that achieving equilibrium with the local economic environment may be at least as important as achieving parity with peer institutions in other locales. (Contains 15 references.) (JB)

Cost of Living and Taxation Adjustments in Salary Comparisons

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Jean Endo
Chair and Editor
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ABSTRACT

Many higher education institutions are facing the challenge of improving competitiveness in faculty salaries. Institutional research officers in turn are challenged to fairly measure the real value of the dollars received by faculty. This paper reports on a study of 50 institutions using methods to adjust salaries for (1) geographic differences in cost of living, and (2) tax burdens, so that comparisons were made based on the real rather than nominal value of salaries. The main finding of the study was that rankings of faculty salaries among institutions differ substantially when adjustments are made for both cost of living and taxation differences. Rankings were more affected by cost of living differences, but taxation was also important for institutions in states with either very high or very low rates of taxation. The main recommendations of this study are (1) to use both cost of living and taxation measures in comparing salaries in different geographic areas; (2) to use the ACCRA breadbasket survey for measurement of cost of living ; (3) to either use a tax model based on fairly extensive research or one of two "off-the-shelf" alternatives (taxes per thousand dollars of income or tax percent of income) to measure taxation differences among locales; (4) to encourage further research to identify more reliable and accessible taxation measures; and (5) to consider how well salaries are in balance with the economics of their local environments in addition to how well salaries compare to peer institutions in evaluating the adequacy of salaries in different areas.

Cost of Living and Taxation Adjustments in Salary Comparisons

Many higher education institutions are facing the twin challenge of attracting and retaining faculty. As a result, they are experiencing pressure to improve competitiveness in faculty salaries. This pressure is caused by a number of factors, including retirements and anticipated shortages of faculty, unionization of faculties, the need to demonstrate wise use of scarce resources, and the desire to maintain a quality faculty in the face of budget constraints. The competition for enrollments in many sections of the country also adds to the pressure. At the same time, most institutional research officers are faced with the problem of how to fairly measure the real value of salary dollars received by faculty (or other staff).

The art of assessing the competitiveness of salaries has centered on use of comparative methods (Simpson and Sperber, 1988). The most frequent approach is to identify a peer group (either a number of similar institutions, or a national category of institutions) and then make direct comparisons of salaries to the averages of the peer group. This method is usually refined to include comparisons by faculty rank, and sometimes, to reflect disciplinary differences within rank. However, less attention is paid to the question of differences in the value of the dollars received due to variation in cost of living and taxation. The extent to which salaries are well matched with local rather than regional or national economic conditions is also not generally considered. Yet, it may be as important that salaries are adequate for local conditions as for competition in the national arena for hiring and retention.

FOCUS OF STUDY

This paper reports the results of a comparative study of average faculty salaries for full professors at institutions responding to the American Association of University Professor's 1992 annual survey of faculty compensation. The goal of the research was to compare nominal salaries with salaries adjusted for both cost of living and taxation differences. The focus of the study was on examining how adjustments for differences in (1) cost of living, (2) taxation, and (3) a combination of both, impact the relative ranking of the average institutional salaries.

BACKGROUND

There are at least four challenges faced in making appropriate adjustments for differences in the value of dollars received in differing geographic locations. First, available cost of living indexes are limited to those cities which participated in surveyes or studies. Thus in some cases, we are obliged to use adjacent cities as proxy, or the latest available data for the city. Many

locations are part of or adjacent to areas of population sprawl. These areas are best seen as a single standard metropolitan statistical area rather than as individual cities. In such cases, it can be difficult to find an appropriate location match when using cost of living survey data based on the response of individual cities. Second, cost of living surveys have variable response patterns over time, so the potential for historical or trend analyses may be limited. Third, some key expense areas, such as medical costs, are not reflected in the cost of living surveys. Finally, comparative salary studies generally fail to take into account an important factor in the value of salary dollars across geo-political boundaries - the impact of differences in taxation practices.

Cost of Living

Living costs differ among regions and among localities within regions. Adjustment of faculty salaries by some measure or index of cost of living enables us to conduct comparative studies on the basis of "real" rather than "nominal" purchasing power of salaries.

A cost of living index is a statistical tool for measuring differences in the purchasing power of money, and thus, when applied to a realistic market basket of purchases, in actual cost of living. In addition to indicating differences in prices, a cost of living index makes assumptions about consumption patterns of households with different demographic profiles. Thus, the ideal way to estimate differences in geographic cost of living for faculty would involve the following steps: first, conduct detailed budget studies of faculty expenditures in each urban area where a university is located to establish the composition and necessary weights for given patterns of expenditures, second, collect price data for consumer goods and services from the same locations, and third, calculate the appropriate cost of living indexes. Such a procedure would be prohibitively expensive and therefore is unlikely to be undertaken.

The Bureau of Labor Statistics (BLS) used to collect and publish a cost of living index for selected localities based on a standard budget for a typical family of four. The Bureau discontinued its cost of living index in 1981. It continues to publish the consumer price index (CPI) for four major regions and 15 major cities of the United States. But the CPI does not measure differences in the level of prices among regions or cities; it measures the average changes in price for each area since the base period. Thus, CPI data cannot be used to determine "high living cost" or "low living cost" regions or cities (BLS, 1984).

In the absence of data from Federal sources, we had to rely on indexes developed by non governmental sources, each of which has strengths and weaknesses. In this study, we will review available cost of living indexes, select the most appropriate index and apply it to faculty salaries in selected institutions to analyze its impact.

Taxation

There is no real tradition in comparative salary analysis for making adjustments based on taxation differences between geo-political units such as states or cities. Federal tax rates assessed

to individuals do not vary on a state or local basis. However, the amount of federal taxes will vary from location to location in the sense that those living in higher cost areas may receive higher salaries, which are then taxed progressively (Halstead, 1992). This study is limited to consideration only of state and local tax variation.

There are two basic views of the effect of taxation on spending power. One is that taxation delivers services of equal value to the individual affected and so can be ignored in an analysis (see, for instance, Halstead, 1992). The individual is compensated for the loss in income due to taxes by the services or benefit received. The other view is that while the population of a city or town as a whole may obtain needed benefits in return for tax contributions, individuals may or may not equally benefit. Thus, there may or may not be a direct link between taxes paid to state and local sources and benefits received. Also, the contribution of non-residents to the tax base through sales or other taxes may be substantial. In this view, tax adjustments to income are appropriate since the tax is not so much a result of individual choice behavior in acquiring services as a normal condition of living in a particular geo-political area. That is the view taken in this paper.

A variety of data sources are available from which to create an adjustment based on tax-constant dollars. These include basic data on state tax structures and rates (US Advisory Commission on Intergovernmental Relations, 1992), data on the general "wealth" of the population (produced by the US Bureau of Economic Analysis) and data on the value of physical structures in a given state (housing data from the US Bureau of the Census). Measures of the impact of taxation on income available to faculty are challenging to create for three main reasons. First, data are generally available only at a state level. Local variation in real estate taxes or in city taxes, for instance, can be difficult to capture. Second, individuals are impacted differentially by taxes, based on lifestyle choices such as home ownership, charitable activity, or outside consulting. Third, most tax data are reported on a per capita basis, reflecting the different populations in each state. The size of the working population, employment rates, and differences in the age structure of states all influence per capita measures. In this study, we will rely on a tax model specifying expected taxes for faculty members in different locales for income, personal property, general sales, and selective sales.

SAMPLE

The sample for the study consisted of one public doctoral granting institution from each state. If there was more than one public doctoral granting institution in a state, the "flagship" or lead public institution was included in the study. Salary data were obtained for 1991-92 from the annual survey by the American Association of University Professors (1992). The analysis was limited to the salaries of full professors, since individuals at the senior level were assumed to be

more firmly rooted in their communities and as a consequence, more likely to be homeowners and full participants in the local economy.

MEASUREMENT

There were two measurement tasks associated with this study. The first task was to review existing measures of cost of living and select the best available measure. The second task was to develop a measure for taxation differences among areas based on existing information sources.

Cost of Living

We identified four non-governmental sources of cost of living indexes: (1) McMahon's Cost of Living Among States, (2) The American Chamber of Commerce Researchers Association (ACCRA), (3) The Economic Research Institute (ERI), and (4) Halstead's Cost of Living Index.

McMahon Cost of Living Among States

McMahon's Cost of Living Among States was developed by Walter W. McMahon of the University of Illinois. McMahon established his cost of living index by state on the basis of the Consumer Price Index (CPI) which is published by the Bureau of Labor Statistics. He estimates a state's cost of living using regression analysis on data for personal income, housing costs, and population changes. To control for household differences in expenditure patterns, McMahon relies on the Bureau of Labor Statistics' concept of a "standard budget for a family of four."

The only significant advantage of the McMahon index is that it covers all states, and thus, there are no missing data when used for peer comparisons. It has however two major disadvantages: first, the index aggregates data at the state level, thus ignoring differences in cost of living among cities within state; and, second, the index is derived and not a result of direct price data collection.

ACCRA Cost of Living Index

ACCRA's cost of living index was developed by the American Chamber of Commerce Researchers Association and is reported quarterly (ACCRA, 1992). The urban areas included in the survey are those where the chamber of commerce or similar organization has volunteered to participate. According to ACCRA, items on which the index is based have been carefully chosen to reflect the different categories of consumer expenditures. ACCRA assigns weights to relative costs based on government survey data on expenditure patterns for "midmanagement" households. (A midmanagement employee is always salaried rather than paid by the hour. Examples include: tenured university faculty, partners in small CPA firms and owners of small businesses.)

The ACCRA index has the following advantages: First, it is the result of direct price data collection in the urban areas of concern. Second, the cost components are assigned weights which reflect a "midmanagement" standard of living, which seems to be a more appropriate

standard for faculty than McMahon's "budget for family of four" standard. The ACCRA index, however, has the disadvantage of limited coverage in that not all urban areas participate in the survey. Thus, there are missing data. Because of this limitation, proxies or indexes of prior years may have to be used.

ERI Cost of Living Index

The ERI cost of living index was developed by BTA Economic Research Institute (ERI), an independent research firm located in California. Cost of living is one of the subjects covered by the Institute's general research efforts to profile geographic differences that affect decisions related to human resource management.

According to one of the institute's publications (ERI, 1988), the ERI cost of living index is the result of a combination of three distinct sources of data: (1) information published by governmental agencies, such as the US Department of Labor, Bureau of Labor Statistics and various State and local agencies; (2) information published by private sources such as Chamber of Commerce, local surveys, association data, and various consulting firms and their regional and national surveys; (3) information collected by ERI's personnel through visits to local areas to sample costs, supported by telephone queries and correspondence with local personnel representatives. ERI's cost of living index is updated quarterly and covers about 3,100 cities.

To account for differences in household expenditure patterns, the ERI index profiles costs at four income levels from which the level most appropriate for faculty can be selected. The four income levels are: $7,000, $15,600, $32,000 and $50,000. (The most appropriate level for faculty would be $50,000.)

The ERI index has the following advantages: first, the index is the result of direct price data collection for about 250 cities, and the institute's model extends coverage to over 3,000 metropolitan and city areas, thus overcoming ACCRA's limited coverage. Second, the index profiles prices at four income levels from which one could select the standard of living that is appropriate for faculty. The ERI index, however, has the following disadvantages: first, the index is only partially the result of direct price data collection. Moreover, ERI does not describe how it combines data from different sources to provide reliable measure of price levels. Second, the indexes for many cities are derived by application of an estimating model whose details are not known.

Halstead's Cost of Living Index (CLI)

CLI, a new index unveiled this year, was developed by Kent Halstead of Research Associates (Halstead, 1992). It estimates total living costs for typical urban middle income home-owning families. The index combines consumption price data from ACCRA, land site price data from the U.S. Department of Housing and Development and other sources, and wage data from the Bureau of Labor Statistics. Halstead also provides a derivative Equivalent Living Cost Index (ELC)

which excludes land site price from the CLI measurement in order to control for differences in local amenities.

Halstead provides convincing theoretical justification for the components of his CLI, but was able to provide index values, based on direct price collections, for only 164 city urban areas. He uses a formula, based on prevailing wages and house mortgages, to estimate values for an additional 323 cities. Thus, Haltead's CLI has disadvantages similar to those mentioned for the ERI cost of living index.

Conclusion on Review of COLIs

In assessing the appropriateness of the four indexes for adjusting faculty salaries, a trade off must be faced between methodological soundness and completeness of data. The advantages and disadvantages of each above-described index made this trade off apparent.

The ERI index has the greatest coverage (over 3,000 cites) but most observations are estimated by an unknown model. Similarly, Halstead's CLI has directly collected data for only 150 locations; the rest are estimates by a model. The McMahon index estimates state level data, as does Halstead too, but cannot reflect cost of living differences among cities within a state (which can be larger than inter-state differences). The ACCRA index, though limited in coverage, has the soundest methodology in that it avoids estimation problems by using directly-collected local price data. It is by far the simplest and most commonly used index both nationally and in the higher education community. Thus, for this study, we chose the ACCRA index to adjust faculty salaries for geographic differences in cost of living.

Taxation

Several objectives characterized the effort to measure the impact of taxation upon the real value of faculty salaries. One objective was to identify measures which were as specific and current as possible for the area in which each institution was located. State data were favored over regional data, and local data over state data. A second objective was to incorporate sufficient information to cover the diverse practices and taxation strategies of each state, including at the minimum information on income tax, property tax, general sales tax, and selective sales taxes (for example, motor fuels or alcohol taxes). A third objective was to minimize any assumptions about personal spending habits or behavior on the part of faculty. Finally, available "off the shelf" resources were preferred to measures requiring complicated calculation.

We examined two different types of taxation measures: a tax model based on faculty spending behavior and measures based on state and local revenues or income.

Individual Tax Model

The first type of measure was based on a tax model for an individual. This model estimated an individual's tax liability based on four types of state and local taxes: Income taxes, property taxes,

general sales taxes, and selective sales taxes. Total property tax obligation was calculated based on the assumption that a faculty member owned the median-priced home in the area (U.S. Bureau of the Census, 1992 a) and paid property taxes at the prevailing rate for that locale. Income taxes were estimated by assuming that each faculty member paid the full marginal tax rate appropriate to his or her income level. Adjustments were made to taxable income based on features of each state's 1991 income tax guidelines (United States Advisory Commission on Intergovernmental Relations, 1992 a) including personal exemptions, standard deductions, and exclusions for federal tax liability. Normally the state's standard deduction was used, unless tax regulations in the state allowed deduction of property taxes (and such taxes were higher than the standard deduction). No deductions were calculated for any other expense area although it was recognized that individuals vary greatly in spending patterns. All calculations were based on tax rates for single taxpayers or for married individuals filing separately. Where appropriate, estimates of local income taxes were also included.

General sales and selective sales taxes are important tax strategies in a number of states. For instance, states without income taxes often do have substantial sales taxes (Washington, Florida, Nevada, Tennessee, Texas, South Dakota, and Wyoming). For some other states such as Hawaii, the sales tax revenues rival those of other sources. For the individual tax model, each faculty member was assumed to pay the average per capita taxes for sales and selective sales in his or her state. The per capita amount for sales and selective sales taxes probably underestimated the total sales taxes of individual faculty members, but was judged a better estimate than one based on assumptions about individual spending habits. Per capita sales taxes could also be expected to overestimate tax contributions of state residents in those states where spending by non-resident visitors is substantial.

The total tax estimate under the tax model measure was the combination of estimated property taxes, estimated personal income taxes from state and local sources, per capita general sales taxes, and per capita selective sales taxes. This approach had the chief advantage that most components of the model were specific to the area where each institution was located, rather than being based upon statewide data. In addition, the tax model covered all four areas of state tax practices affecting individuals (income, property, sales, and selective sales), thus recognizing the diverse tax practices of different states, cities, and locales. The disadvantages were the amount of effort required to produce the analysis and the necessity to make assumptions about faculty spending behavior for which no evaluation is possible without further study.

State and Local Revenue/Income Measures

The second type of measure was based on state and local revenue and income data. Only revenues from property, income, sales, and selective sales sources were included; corporate,

estate, and other types of sources of tax revenue were excluded where possible. Four tax measures were examined:

(1) taxes per $1,000 of per capita income in 1990, using per capita income reported by the United States Bureau of the Census (1992 b) and taxes as reported by the United States Advisory Commission on Intergovernmental Relations (1992 b);

(2) average taxes paid per employed person in a state in 1990 (U.S. Department of Labor, 1991; United States Advisory Commission on Intergovernmental Relations, 1992 b);

(3) the estimated tax percent of total income resulting from taxes collected from individuals in 1990 (United States Advisory Commission on Intergovernmental Relations, 1992 b); and

(4) the ratio of state disposable per capita personal income to state per capita personal income (U.S. Bureau of the Census, 1992 b). (Disposable per capita personal income is per capita personal income minus personal tax and nontax payments made by individuals. The ratio was examined as a potential deflator of salary dollars.)

The advantage of the measures based on total state tax revenues or on per capita income was ease of obtaining and creating measures from the data. However, state revenue-based measures are sensitive to the overall size of the population, the number of individual workers in a state, the ratio of working to nonworking persons in a state, and to the overall distribution of salaries across workers in a state. In addition, these measures often aggregate taxes for both individuals and corporations into the same general category. For example, the income category of state revenues in this study included just personal income, but the property category included personal as well as business or commercial property. Measures based on total state revenues also average out the taxes across all groups in the state - property owners and nonowners, high income wage earners and low income wage earners. This might result in understating the actual tax obligation of faculty who are likely to have higher than average incomes and to be residential property owners.

For this study, we decided to create and use the individual tax model to estimate tax adjustments for faculty salaries. The individual tax measure was expected to be more accurate than measures based on state and local revenues since both costs and prices vary between locales (see, for instance, Banta, 1989).

RESULTS

There were three stages to the study: (1) evaluation of the effects of cost of living; (2) evaluation of the effects of taxation; and (3) evaluation of the combined effects of both cost of living and taxation on faculty salaries.

Cost of Living

Of the four available cost of living indexes, we choose the ACCRA cost of living index as the most appropriate for this study. ACCRA data for Third Quarter 1992 were used for the most part. However, where no index was available for that quarter, the latest available index was used. In instances where no index was available for a location of an institution included in the study, a proxy had to be used, usually within the same state. ACCRA indexes were applied to 1991-92 average faculty salaries at the full professor level. The indexes and the urban areas used are shown in Table 1.

The method of adjustment was straightforward. Average salaries for full professors for each comprehensive state university were obtained from AAUP's Annual Report on the Economic Status of the Profession, 1991-92. The ACCRA indexes were obtained from the ACCRA quarterly publications. The ACCRA indexing assumed the national average equals 100 and served as the base. For example, to adjust the average salary of a full professor at University of Alabama (Cost of Living Index or COLI of 99.4, where US equals 100), we divided the nominal salary of $57,300 by 0.994 to obtain the "real" salary of $57,445. Similarly, for University of Alaska, we divided the nominal salary of $63,700 by 1.299 (COLI of 129.9 where US equals 100) to obtain the "real" salary of $49,038.

The results of COLI application to all universities in the study are shown in Table 2. Adjustment by COLI changed the average salaries, in real terms, in many institutions. Seven institutions lost ground by twenty or more steps due to a high cost of living (New Jersey, Connecticut, Hawaii, Alaska, California, Washington, and Massachusetts). On the other hand, four institutions substantially improved positions because of lower costs (Oklahoma, Arkansas, Nebraska, and Missouri). The total dollar adjustment for cost of living ranged from a high of $25,877 in New Jersey to $0 in Maine and Indiana, where the cost of living was at the national average.

Evaluation of the Tax Model

Table 3 shows the results of the calculation of total taxes under the individual tax model and associated rankings for the adjusted faculty full professor salaries for the 50 institutions in the study.

Total tax obligation ranged from a low of $1,126 in Laramie, Wyoming to a high of over $10,595 in Berkeley, California; the average was $5,131. Most of the institutions which improved by six or more salary ranks were located in states without a personal income tax (Alaska, Texas, Florida, Tennessee, Nevada, Washington, and Wyoming). Only two institutions in states without a personal income tax failed to improve ranks much after adjustment for tax burden - New Hampshire (which has high property taxes) and South Dakota (where the average salary was too low to be affected much by adjustment). Similarly, institutions in states with

Table 1. ACCRA Cost of Living Index for Universities Included in the Study (Based on Third Quarter 1992 or Latest Available)

State	Name of Institution	Location	ACCRA COLI	Urban Area Used
Alabama	University of Alabama	Tuscaloosa	99.4	Tuscaloosa
Alaska	University of Alaska, Fairbanks	Fairbanks	129.9	Fairbanks
Arizona	University of Arizona	Tucson	106.5	Tucson
Arkansas	University of Arkansas-Fayetteville	Fayetteville	90.2	Fayetteville
California	University of California-Berkeley	Berkeley	135.6	San Jose, 2nd Q '91
Colorado	University of Colorado, Boulder	Boulder	105.9	Boulder
Connecticut	University of Connecticut	Storrs	130.2	Hamden
Delaware	University of Delaware	Newark	112.5	Wilmington
Florida	University of Florida	Gainesville	101.7	Gainesville, 1st Q '92
Georgia	University of Georgia	Athens	99.6	Atlanta, 2nd Q '92
Hawaii	University of Hawaii at Manoa	Honolulu	136.7	Hilo
Idaho	University of Idaho	Moscow	94.3	Twin Falls
Illinois	University of Illinois at Urbana-Champaign	Urban-Champaign	100.7	Urban-Champaign
Indiana	Indiana University at Bloomington	Bloomington	100	Bloomington
Iowa	University of Iowa	Iowa City	98.5	Cedar Rapids
Kansas	University of Kansas Main Campus	Lawrence	94.5	Lawrence
Kentucky	University of Kentucky	Lexington	99.2	Lexington
Louisiana	Louisiana St. U. and Ag. & Mech. College	Baton Rouge	99	Baton Rouge
Maine	University of Maine	Orono	100	Bangor (estimate)
Maryland	University of Maryland College Park	College Park	114.6	Prince William, 2nd Q '92
Massachusetts	University of Massachusetts at Amherst	Amherst	116.4	Worcester, 2nd Q '92
Michigan	University of Michigan-Ann Arbor	Ann Arbor	101.4	East Lansing
Minnesota	University of Minnesota-Twin Cities	Minneapolis/St. Paul	103.5	Minneapolis/St. Paul
Mississippi	University of Mississippi	University	90.2	Hattiesburg, 3rd Q '91
Missouri	University of Missouri-Columbia	Columbia	90.9	Columbia
Montana	University of Montana	Missoula	101.6	Missoula
Nebraska	University of Nebraska-Lincoln	Lincoln	89.2	Lincoln
Nevada	University of Nevada, Reno	Reno	109.6	Reno
New Hampshire	University of New Hampshire	Durham	113.7	Manchester
New Jersey	Rutgers, State U. of NJ-New Brunswick	New Brunswick	147.9	Nassau-Suffolk, 3rd Q '91
New Mexico	University of New Mexico Main Campus	Albuquerque	99.3	Albuquerque
New York	State University of New York at Binghamton	Binghamton	99.1	Binghamton
North Carolina	University of North Carolina at Chapel Hill	Chapel Hill	103.5	Chapel Hill
North Dakota	University of North Dakota Main Campus	Grand Forks	95.1	Minot
Ohio	The Ohio State University Main Campus	Columbus	107.6	Columbus
Oklahoma	University of Oklahoma Norman Campus	Norman	93.3	Norman 2nd Q '92
Oregon	University of Oregon	Eugene	106.7	Eugene
Pennsylvania	Penn. State University Main Campus	University Park	108.4	Williamsport
Rhode Island	University of Rhode Island	Kingston	105	Estimate
South Carolina	University of South Carolina-Columbia	Columbia	98.4	Columbia
South Dakota	University of South Dakota	Vermillion	95.4	Vermillion
Tennessee	University of Tennessee, Knoxville	Knoxville	94.9	Knoxville
Texas	University of Texas at Austin	Austin	94.6	Austin
Utah	University of Utah	Salt Lake City	96.2	Salt Lake City
Vermont	University of Vermont	Burlington	109.6	Montpelier-Barre
Virginia	University of Virginia	Charlottesville	96.2	Lynchburg
Washington	University of Washington	Seattle	117.7	Seattle
West Virginia	West Virginia University	Morgantown	101.7	Charleston
Wisconsin	University of Wisconsin-Madison	Madison	104.9	Milwaukee
Wyoming	University of Wyoming	Laramie	97.3	Laramie

Table 2. 1991-92 Average Salaries of Full Professors Adjusted by ACCRA Cost of Living Index

State of Institution	Unadjusted Salary	Unadjusted Rank	ACCRA COLI	ACCRA-Adjusted Salary	ACCRA-Adjusted Rank	Rank Change
Alabama	$57,100	33	99.4	$57,445	28	5
Alaska	$63,700	19	129.9	$49,038	47	-28
Arizona	$60,100	28	106.5	$56,432	31	-3
Arkansas	$53,100	42	90.2	$58,869	21	21
California	$78,100	2	135.6	$57,596	27	-25
Colorado	$64,200	16	105.9	$60,623	15	1
Connecticut	$69,200	5	130.2	$53,149	41	-36
Delaware	$66,200	12	112.5	$58,844	22	-10
Florida	$60,300	27	101.7	$59,292	19	8
Georgia	$58,700	31	99.6	$58,936	20	11
Hawaii	$67,700	11	136.7	$49,525	45	-34
Idaho	$49,400	46	94.3	$52,386	42	4
Illinois	$65,200	14	100.7	$64,747	7	7
Indiana	$63,900	18	100.0	$63,900	8	10
Iowa	$65,000	15	98.5	$65,990	6	9
Kansas	$54,100	40	94.5	$57,249	29	11
Kentucky	$61,600	22	99.2	$62,097	12	10
Louisiana	$59,300	30	99.0	$59,899	16	14
Maine	$55,700	37	100.0	$55,700	33	4
Maryland	$68,600	8	114.6	$59,860	17	-9
Massachusetts	$61,900	21	116.4	$53,179	40	-19
Michigan	$73,300	3	101.4	$72,288	2	1
Minnesota	$63,000	20	103.5	$60,870	14	6
Mississippi	$49,000	47	90.2	$54,324	38	9
Missouri	$53,000	43	90.9	$58,306	24	19
Montana	$40,000	50	101.6	$39,370	50	0
Nebraska	$61,000	25	89.2	$68,386	5	20
Nevada	$61,100	24	109.6	$55,748	32	-8
New Hampshire	$56,000	36	113.7	$49,252	46	-10
New Jersey	$79,900	1	147.9	$54,023	39	-38
New Mexico	$54,200	39	99.3	$54,582	36	3
New York	$69,000	6	99.1	$69,627	4	2
North Carolina	$65,300	13	103.5	$63,092	10	3
North Dakota	$45,400	48	95.1	$47,739	48	0
Ohio	$68,700	7	107.6	$63,848	9	-2
Oklahoma	$56,900	35	93.3	$60,986	13	22
Oregon	$52,900	44	106.7	$49,579	44	0
Pennsylvania	$67,900	10	108.4	$62,639	11	-1
Rhode Island	$59,900	29	105.0	$57,048	30	-1
South Carolina	$57,000	34	98.4	$57,927	26	8
South Dakota	$45,000	49	95.4	$47,170	49	0
Tennessee	$55,000	38	94.9	$57,956	25	13
Texas	$68,300	9	94.6	$72,199	3	6
Utah	$57,200	32	96.2	$59,459	18	14
Vermont	$60,700	26	109.6	$55,383	34	-8
Virginia	$70,700	4	96.2	$73,493	1	3
Washington	$64,200	16	117.7	$54,545	37	-21
West Virginia	$50,800	45	101.7	$49,951	43	2
Wisconsin	$61,600	22	104.9	$58,723	23	-1
Wyoming	$53,400	41	97.3	$54,882	35	6

* State names are used in this table to reference institutional data. See Table 1 for the names of institutions within each state.

Table 3. Average Salaries for Full Professors in 1992 Adjusted for Taxation Differences Among States and Locales

State of Institution	Full Prof. 92 Salary	Nominal Rank	Estimated Property Tax	Estimated State/Local Income Tax	Per Capita Sales Tax in FY90	Per Capita Sel. Sales Tax in FY90	Estimated Total Tax Liability	Salary Adjusted for Tax Liability	Adjusted Salary Rank	Rank Change
Alabama	$57,100	33	$403	$2,063	$402	$267	$3,134	$53,966	30	3
Alaska	$63,700	19	$1,417	$0	$131	$193	$1,741	$61,959	9	10
Arizona	$60,100	28	$994	$2,651	$638	$207	$4,491	$55,609	25	3
Arkansas	$53,100	42	$604	$2,977	$413	$182	$4,175	$48,925	43	-1
California	$78,100	2	$2,845	$6,999	$574	$177	$10,595	$67,505	2	0
Colorado	$64,200	16	$1,313	$2,915	$506	$182	$4,916	$59,284	15	1
Connecticut	$69,200	5	$4,822	$1,038	$743	$314	$6,917	$62,283	8	-3
Delaware	$66,200	12	$485	$4,901	$0	$240	$5,626	$60,574	11	1
Florida	$60,300	27	$1,665	$0	$635	$287	$2,587	$57,713	20	7
Georgia	$58,700	31	$2,089	$3,104	$542	$186	$5,921	$52,779	34	-3
Hawaii	$67,700	11	$1,845	$6,018	$1,062	$341	$9,267	$58,433	17	-6
Idaho	$49,400	46	$638	$3,314	$380	$180	$4,512	$44,888	47	-1
Illinois	$65,200	14	$1,920	$1,926	$492	$288	$4,626	$60,574	12	2
Indiana	$63,900	18	$2,375	$2,937	$460	$152	$5,924	$57,976	19	-1
Iowa	$65,000	15	$1,868	$4,965	$351	$197	$7,381	$57,619	21	-6
Kansas	$54,100	40	$1,047	$1,886	$435	$194	$3,562	$50,538	39	1
Kentucky	$61,600	22	$391	$5,787	$295	$264	$6,737	$54,863	26	-4
Louisiana	$59,300	30	$749	$1,503	$586	$211	$3,049	$56,251	23	7
Maine	$55,700	37	$1,614	$4,433	$414	$215	$6,676	$49,024	42	-5
Maryland	$68,600	8	$3,683	$4,689	$329	$273	$8,974	$59,626	14	-6
Massachusetts	$61,900	21	$2,058	$3,731	$325	$157	$6,271	$55,629	24	-3
Michigan	$73,300	3	$3,689	$3,987	$343	$137	$8,156	$65,144	5	-2
Minnesota	$63,000	20	$754	$4,357	$431	$266	$5,808	$57,192	22	-2
Mississippi	$49,000	47	$580	$1,885	$423	$198	$3,086	$45,914	46	1
Missouri	$53,000	43	$735	$2,043	$497	$178	$3,453	$49,547	41	2
Montana	$40,000	50	$1,211	$3,191	$0	$229	$4,631	$35,369	50	0
Nebraska	$61,000	25	$1,688	$3,883	$379	$215	$6,165	$54,835	27	-2
Nevada	$61,100	24	$595	$0	$674	$562	$1,831	$59,269	16	8
New Hampshire	$56,000	36	$3,671	$0	$0	$245	$3,916	$52,084	36	0
New Jersey	$79,900	1	$3,175	$3,573	$426	$280	$7,453	$72,447	1	0
New Mexico	$54,200	39	$827	$2,844	$675	$219	$4,565	$49,635	40	-1
New York	$69,000	6	$3,094	$4,602	$616	$258	$8,570	$60,430	13	-7
North Carolina	$65,300	13	$2,382	$4,084	$400	$219	$7,085	$58,215	18	-5
North Dakota	$45,400	48	$2,722	$2,167	$382	$240	$5,511	$39,889	49	-1
Ohio	$68,700	7	$1,380	$4,150	$381	$203	$6,114	$62,586	7	0
Oklahoma	$56,900	35	$744	$3,418	$434	$242	$4,838	$52,062	37	-2
Oregon	$52,900	44	$2,310	$4,269	$0	$173	$6,752	$46,148	45	-1
Pennsylvania	$67,900	10	$1,216	$1,901	$356	$201	$3,674	$64,226	6	4
Rhode Island	$59,900	29	$4,079	$3,411	$396	$247	$8,133	$51,767	38	-9
South Carolina	$57,000	34	$299	$2,622	$415	$207	$3,543	$53,457	31	3
South Dakota	$45,000	49	$1,321	$0	$472	$221	$2,014	$42,986	48	1
Tennessee	$55,000	38	$766	$0	$629	$221	$1,616	$53,384	32	6
Texas	$68,300	9	$1,564	$0	$544	$283	$2,391	$65,909	3	6
Utah	$57,200	32	$856	$2,805	$495	$148	$4,304	$52,896	33	-1
Vermont	$60,700	26	$1,871	$3,850	$242	$329	$6,292	$54,408	29	-3
Virginia	$70,700	4	$950	$3,589	$299	$280	$5,118	$65,582	4	0
Washington	$64,200	16	$1,874	$0	$1,045	$277	$3,196	$61,004	10	6
West Virginia	$50,800	45	$394	$2,103	$426	$251	$3,174	$47,626	44	1
Wisconsin	$61,600	22	$2,445	$3,909	$410	$211	$6,974	$54,626	28	-6
Wyoming	$53,400	41	$545	$0	$452	$129	$1,126	$52,274	35	6

* State names are used in this table to reference institutional data. See Table 1 for the names of institutions within each state.

relatively high tax burdens (for example, Rhode Island, Hawaii, Maryland, and New York) tended to lower in rankings, but not always. Some states such as California and New Jersey had high enough salaries to overcome the adjustment and maintain the same ranking.

In order to evaluate whether the "off-the-shelf" state revenue or income based measures could substitute for the individual tax model, rankings of adjusted faculty salaries based on each measure were analyzed using Wilcoxon's test for paired, signed ranks (Siegel, 1956). The null hypothesis of no difference between the resulting ranks was accepted for two tests: (1) the comparison of the measure based on taxes per thousand dollars of income and the individual tax model ($z=-.53$, $p=.60$, two-tailed); and (2) tax percent of income and the individual tax model ($z=-.21$, $p=.83$, two-tailed). Significant differences were found between rankings for the other two model comparisons tested: (1) taxes per fulltime worker and the individual tax model ($z=-12.3$, $p=.00$, two-tailed); and (2) ratio of disposable to personal per capita income ($z= -11.4$, $p=.00$, two-tailed). Two of the tests indicated no significant difference between the alternate tax measure and the individual tax model. However, use of these alternate measures had strong effects on the rankings for particular states. Caution is particularly advised in using these alternate measures for institutions in states with steeply graduated income taxes or significant variation in property taxes from locale to locale.

Model Adjusting for both Cost of Living and Taxation

The next step in the analysis was to combine the effects of both tax and cost of living adjustments on average faculty salaries. This was done procedurally by first making the tax adjustment, then applying the cost of living adjustment to the tax constant salary dollars. This practice recognized that most dollars spent on taxes are not available to the individual for other purchases in a locale. In the case of income and property tax dollars, for instance, such dollars are often withheld from pay checks or held in escrow to assure payment.

Table 4 contains the results of the combined analysis of the effects of both cost of living and taxation on real salary dollars.

In order to better understand the results of the combined analysis, it is helpful to think of the different types of scenarios or situations in which institutions may be found with respect to taxes, salaries, and cost of living. Figure 1 illustrates these scenarios in the form of a cube. Breaking the planes of the cube into equal "high" and "low" areas yields eight different scenarios or types of relationships. These eight "cells" of the cube are also shown in detail, with some of the states listed which appear to fit in particular cell corners.

Several areas of the cube can be thought of as being in economic equilibrium with the conditions of their locale. Examples are institutions in cells 1 and 8. In these cases, the salaries of the institutions appear to have been adjusted or normed to some extent to the requirements of the particular area in which they reside. High salaries are being paid in locations with high taxes

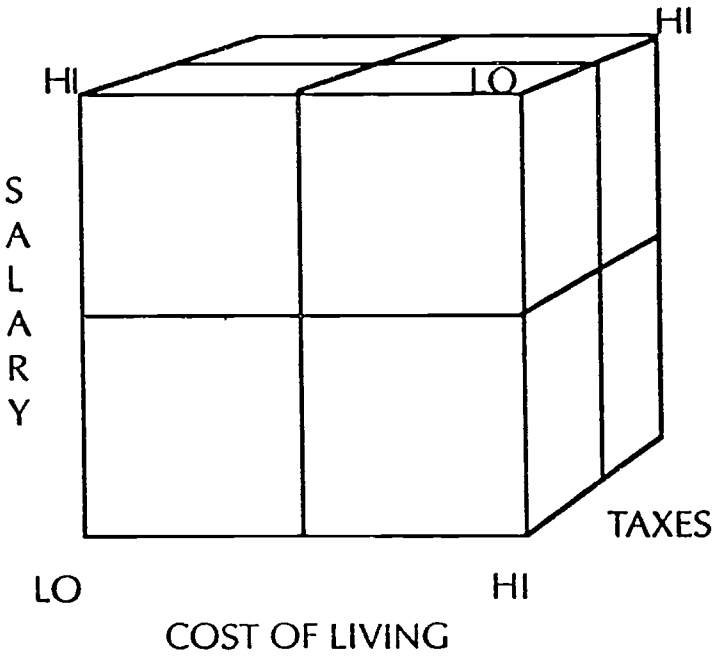
Table 4. 1991-92 Average Salaries of Full Professors Adjusted for Taxation and Cost of Living Differences

State of Institution *	Unadjusted Salary	Rank	Estimated Taxes	Tax-Adj. Salary	Rank	ACCRA COLI	COLI & TAX Adjustments Salary	Rank	Rank Change
Alabama	$57,100	33	$3,134	$53,966	30	99.4	$54,292	22	11
Alaska	$63,700	19	$1,741	$61,959	9	129.9	$47,698	42	-23
Arizona	$60,100	28	$4,491	$55,609	25	106.5	$52,215	29	-1
Arkansas	$53,100	42	$4,175	$48,925	43	90.2	$54,241	23	19
California	$78,100	2	$10,595	$67,505	2	135.6	$49,782	35	-33
Colorado	$64,200	16	$4,916	$59,284	15	105.9	$55,981	15	1
Connecticut	$69,200	5	$6,917	$62,283	8	130.2	$47,836	40	-35
Delaware	$66,200	12	$5,626	$60,574	11	112.5	$53,844	25	-13
Florida	$60,300	27	$2,587	$57,713	20	101.7	$56,749	12	15
Georgia	$58,700	31	$5,921	$52,779	34	99.6	$52,991	28	3
Hawaii	$67,700	11	$9,267	$58,433	17	136.7	$42,745	48	-37
Idaho	$49,400	46	$4,512	$44,888	47	94.3	$47,601	43	3
Illinois	$65,200	14	$4,626	$60,574	12	100.7	$60,153	6	8
Indiana	$63,900	18	$5,924	$57,976	19	100.0	$57,976	10	8
Iowa	$65,000	15	$7,381	$57,619	21	98.5	$58,497	8	7
Kansas	$54,100	40	$3,562	$50,538	39	94.5	$53,480	27	13
Kentucky	$61,600	22	$6,737	$54,863	26	99.2	$55,306	17	5
Louisiana	$59,300	30	$3,049	$56,251	23	99.0	$56,819	11	19
Maine	$55,700	37	$6,676	$49,024	42	100.0	$49,024	38	-1
Maryland	$68,600	8	$8,974	$59,626	14	114.6	$52,030	31	-23
Massachusetts	$61,900	21	$6,271	$55,629	24	116.4	$47,791	41	-20
Michigan	$73,300	3	$8,156	$65,144	5	101.4	$64,245	3	0
Minnesota	$63,000	20	$5,808	$57,192	22	103.5	$55,258	18	2
Mississippi	$49,000	47	$3,086	$45,914	46	90.2	$50,902	33	14
Missouri	$53,000	43	$3,453	$49,547	41	90.9	$54,507	20	23
Montana	$40,000	50	$4,631	$35,369	50	101.6	$34,812	50	0
Nebraska	$61,000	25	$6,165	$54,835	27	89.2	$61,475	4	21
Nevada	$61,100	24	$1,831	$59,269	16	109.6	$54,078	24	0
New Hampshire	$56,000	36	$3,916	$52,084	36	113.7	$45,809	45	-9
New Jersey	$79,900	1	$7,453	$72,447	1	147.9	$48,984	39	-38
New Mexico	$54,200	39	$4,565	$49,635	40	99.3	$49,985	34	5
New York	$69,000	6	$8,570	$60,430	13	99.1	$60,979	5	1
North Carolina	$65,300	13	$7,085	$58,215	18	103.5	$56,247	14	-1
North Dakota	$45,400	48	$5,511	$39,889	49	95.1	$41,945	49	-1
Ohio	$68,700	7	$6,114	$62,586	7	107.6	$58,166	9	-2
Oklahoma	$56,900	35	$4,838	$52,062	37	93.3	$55,801	16	19
Oregon	$52,900	44	$6,752	$46,148	45	106.7	$43,251	47	-3
Pennsylvania	$67,900	10	$3,674	$64,226	6	108.4	$59,249	7	3
Rhode Island	$59,900	29	$8,133	$51,767	38	105.0	$49,302	37	-8
South Carolina	$57,000	34	$3,543	$53,457	31	98.4	$54,327	21	13
South Dakota	$45,000	49	$2,014	$42,986	48	95.4	$45,059	46	3
Tennessee	$55,000	38	$1,616	$53,384	32	94.9	$56,253	13	25
Texas	$68,300	9	$2,391	$65,909	3	94.6	$69,672	1	8
Utah	$57,200	32	$4,304	$52,896	33	96.2	$54,986	18	14
Vermont	$60,700	26	$6,292	$54,408	29	109.6	$49,643	36	-10
Virginia	$70,700	4	$5,118	$65,582	4	96.2	$68,173	2	2
Washington	$64,200	16	$3,196	$61,004	10	117.7	$51,830	32	-16
West Virginia	$50,800	45	$3,174	$47,626	44	101.7	$46,830	44	1
Wisconsin	$61,600	22	$6,974	$54,626	28	104.9	$52,075	30	-8
Wyoming	$53,400	41	$1,126	$52,274	35	97.3	$53,725	26	15

* State names are used in this table to reference institutional data. See Table 1 for the names of institutions within each state.

HIGH SALARY

1	2	3	4
HIGH TAXES HIGH COST OF LIVING CALIFORNIA CONNECTICUT HAWAII MARYLAND NEW JERSEY	LOW TAXES HIGH COST OF LIVING ALASKA DELAWARE PENNSYLVANIA WASHINGTON	HIGH TAXES LOW COST OF LIVING IOWA NEW YORK NORTH CAROLINA	LOW TAXES LOW COST OF LIVING TEXAS VIRGINIA



LOW SALARY

5	6	7	8
HIGH TAXES HIGH COST OF LIVING OREGON RHODE ISLAND VERMONT	LOW TAXES HIGH COST OF LIVING NEVADA NEW HAMPSHIRE	HIGH TAXES LOW COST OF LIVING MAINE NEBRASKA NEW MEXICO	LOW TAXES LOW COST OF LIVING MISSISSIPPI MISSOURI SOUTH CAROLINA SOUTH DAKOTA TENNESSEE WYOMING

FIG. 1. Scenarios for Taxes, Salaries, and Cost of Living as a Cube, with Example Cell Corners

and high cost of living, or lower cost areas have proportionally lower salaries. This does not mean that the salaries are necessarily "adequate" for the areas. All five institutions in cell 1, for instance, dropped substantially in salary ranks after adjustment for taxation and cost of living. Most of the institutions in cell 8, the low cost and taxation states, improved in rankings. Institutions in cells 2, 3, 6, and 7 may be approaching equilibrium, depending on the extent to which the available salaries offset the higher taxes or cost of living in the area. Those institutions in cells 6 and 7 have lower salaries and thus are probably less able to compensate for the higher taxes or cost of living in these areas. It seems clear that cost of living is more important than taxation to match. The institutions in cells 2 and 6 (with high cost of living) tended to drop ranks, while those in cells 3 and 7 (with low cost of living) were often able to improve in rankings. Institutions in cell 5 have the challenge of low salaries in an environment characterized by both high taxes and high cost of living. Finally, two institutions, in Texas and Virginia, have the best scenario - high salaries in a low tax and cost of living environment.

Viewing the relationships in this manner suggests different analytic questions than result from a simple comparative view of the rankings of institutions based on adjusted salaries. For example, for institutions in cells 1, 2, and 6, the key concern may be how well the salaries are keeping pace with inflation or other state or regional economic trends rather than how well or poorly the salaries compare to those of other institutions. It is true of course that the latter question is also important in terms of faculty recruitment and retention, but the former question is often ignored in favor of a focus on rankings. The question of rankings may be moot for institutions in cell 8, but critical for those in cell 5 where major salary adjustments are probably needed to preserve or improve competitiveness.

RECOMMENDATIONS

In assessing the real value of salaries relative to those of peer institutions, institutional researchers should be cognizant of the effects of both cost of living differences and taxation differences. The following recommendations are made as a result of our review of measurement and interpretation of cost of living and taxation differences among the institutions in this study:

(1) Both cost of living and taxation should be taken into account in comparing salaries in different geographic areas;

(2) The most appropriate measurement for cost of living at this time appears to be the ACCRA breadbasket survey, although its limited coverage is a disadvantage;

(3) Measurement of taxation differences is less straightforward at this time; with the limitations noted, the only off-the-shelf alternatives to extensive analysis appear to be the measures for taxes per thousand dollars of income and tax percent of income. More research is needed to try to identify more reliable and accessible measures.

(4) In addition to considering how well salaries compare on a dollar for dollar basis with those of peer institutions, it is important to take into account how well salaries are in balance with the economics of their local environments. An average salary of $78,000 for a full professor may be very "high" nationally but may not be high enough in an area such as California, while a relatively "low" salary of $55,000 may be in better balance economically in an area with low cost of living and taxation such as Tennessee.

CONCLUSIONS

Making adjustments for differences in cost of living does enable comparisons on the basis of real rather than nominal value of salaries. But to the individual faculty member, it is the disposable income rather than the pretax income which is important. Based on the results of this study, it is not sufficient to adjust salaries for cost of living without also taking taxation practices into account. In most states, cost of living is a stronger factor than taxation in ranking institutions based on salary. However, comparative analyses of salaries at institutions located in very high or very low tax states will be affected by failing to take taxes into account. In addition, for institutions in many states, achieving equilibrium with the local economic environment may be at least as important as achieving parity with peer institutions in other locales.

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