WYOMING EDUCATION FINANCE ISSUES REPORT

Reconsideration of Housing Cost Adjustment

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I- Background

The May 1997[1] Management Analysis and Planning, LLC (MAP) report to the Wyoming Legislature proposed that revenues to school districts in Wyoming be adjusted for differences in real costs of providing education in different regions of the state. Because there is no direct way of measuring education cost differences, MAP recommended, as a second-best alternative, that the Department of Education adjust revenues to school districts by estimating the variation in funds required to permit school districts in different regions to offer salaries that would enable employees to purchase the same standards of living. And because there is no direct way of measuring standards of living in different regions, MAP recommended that the Department of Education estimate differences in standards of living by measuring differences in prices paid by consumers in different regions. MAP recommended to the Wyoming Legislature that revenues to school districts be varied to the same degree that consumer prices varied in those districts.

To estimate the variation in consumer prices, MAP proposed the use of data collected semi-annually by the Economic Analysis Division of the Wyoming Department of Administration and Information. The Division uses these data to produce an index, the Wyoming Cost of Living Index (WCLI), to adjust maximum income levels for property tax forgiveness. WCLI economists survey prices in Cheyenne, and the Division then contracts with individuals who conduct similar surveys in 14 other towns across the state. Fifteen counties in the state each contain one such town (including Cheyenne). The Division assumes that the relationship of prices from one county to another is the same as the relationship of prices from one of these towns to another. The Division then estimates the relationship of prices in the remaining eight counties by using its best judgment about which of the surveyed counties (or combination of surveyed counties) are most similar in price experience to these eight non-surveyed counties. MAP proposed that a school district's revenues be adjusted utilizing the resultant index number for the county in which that school district is located.

Because this recommendation was based on an attempt to assure school employees the ability to purchase comparable collections of consumer goods and services, MAP recommended that this index be applied only to that portion of a

[1] The May 27, 1997 verson of A Proposed Cost-Based Block Grant Model for Wyoming School Finance replaces and supercedes all previous versions. The changes from the April version accepted by the Wyoming Legislature are editorial and cosmetic rather than substantive.

district's expenditures normally devoted to the salaries of school personnel (about 76 percent of all district expenditures).

The WCLI weights the prices obtained by its surveyors for relative importance, using weights (with some small modifications, based on Wyoming experience) established by the Bureau of Labor Statistics in its Consumer Price Survey, the basis for the well-known Consumer Price Index (CPI). These relative importances, as modified, are (total = 100): housing, 40.9; transportation, 17.0; food, 15.8; recreation and personal care, 13.2; medical care, 7.1; and apparel, 5.9. MAP recommended, however, that when the WCLI is used for the purpose of estimating consumer price relationships affecting school employees, housing and medical care ***not*** be included, and that the other elements in the index be re-weighted appropriately. Therefore, MAP's proposed geographic cost adjustment for Wyoming education was based on an index with these relative importances (total = 100): transportation, 33.1; food, 30.2; recreation and personal care, 26.2 and apparel, 10.5. In this memorandum, we refer to such an index as the "net-WCLI" (the WCLI, net of housing and medical prices).

MAP recommended that housing prices not be included in the calculations of geographic index numbers for adjusting Wyoming education because housing prices include not only prices for the consumption of utilities, construction, furniture and household services, but also prices paid for the amenity of location. If housing prices in an area are higher than elsewhere, this may be because the housing is located in a more desirable place to live. If school employees' salaries in such locations were increased to compensate them for these higher housing prices, these employees would be doubly compensated: first, with higher salaries; second, with the amenities of location. Giving additional funds to districts to provide this double compensation would create an unconstitutional cost difference in the Wyoming education system, because districts in high-amenity areas would be given the resources to hire more expensive (i.e., better quality) teachers and other personnel. Failing to provide this double compensation forces school employees in highly desirable communities to sacrifice consumption of other goods and services in order to enjoy the greater amenities of these communities. Experience shows that, if adjustments are made properly, sufficient personnel will be willing to make these "trade-offs" so that districts can employ comparably qualified personnel.

Housing in less desirable communities may also be less expensive. School employees who live in such communities can use the savings from lower housing prices to purchase greater quantities or better qualities of other goods and services, and this higher consumption level offsets the disadvantages of living in communities with disamenities. If housing prices were included in the calculations of school districts' geographic cost adjustments, these low-amenity districts would have difficulty attracting qualified personnel because the districts could no longer offer such personnel the opportunity of utilizing their savings from lower housing costs to consume more of other goods and services, because

the geographic cost adjustment would result in the state recapturing these savings from low-priced housing. Such a recapture would appear to be unconstitutional, as it would prevent these districts from offering an equal education with qualified personnel.

MAP recognized that this solution was not perfect, because housing prices reflect not only amenities but also consumption of utilities, construction, furniture and household services. Unfortunately, a consumer price survey cannot disaggregate the relative influence of amenities and consumption in making housing in a community more or less expensive. While it was MAP's professional judgment that amenities were more important than consumption in generating housing price differences from region to region, MAP could not prove that this was the case. Therefore, while MAP recommended that housing prices be excluded from the calculation of regional consumer price differences, MAP invited the Legislature to reverse this recommendation if the Legislature disagreed with MAP's reasoning in this respect. Readers are referred to MAP's more detailed explanation of this reasoning in its May 1997 report.

MAP's May 1997 report was drafted when the most recent WCLI survey available utilized data from the second quarter of 1996. Using these data, a geographic index number was created for each Wyoming district. In addition, MAP calculated what the index numbers would be if housing price data collected for the WCLI had been included in the calculations. (If housing had been included, but medical care was still excluded, the relative importances would be (total = 100): housing, 43.6; transportation, 18.7; food, 17.0; recreation and personal care, 14.8 and apparel, 5.9.) Appendix 1 of this memorandum displays these two series: first, the recommended index numbers calculated without housing prices (the net-WCLI); second, the corresponding index number with housing prices included.

Subsequent to the publication of the May 1997 report, several policymakers in Wyoming expressed doubt about the validity of MAP's recommendation to calculate consumer price differences without including housing price differences in these calculations. In particular, they stated that Teton County had difficulty attracting qualified teachers because housing prices were so high in Jackson, and unless the Teton school district were given a differential in revenue to pay teachers a salary adjustment to account for higher housing costs, educational services in Teton would be unconstitutionally inferior to those elsewhere in the state. Concerns were also expressed that other school districts would face similar problems if the MAP recommendation were followed; these school districts are those (like Campbell County or Sweetwater County) where a tight employment market and rapid growth in the mining industry had attracted large numbers of workers who gobbled up the available good housing, making it difficult for teachers to find adequate housing unless they could be paid a salary adjustment to offset its higher cost.

In the course of preparing its recommendations to the Wyoming legislature, MAP heard several reports from Wyoming school district officials that their districts suffered particular hardship because the high cost of housing in those districts made teacher recruitment difficult. On November 7, 1996, as part of MAP's investigations prior to drafting its report, Dr. Ellis Bowman of MAP met with the acting superintendent and business manager of the Teton school district. These administrators told Dr. Bowman that new teachers cannot afford to live in Jackson or in the surrounding area and that those who do tend to be senior staff members who bought homes in previous decades when they were more affordable. Younger teachers who replace these senior teachers as they retire, according to the administrators, must seek homes in distant outlying areas, mostly in Idaho. Because of the Jackson community's amenities, the district has no difficulty attracting applicants for teaching positions -- there are approximately 80 applicants for each opening, according to the Teton administrators. But once these applicants discover how difficult it is to find adequate housing, they change their minds and refuse to sign teacher contracts. Nonetheless, according to the Teton administrators, the district has been able to keep positions filled, by paying higher salaries to new hires (giving these new hires credit on the salary schedule for up to 7 years' prior experience) and by requesting credential waivers from the state's Professional Teaching Standards Board.

On November 6, 1996, MAP representatives met with officials of the Campbell School District #1 in Gillette. These officials reported that the high cost of housing in Gillette made recruitment of teachers difficult, but that there was nonetheless a good pool of candidates for teaching positions (5 applicants per position at the elementary level). "Occasionally," the administrators reported, the district induces teachers to accept positions by granting credit on the salary schedule for as much as 6 years' prior service.

On November 5, 1996, Dr. Bowman met with a group of administrators from the Sweetwater District #2 in Green River. These administrators told Dr. Bowman that the high cost of housing in the community was an impediment to hiring teachers. Nonetheless, they stated, the district receives approximately 10 to 15 applicants for each teaching position, and induces teachers to accept positions by offering a superior benefit package (offset by low initial salaries) and by granting some teachers credit for up to 5 years' prior service on the salary schedule, thereby justifying a higher initial salary. Once teachers begin teaching in the Sweetwater District, they tend to remain, and the district has over half its teachers with sufficient seniority to be at the maximum step on its salary schedule. Given limited time, MAP has investigated in detail the implications of these claims in Teton County. Similar procedures could be followed if the State chose to conduct a similar investigation in Sweetwater or Campbell Counties.

Prior to the December 1997 trial of *Campbell County School District v. Wyoming* in Wyoming's First Judicial Circuit, plaintiffs' attorneys notified the

State that Mr. Jim Rooks, a member of the Board of Trustees in Teton County District #1, planned to testify that specific administrators and teachers either refused to accept employment in Teton County or resigned from employment in Teton County due to the high cost of housing. Mr. Rooks also planned to testify that, due to this high housing cost, young teachers remain in Teton only for a year or two, creating a constantly revolving faculty. However, Mr. Rooks did not, in fact, appear as a witness, nor did any other representative of the Teton district.

In a March 21, 1997 memorandum analyzing the forthcoming MAP recommendations, Steve Furtney, Administrator of the Economic Analysis Division of the Department of Administration and Information, expressed his own concern about the MAP methodology. Furtney stated,

> The consultants recommend excluding the housing component of the WCLI in school district funding and recognize that the ultimate decision regarding the housing component is a political choice.
>
> Neoclassical economic theory would explain the high price of housing in Jackson by saying that people choose to pay a premium to live in a beautiful place. Hence, people should not be compensated by a higher wage to cover the higher cost of housing because they are being compensated by their beautiful surroundings. However, *the practical matter of labor supply may override the hard line economic explanation for excluding housing costs from education funding.*
>
> The Legislature may wish to consider more research on labor supply in certain counties in Wyoming. *An alternative to excluding housing from education funding is to include a minimum threshold component for housing (e.g. the difference between Jackson and the statewide average for the cost of an apartment).* The state of Wyoming has set a policy of paying its employees in Teton a $400 housing allowance (emphasis added).

On May 28, 1997, David Black, Senior Economist in the Division of Economic Analysis of the Department of Administration and Information, wrote a memorandum to Rick Miller, Director of the Legislative Service Office, in which he stated,

> We understand MAP's concerns that including housing will subsidize the more scenic areas of the state. But by excluding the housing component entirely, several other items which are included in the housing category other than the shelter component (rent or home purchase) will be excluded including utility expenses, home furnishings including appliances, and home maintenance and upkeep. *One method to retain the housing component of the index while removing the amenities from the cost of shelter would be to use a hedonic price index*...[,] using regression analysis to explain the price of a house by its

> characteristics such as square footage, number of bedrooms, number of bathrooms, garage size, if the property has a patio\porch\deck, scenic amenities, and other characteristics... By using the hedonic index, the exact same property at a given level of amenities can be priced in every county regardless of the actual amenity level of the county (emphasis added).

Mr. Black went on to recommend that Professor Shelby Gerking of the University of Wyoming be enlisted to assist the Economic Analysis Division in creating such an index.

In a November 17, 1997 memorandum, however, Mr. Black reported that the Division had researched another method for including a housing component in a regional consumer price index, "while eliminating the amenity value of an area." This method was a "cost of construction" index: "A cost of construction index would consider the cost of building a new house by pricing the materials and labor used in residential construction but would exclude land values." The Division undertook a preliminary test of such an index by surveying construction material and labor costs in Cheyenne (Laramie County) and Jackson (Teton County). Based on this survey, the Division concluded that construction costs in Jackson were 15.3 percent higher than in Cheyenne.

Mr. Black concluded that a "cost of construction" index was a preferable approach to the hedonic price index considered earlier, primarily because data collection and calculation was easier and because the "cost of construction" concept was easier to explain to education policy consumers than the hedonic price index. Because the Division is no longer recommending the hedonic approach, and because MAP has explained its own reservations about this approach elsewhere, this memo does not evaluate it in any further detail. If requested, MAP can provide greater elaboration of its reasons for not recommending the hedonic approach.

On November 13, 1997, a "Regional Cost of Living Working Group," advisory to the Legislative Service Office, conducted a telephone conference. The group consensus was that "[h]ousing should be included as one of the components within the regional cost of living adjustment. Some adjustment recognizing the amenities of an area may be appropriate; however, persons accepting employment 'receive' those amenities whether they are desired or not." Following this conference, Mr. Rick Miller of the Legislative Service Office "requested that Richard Rothstein and Dave Black confer as necessary to make recommendations regarding a methodology that would include the price of housing within Wyoming's existing cost of living index, but would exclude the cost of amenities."

The following analysis by MAP is written in response to this request to reconsider the original recommendation with regard to housing in the

methodology for making geographic adjustments to education costs in Wyoming. In preparing this memorandum, Richard Rothstein has consulted with Dave Black and with other experts in the field, and has re-examined the underlying data regarding housing prices and education costs in Wyoming.

Based on these consultations and re-examinations, ***MAP recommends, with some reservations, that the net-WCLI be modified to incorporate non-rental subcomponents of the housing component of the WCLI. MAP notes that this modification, while theoretically justified, has a small but significant impact on the relationships generated by the net-WCLI. MAP reiterates its caution to Wyoming policymakers to exercise care before adopting indices that may overstate geographic cost differences. MAP recommends that careful monitoring of the effect of these indices be conducted, and that this monitoring, in particular, should include teacher quality analysis. MAP further recommends that, to avoid short term fluctuations in the geographic cost adjustment that may result from temporary or mis-measured phenomena, the geographic cost adjustment applied to Wyoming school district revenues should be calculated using a rolling three year average of index values, not the most recent survey alone.*** The balance of this report explains the reasoning behind these recommendations.

II - How MAP's recommended method accounts for higher housing prices

The fact that MAP's initially recommended cost adjustment (based on the net-WCLI) was calculated without use of housing prices does not mean that higher housing costs are not reflected in MAP's geographic cost adjustment. This is because housing prices implicitly influence many of the items which are priced in the non-housing products and services of the net-WCLI.

To understand how housing prices influence the net-WCLI, even when the net-WCLI does not take explicit account of them, consider food, one of the more important items in the net-WCLI, with a weight of 30 percent. Differences in land prices affect differences in food prices. One cause of differences in food prices from region to region in Wyoming may be differences in rental, lease, or mortgage prices faced by grocers from region to region. These differences are mostly attributable to differences in land prices, the very element that plays so important a role in housing prices.

Also, if grocery sales clerks or other personnel demand higher wages to offset their higher housing prices, these higher housing prices will ultimately be passed on and reflected in higher food prices. The differences in food retail prices from place to place may reflect, to a considerable extent, differences in land and/or housing prices. The same is true of the other consumer prices incorporated in the net-WCLI.

Thus, it is not the case that a net-WCLI which is calculated without explicitly taking housing prices into account does not, for that reason, fail to reflect housing price differences. Because all experts seem to agree that fully incorporating housing price differences in the index would capture amenity values and thus result in an over-adjustment, the proper question is whether the net-WCLI adjusts for housing too little, too much, or about the right amount.

III - Utilizing the "cost of construction" in an index

The MAP report utilized WCLI data for the second quarter of 1996, the most recent available when the report was drafted. Utilizing these data, a net-WCLI index was created with an enrollment-weighted average of price levels in Albany and Laramie Counties defined as the base (= 100). Laramie County (Cheyenne) had an index number of 99.5 and Teton County (Jackson) an index number of 112.9. (Using the statewide average as the base, Laramie County had an index number of 98.7 and Teton County an index number of 112.0.) In other words, if the respective school districts adopted the resource mix recommended in the MAP models, Teton County salaries would be 13.5 percent higher than Laramie County salaries (112 / 98.7, or 112.9 / 99.5).

If housing prices had been included in the calculations, the resulting index numbers would be 134.4 for Teton County and 100.1
for Laramie County, a difference of 34.3 percent (134.4 / 100.1).

Dave Black's memorandum of November 17, 1997 recommends including a "cost of construction" element in the net-WCLI in order to capture an adjustment for housing prices exclusive of amenities, and he tested this approach by collecting cost-of-construction prices in Cheyenne and Jackson. He found that Jackson's cost-of-construction was 15.3 percent higher than Cheyenne's.

In a conversation between Dave Black and Richard Rothstein on December 17, 1997, it was agreed that if valid cost-of-construction index values could be obtained, these values should be substituted not for the full housing component (with a weight of 40.9) of the WCLI, but only for those elements of housing costs which reflect land values (and thus, presumably, amenities). Using this approach, the cost-of-construction would be substituted in the WCLI for house rents (and rental equivalence of owner-occupied housing), for apartment rents, for mobile home rents and mobile home lot rents. These rents combined have a relative importance in the WCLI of 25.9 percent. The balance of the housing component (utilities, household furnishings, housekeeping supplies, etc.) would be retained in the index. Once medical care was removed, this would generate a "revised-net-WCLI-1," in other words, the WCLI, net of medical care and the portion of rental costs presumed attributable to land values, not construction.

When Black's estimated cost-of-construction prices are substituted for rental prices (house rents and rental equivalence of owner-occupied housing, apartment rents, mobile home rents and mobile home lot rents), and medical care is removed from the WCLI, a "revised-net-WCLI-1" produces an index number for Jackson of 120 when Cheyenne = 100. This is considerably higher than the Jackson number of 113.5 (Cheyenne = 100) produced by the MAP recommended net-WCLI, but lower than the Jackson number of 134.4 produced by the full WCLI less medical care.

The preliminary work of the Division of Economic Analysis on a cost-of-construction index consisted of interviews with a single housing contractor in Laramie to establish relative importances of the various components of the index; i.e., how much weight should be given to lumber, cement, construction labor, etc. The preliminary work has not yet developed a methodology for converting this input-to-construction index to a consumption-of-construction index that would be comparable to other elements of the WCLI. (For example, a consumption-of-construction index would have to assign a profit rate to the use of construction inputs, in order to be comparable to other consumption elements in the WCLI.) Based on this preliminary work, Dave Black reports that he no longer recommends this approach.

For these reasons, at the present time MAP recommends that the net-WCLI not be modified to include a cost-of-construction component, but MAP proposes to re-visit this recommendation if and when additional work to develop this cost-of-construction component is completed.

IV - Including Non-Rental Portions of the WCLI Housing Component in the Net-WCLI

MAP, with Dave Black's assistance, has considered an alternative approach, a refinement of the methodology of the original MAP-recommended net-WCLI. MAP reweighted the net-WCLI index after the removal of housing (and medical care) because MAP felt there was no acceptable method for removing the influence of amenities on housing values, without removing the entire housing component. Upon further consideration, however, we now conclude that it is not necessary to remove the entire housing component of the WCLI, with a weight of 40.9 percent, to accomplish this purpose. The Division of Economic Analysis constructs the housing component of the WCLI by adding a number of sub-components of housing, and data on these sub-components is available and can be utilized where appropriate.

Therefore, a "revised net-WCLI-2" could be constructed by removing from the WCLI only medical care and the prices of rental housing, leaving in place the other sub-components that are included in the broader housing component. These sub-components that would remain include maintenance and repair

services, fuel and other utilities, household furnishings and appliances, housekeeping supplies, and housekeeping services (including babysitting).

After re-weighting all of the index components once rental of shelter is removed, the new relative importances are (total = 100): transportation, 25.9; food, 23.7; housing (not including rental of shelter) 21.7; recreation and personal care, 20.5 and apparel, 8.2.

Application of the "revised-net-WCLI-2" generates an index number for Jackson of 117.9, when Cheyenne = 100. This is higher than the Jackson index number of 113.5 (Cheyenne = 100) of the net-WCLI, but substantially lower than the 134.3 (Cheyenne = 100) in the full WCLI (less medical care). Appendix 2 displays this index series for all Wyoming districts. It compares this "revised-net-WCLI-2" with the original MAP-recommended net-WCLI. Readers should note that Appendix 2 is calculated with the Laramie-Albany Counties enrollment-weighted average = 100, not the city of Cheyenne alone. So the numbers in Appendix 2 differ slightly from those described in this paragraph, but the relationships are the same.

Because of this improved theoretical justification, we recommend that the state adopt this "revised-net-WCLI-2" in place of the net-WCLI originally recommended. This substitution has an important effect on the overall school funding distribution in the state, apparently increasing (in comparison to the adjustment from the net-WCLI) revenues to all districts in the state except for Laramie in Albany County, whose funding for personnel salaries will be reduced by 2 percent from the level generated by the net-WCLI (and the Carbon County districts, whose funding for personnel salaries will be reduced by 0.2 percent). This is because housing prices (with rent of shelter excluded) are exceptionally low in Laramie, due particularly to low utility and water charges. Because the cost-based education model bases all geographic adjustments on an average of Laramie and Albany Counties = 100, and because the "revised-net-WCLI-2" shows consumer prices elsewhere in the state higher, relative to the Laramie-Albany average, with non-rental housing prices included than these consumer prices are with non-rental housing prices excluded, almost all other districts in the state will receive more revenue with this adjustment. In general the increases are small, with almost all districts receiving less than 1.5 percent additional funding for the salary portion of the educational model (compared to that generated by the net-WCLI) except for Teton (4.4 percent additional), Kemmerer and Afton (3.1 percent additional), Pinedale and Big Piney (2.8 percent additional), Evanston, Mt. View and Lyman (2.6 percent additional) and Campbell (2.4 percent additional). These numbers, utilizing second quarter 1996 data, however, are all small enough that relationships could change when the model is actually implemented utilizing current data.

V - A Caution Regarding Further Variation in the WCLI

The net-WCLI had a variation of 16.4 percent from the lowest cost districts (in Fremont County) to the highest (Teton). The "revised-net-WCLI-2" increases this variation to 20.6 percent (from Fremont to Teton). While MAP believes that the "revised-net-WCLI-2" is theoretically justified, and is an important amendment in response to concerns expressed by policymakers that housing prices should be included in the calculation of a Wyoming geographic cost adjustment, there remains the possibility that the greater the variation in the geographic cost index, the less successful we have been in eliminating the influence of amenities in this index. A 20.6 percent variation is at the limit of what, in MAP's judgment, is acceptable without conducting substantial additional field research into its practical meaning, and particularly, additional research into the subject of teacher quality. At this point, we simply urge policymakers to be cautious about considering even further modifications that might increase the variation of the geographic cost adjustment.

Policymakers should consider the "downside" to increasing the variability of the geographic cost adjustment. An important consideration for MAP in its original recommendation to avoid incorporating amenity values in a geographic cost adjustment was that this recommendation would also avoid incorporating disamenity values in the adjustment. If disamenity values were included, districts with lower housing prices due to disamenities would receive less per-pupil funding, and this would make it difficult for these districts to attract teachers by offering greater purchasing power for other goods and services with the savings generated by lower housing prices. We agree that both the "cost-of-construction" proposal ("revised-net-WCLI-1") and the "revised-net-WCLI-2" are carefully crafted to avoid this danger, as they are reasonably designed to make possible adjustments that are not based on amenity values. Nonetheless, to the extent that further modifications to these methods determine that some districts have lower non-amenity housing costs than the base communities of Laramie and Albany Counties, these lower cost districts will receive less per-pupil funding than they would if "cost-of-construction" or non-rental housing elements were not included. Note that, with the use of the "revised-net-WCLI-2", the loss of funding to Albany County would have been greater if the overall model did not average Albany's costs with those of Laramie County to create a base = 100. This reduction in funding would be justified in accordance with the theoretical underpinnings of the cost-based model.

As the following discussion will show, there remains the possibility that a more variable index has not fully stripped out the influence of amenities. This possibility is difficult to test because we have no easily quantifiable method of controlling for teacher quality. The consequence is that, to the extent Teton County teachers are compensated for presumed higher price levels in the community, the danger must be guarded against that this compensation will permit Teton County to hire better quality teachers than other Wyoming

communities. And, a more serious concern, the opposite may be the case for districts which are less able to offset disamenities, and may be forced to hire poorer quality teachers.

VI - Testing the Reasonableness of the Net-WCLI, with specific reference to Teton County

a) Wyoming's $400 state employee adjustment for Teton County

The State of Wyoming provides a $400 monthly "housing bonus" to state employees in Teton County, to offset the higher cost of housing in that county.

The State Compensation Commission initially recommended that Teton employees receive a salary increment following a widely publicized traffic accident in Teton County to which there was no highway patrol response because no highway patrol officer lived in Teton County. The increment was intended to make the purchase or rental of homes in Teton County more affordable for highway patrol officers. Other state agencies have now adopted a similar policy. About 62 state employees now receive the salary adjustment.

The Compensation Commission, following the practice at a statewide banking firm (one of whose officials was a member of the Commission), initially recommended a salary adjustment for Teton employees of $200 per month. No recommendations of housing adjustments were made for other communities in the state where housing may be higher-priced than average, because salary adjustments in these cases were reported to be considered politically and fiscally unacceptable. After Teton, the next most expensive housing was believed by the Commission to exist in Cheyenne, where over 3,000 state employees would be affected, and it was reported to MAP that the Commission believed that a recommendation of a salary adjustment for Cheyenne employees was not viable. Subsequent to enactment of this policy, the State increased the Teton adjustment to $400 monthly. The official of the banking firm where the policy originated recently told MAP that he believed that $400 was too high; the bank has increased the bonus for its own employees to $300.

State officials who were responsible for this policy are unclear about how the $400 figure was developed. Some believe that the figure was simply the product of guesswork; others believe that the figure may have been based on data provided by the Division of Economic Analysis regarding differences in the price of rental housing in different areas of the state. (Rental price data are collected as part of the WCLI.) However, the Division cannot now locate rental price data which supports the $400 decision.

According to data supplied by the Division from the WCLI, in the second quarter of 1996, the average monthly rental rate for a two-bedroom, unfurnished (excluding gas and electric) apartment in Jackson was $721 and in Cheyenne was

$430, a difference of $291. The average monthly rental rate for a two or three-bedroom, single family (excluding gas and electric) house was $1,077 in Jackson and $684 in Cheyenne, a difference of $383. Data are not available for mobile home rentals for the second quarter of 1996, but for the second quarter of 1997, the average monthly rental expense (including lot rental) was $785 in Jackson and $433 in Cheyenne, difference of $352. These data, of course, include both the consumption portion and the amenity portion of rental prices. Therefore, these data suggest only an upper limit on the price differences attributable to the consumption portion which would presumably be considerably less than the price differences attributable to the full rental prices themselves.

As noted above, the MAP-recommended net-WCLI adjustment was, for the second quarter of 1996, 112.9 for Teton and 99.5 for Cheyenne. If these districts were to adopt the resource strategies recommended in the MAP prototypical models, the average monthly salary for teachers in Teton would be $2,988 (31,758 * 1.129 / 12) and in Cheyenne would be $2,633 (31,758 * .995 / 12), or a difference of $355. We have no data about the relative importance of apartments, houses, and mobile homes for Teton County teachers, but it appears that the net-WCLI adjustment is adequate to offset this rental difference.

It also appears that the MAP-recommended net-WCLI adjustment produces an "added salary increment" for school employees in Teton which is similar to the adjustment currently paid to state employees in Teton. Based on 1996 data, the net-WCLI adjustment for teachers is $45 per month less than the state employee policy, or 89 percent of the amount provided in the state employee policy ($355 vs. $400). However, because the net-WCLI will be recalculated on a regular basis, and because there will also be an external adjustment made to the MAP-recommended model to incorporate changes in education costs over time, the actual difference between the MAP-recommended net-WCLI adjustment and the State housing increment for Teton may presently be slightly more or slightly less than $45. To the best of our knowledge, the State has no present plans to further adjust the $400 Teton increment in the near future.

b) Teacher recruitment difficulties in high housing-cost districts

Another way to test the reasonableness of the MAP-recommended geographic cost adjustment with respect to high housing-price districts is to see if these districts have, in fact, paid higher entry salaries to beginning teachers than other districts, perhaps because of the difficulty of recruiting teachers in high-housing price districts. A second test is to see if high housing-price districts have higher teacher turnover than normal, and whether the MAP-recommended adjustment based on net-WCLI data is likely to be sufficient to reduce higher teacher turnover in high-housing price districts.

As noted above, Teton officials claim that both are the case. First, they note that they actually pay higher salaries to beginning teachers than are called for by their published salary schedule, because they cannot attract teachers to the community due to high housing prices. Thus, the district offers higher salary inducements to new teachers by giving these new teachers up to 7 years' credit for prior experience. Nonetheless, Teton officials state, new teachers quit Teton at a high rate, because once they arrive in the community, they find that housing prices make an acceptable living standard unaffordable.

i) Beginning teacher salary levels.

In its prior analyses, MAP relied on published salary and experience and training tables for each district in the state, published by the Wyoming Education Association. The State Department of Education does not collect or publish such data, so the WEA data were the only data available.

Because Teton officials state that they pay higher salaries than those called for in the published WEA tables, MAP obtained from the Teton district a listing of all teachers employed in 1997-98, along with their years' of teaching service in the district, their post-bachelor's degree units, and the step and column at which they are paid. If a Teton teacher is paid in accordance with the schedule, his/her years of service and his/her step would be identical (after adjustment for comparability: Teton calls its beginning step "0" and its schedule goes to step 18; the WEA converts this for publication as a schedule that runs from step 1 to step 19).

Because previous analyses have been conducted using the 1995-96 published schedules, MAP compared this Teton district list to the WEA published salary schedules for 1995-96. Using these data, we calculated the average salary that would actually have been paid to these first year teachers in 1995-96, based on actual practice this year, i.e., giving these new teachers credit for prior experience in other districts. We also calculated the average salary that would have been paid to these first year teachers if they had been paid in accordance with the published Teton salary schedule for 1995-96. We also calculated the average salary that would have been paid to these first year teachers if they had been paid in accordance with the statewide composite teacher salary schedule for 1995-96. And finally, we calculated the average salary that would have been paid to these first year teachers if they had been paid in accordance with the Cheyenne salary schedule for 1995-96. Teton's practice is, when paying teachers more than the published requirement, to give teachers credit for prior experience in the step assigned but to pay teachers at these higher steps in accordance with the appropriate column based on their actual post-bachelor's credits. The MAP analysis reflects this practice in each of these cases.

In 1997-98, there are 21 first year teachers in Teton. District officials estimate that this is roughly the number of new teachers in 1995-96; if anything, the 1995-96 number was smaller, but MAP did not ask District officials to undertake a data search to confirm this estimate, and this analysis treats the 1997-98 teacher list as though it were a 1995-96 teacher list. Of the 21 first-year teachers, 12 are paid according to the published schedule and 9 are given credit for prior experience. Of these 9, 6 are given credit for 7 years' prior experience (the maximum), 1 is given credit for 3 years', 1 for 2 years', and 1 for 1 year.

Using the 1995-96 salary data, based on their post-bachelors' credits, if these 21 teachers had been paid according to the statewide composite salary schedule, their average salary would have been $21,886. If they had been paid according to the published Teton salary schedule, their average salary would have been $22,528. If they had been paid according to the published Cheyenne salary schedule, their average salary would have been $23,157. (Cheyenne's published rate for a teacher with no credits beyond the bachelor's degree is lower than Teton's published rate, but Cheyenne awards greater increments than Teton to first year teachers who move across "columns" because of additional credits, so the average first year salary is higher on Cheyenne's published table than on Teton's.) In actuality, these teachers, because some had been given credit for prior experience, would have had a 1995-96 average salary of $24,631, based on their credited experience and the Teton schedule.

Thus, newly hired teachers in Teton are paid 9.3 percent more than Teton's published schedule calls for ($24,631 vs. $22,528), 6.4 percent more than Cheyenne's published schedule calls for ($24,631 vs. $23,157), and 12.5 percent more than the state average schedule for beginning teachers with these qualifications ($24,631 vs. $21,886).

The net-WCLI provides a geographic cost adjustment to the Teton district of 12.9 percent over the state average, and of 13.5 percent over Cheyenne. If the current Teton practice of crediting prior service is what is necessary to attract qualified teachers to Teton, it would appear that the net-WCLI provides a sufficient adjustment to fund this cost. The net-WCLI generated salary adjustment would appear to be insufficient only if the teachers Teton actually attracts with such salary increments are less qualified than the state average, and less qualified than is necessary to deliver the basket of educational services. In this case, a greater salary increment would be necessary to attract an adequate quality of teacher. However, MAP presently has no reason to believe that this is the case.

Finally, we note that most teachers (12 out of 21) hired by Teton this year were hired without credit for prior experience and are paid at the bottom step of the salary schedule. Such teachers are apparently available to the Teton District, a reality confirmed by MAP's interview with Teton administrators who stated that Teton receives 80 applicants for each position, and so Teton's decision to hire

teachers with prior experience may be a matter of choice, not necessity. We do not doubt that, when Teton selects teachers with prior experience, it must pay these teachers higher salaries to induce them to accept positions. But Teton is also obtaining, in this process, teachers who are likely to be higher quality teachers than beginning teachers. As the MAP May 1997 report noted, research suggests that teacher quality generally improves with experience, up to about 7 years. Thus, if an analysis of salaries paid to beginning teachers in Teton were quality-adjusted, it may suggest that Teton is not, in fact, paying higher salary to offset higher housing costs, but is rather paying for a higher quality of beginning teaching than is "necessary," assuming that the beginning teachers hired without prior experience credit are adequately qualified to embark upon the normal learning curve for teachers.

ii) Teacher retention.

Teton District officials contend, however, that the current practice of crediting new hires with up to 7 years of prior experience is insufficient to overcome the high price of housing in Jackson. They state that while they can attract teachers to Teton with the present practice, they cannot retain them, and newly hired teachers tend to remain only for brief periods, resigning because they cannot find adequate housing at the salaries they are paid.

To test whether the data support this impression, MAP examined teacher retention rates. This test is, as are the others, imprecise. Teacher retention data are ultimately unreliable for this purpose because a low turnover rate may be maintained, despite unacceptably high housing prices relative to salaries, if a district is willing to accept less qualified teachers in order to fill positions. MAP has no independent measure of teacher quality by which we can evaluate whether this is the case. However, while some district administrators in high-housing price communities (like Teton) noted that they request state credential waivers in order to recruit new teachers, they did not claim that this practice required them to hire teachers who were unqualified, except in this technical sense.

Data are also imperfect for making this test because the only information available regarding teacher retention also comes from the experience tables for district teachers published annually by the Wyoming Education Association. The Wyoming Department of Education presently collects no data on teacher experience, and data collected by Wyoming's retirement system is not usable for purposes of distinguishing teacher years of service. The data we can use, that from the WEA experience tables, is inaccurate in that it reflects credit for prior service granted by districts for new hires. However, we assume that the practice of granting prior credit is mostly restricted to districts like Teton that claim a difficulty in recruiting teachers because of high housing price levels. In MAP's interviews with district officials in the Fall of 1996, only a few districts (Teton, Sweetwater #2) claimed that difficulties in attracting teachers led them to adopt a

policy of granting experience credit for teaching experience prior to hire by the district. We assume, therefore, that the WEA statewide composite experience table is approximately accurate for our purposes.

We combine these WEA statewide data with the teacher list we obtained from the Teton district, showing actual hire dates. It is worthwhile noting that a further adjustment had to be made by the district in its seniority list before it could provide this list to MAP for the purpose of this analysis. In several cases, hire dates had to be corrected to show the date an employee actually began teaching, because some qualified teachers were sufficiently eager to teach in this district that they initially took teacher aide, substitute, or clerical positions while they waited for a teacher opening. District officials explained that while they feel they must offer higher salaries to out-of-state teacher recruits to offset the cost of housing in the community, they are also able to take advantage of a supply of residents who were established in the community (spouses of community residents already employed, for example) and who wanted to teach in the Teton District. It is not possible to determine which factor predominates in the Teton District's hiring efforts (a surplus of community residents wanting jobs in the District, or a shortage of candidates that must be overcome by attracting out-of-state teachers who cannot afford housing in Teton), but it is undoubtedly the case that in discussions of Wyoming's geographic cost adjustment for education, District officials are more likely to emphasize the latter group than the former. This is understandable, but it suggests caution in how anecdotal evidence is weighed for this purpose.

As in our salary comparisons, the data we use for this analysis is also not strictly comparable, because we are comparing WEA published statewide data for 1995-96 (a total of 6,490 teachers) with a current listing of teachers obtained from the Teton district for 1997-98 (a total of 188 teachers). We assume, therefore, that the 1997-98 Teton list has similar characteristics to a list we would have obtained with 1995-96 data, and so treat it as though it were a 1995-96 listing, even though the published WEA experience table for Teton shows a total of only 163 teachers. We cannot explain this discrepancy, as it appears to be too large to be attributable solely to enrollment growth from 1996 to 1998.

An additional factor complicates this analysis. If Teton enrollment growth has been faster in recent years than enrollment growth in the state as a whole, this would require Teton to hire more new teachers than the state as a whole and, thus, a high proportion of teachers with less experience might not necessarily indicate a difficulty with teacher retention.

Teton District enrollment grew by 26 percent in the 7 year period from 1988-89 to 1995-96, while statewide enrollment in Wyoming grew by 2 percent in this period. Thus, we would expect Teton to have a considerably higher proportion of less experienced teachers than Wyoming as a whole, even if teacher retention was not difficult for Teton.

From the fact that Teton enrollment grew by 26 percent in the 1989-1996 period, we conclude that enrollment growth alone should result in 48 teachers with 7 years or less of seniority (188 * .258). We attribute a quantity of less experienced teachers in excess of 48 to teacher turnover.

From the fact that Wyoming state enrollment grew by 2 percent in the 1989-1996 period, we conclude that enrollment growth alone should result in 126 Wyoming teachers with 7 years or less seniority (6490 * .019). We attribute a quantity of less experienced teachers in excess of 126 to teacher turnover.

According to the WEA experience tables, statewide in 1995-96, 2,280 teachers, or 35 percent of the teachers in the state, had 7 years or less experience. We attribute 2 percent from this group (126 teachers) to enrollment growth and 33 percent (2,154) to teacher turnover.

According to district-generated listing of Teton teachers, Teton had 89 teachers (47 percent of all Teton teachers) with seven years or less seniority in the district. We attribute 26 percent from this group (49 teachers) to enrollment growth and 22 percent (40 teachers) to teacher turnover. (As noted, this is a rough estimate, because data are not strictly comparable: because of lack of data, we use available data here for enrollment growth from 1989 to 1996, but for seniority for Teton teachers hired from 1991 to 1998.) Some of these newly hired teachers from the "turnover" group replaced teachers who retired, but others replaced teachers who left before retirement.

All other things being equal, we would expect teacher turnover in Teton to be higher than in the state as a whole, if the claim was correct that the price of housing was inducing teachers to leave after only a few years of service. The fact that teacher turnover is considerably lower than in the state as a whole (22 percent vs. 33 percent) leads us to believe that some factor is inducing teachers to remain in Teton longer than they would remain elsewhere in the state.

The two most likely causes of low teacher turnover in Teton are the ability of the district to pay higher salaries or the amenities of the community. As noted above, the salary differential currently paid by the Teton district does not seem to be sufficient to explain the lower turnover, and this differential will increase once the district receives a geographic cost adjustment based on the net-WCLI. Therefore, it is likely that, despite the high price of housing in Teton, the offsetting attractions of community amenities are sufficient to retain teachers in the district.

We conclude that this examination of Teton teacher seniority and pay does not provide a compelling reason to further exacerbate the adjustment.

VII - Other States

Four other states (Ohio, Florida, Texas, Colorado) currently adjust education revenues to districts for variations in the geographic cost of providing education. Policymakers in these states are similarly concerned with the possibility of exaggeration resulting from inclusion of housing costs in calculating this adjustment.

In Colorado, a situation exists in several locations that is similar to that described for Wyoming's Teton District #1, where teachers commute from lower-priced communities in Idaho. In Colorado, teachers employed by districts in communities with high housing prices often cannot afford to (or choose not to) live in the communities where they teach, but rather live in lower cost adjacent communities and commute to higher cost communities to work. The State of Colorado has chosen not to risk overcompensating districts in high-priced communities by basing district revenues on the prices in those communities. Rather, Colorado adjusts revenue to districts by utilizing the consumer prices prevailing in the communities where teachers reside, not in the communities where they teach. A Colorado district's revenue is adjusted by the weighted average of price indices obtained in the zip-codes where the district's teachers actually reside. Thus, in cases where teachers live in lower priced communities, it is these lower prices that affect district revenues, not the higher prices in the districts themselves. If this method were applied to Wyoming, an index number for Teton would be based on prices in Idaho, to the extent teachers lived there.

This Colorado approach to avoiding overcompensating high-amenity districts is not generally applicable to Wyoming because WCLI index numbers apply to entire counties, not to zip codes. It is also very complex, requiring an annual (or biannual) survey of teacher residence addresses and the incorporation of these data in the overall cost adjustment.

In Ohio and Texas, geographic cost adjustments are not based on consumer prices, although the experience in these states is nonetheless relevant. In both cases, state policymakers have taken steps to avoid exaggerated index numbers that might be generated by endogenous district data. In Texas, actual teacher starting salaries, not consumer prices, are utilized to make a geographic cost adjustment, but the starting salaries used are those of surrounding districts, not that of the district itself. In Ohio, wage data is utilized to create an index but, as in Texas, a district's index number is based on data from surrounding districts, not on data in the district itself. Ohio further assures that exaggerated values not be used by artificially restricting the range permitted to be generated by relative wages: currently the maximum range is 9.1 percent. A recent Ohio court decision found the system unconstitutional, and Ohio policymakers are currently considering a new methodology. But under the new methodology the range would also be artificially restricted, though to 18 percent. Neither the Texas nor the Ohio methods for attenuating the range of variation are available in

Wyoming, because both the Texas and Ohio methods require geographically small districts or counties whose economic conditions are affected by the immediately surrounding districts or counties.

In Florida, the state Department of Education has commissioned an academic study of its geographic cost adjustment methodology. One of the subjects being studied is whether the present method of adjustment (Florida utilizes assessor's valuations, not rental prices) inappropriately captures amenity values producing excessive variation in its index. The academic study has not yet been completed.

VIII - Avoiding Erratic Fluctuation in the Geographic Cost Adjustment

MAP recommends a further modification in the way in which Wyoming revenues to school districts are adjusted for geographic cost differences. This modification is designed to avoid erratic fluctuations in the "revised-net-WCLI-2" that may result from either temporary economic phenomena or mis-estimation of price changes in the data gathering for the WCLI.

Because of the inherent imprecision of price indices, compounded in this case by the relatively unsophisticated (compared, for example, to that conducted by the Bureau of Labor Statistics in its Consumer Price Survey) data collection which the Division of Economic Analysis can undertake, there is the danger that a single data report of the WCLI may contain values that are aberrant, either because of data collection error or because of very transitory local economic phenomena.

Therefore, MAP recommends that, when revenues are actually distributed to school districts by the state, these revenue amounts be adjusted not by a single WCLI report, but by an average of the prior three years' reports (i.e., six semi-annual reports). This will prevent exaggeration of the cost adjustment by temporary spikes in index values.

There are two advantages to this rolling three-year average. First, as noted above, errors or transitory phenomena will be reduced in influence. Second, school districts' revenues will be more stable and predictable for district officials who must plan programs based on expectations of revenue.

There is one disadvantage to this procedure. In the event of a genuine local economic boom, the index will be slower to catch up with the higher prices districts and district residents may face.

MAP regards the advantages to outweigh the disadvantage. It is customary in the American economy for there to be a lag in compensating employees for rapid inflation. Few Wyoming school districts will leave the district's employ immediately upon signs of higher prices in the community. The

district can be confident that, if higher prices become permanent, these prices will eventually be offset by a greater adjustment in district revenues.

Of course, by the same token, an index that is slow to compensate districts for rapidly rising prices in a regional economic boom, will also be slow to penalize districts that experience falling (or more slowly rising) prices in a regional economic downturn. This is also an advantage.

For these reasons, MAP recommends that the geographic cost adjustment for Wyoming districts be calculated using the six most recent WCLI reports by the Wyoming Division of Economic Analysis.

IX - Summary and Conclusion

MAP initially recommended that geographic differences in costs between Wyoming districts be offset by a revenue index calculated from consumer prices, not including housing prices. Housing prices were excluded because they include both the price of housing consumption and a market response to the scarcity of housing in high-amenity communities. These are not easily separable in the WCLI, so to include housing would create an unconstitutional advantage, with funding in excess of costs, for high-amenity school districts and an unconstitutional disadvantage, with funding below costs, for low-amenity districts.

The Economic Analysis Division of the Wyoming Department of Administration had recommended modifying this proposal by including in the calculations of the geographic cost adjustment data relating to the cost-of-construction of housing, in place of data in the WCLI relating to the price of rental housing. The Economic Analysis Division does not currently collect data on the cost-of-construction in its semi-annual consumer price survey, but the Division could begin doing so.

MAP believes that it is premature to include cost-of-construction data, because the methodology of calculating cost-of-construction prices is experimental; it may not necessarily assure greater accuracy than the currently recommended net-WCLI. This methodology should be reviewed if and when it has been further developed. Similarly, MAP concurs with the conclusion reached by Division of Economic Analysis, that a hedonic price index would not be appropriate in this context.

MAP does conclude, however, that it may be easier than we previously believed to separate the price of housing consumption from a market response to the scarcity of housing in high-amenity communities. This can be done by including in the net-WCLI subcomponents of the housing index other than those relating to rent of shelter. MAP recommends that such an index, referred to in

this memorandum as the "revised-net-WCLI-2" be adopted by Wyoming in place of the net-WCLI.

However, while this recommendation is theoretically justified, several tests-for-reasonableness of the current net-WCLI confirm its validity. The results of the MAP-recommended index have been most controversial when applied to Teton County. We find, however, that the MAP-recommended index produces a salary increment for Teton County that is similar to the bonus presently provided by the State of Wyoming to state employees in Teton County; this state bonus was developed without any theoretically based methodology and there is also no official theory to determine how or when the bonus should be adjusted for changing circumstances. Its present level, however, appears reasonable to policymakers. We also find that the current difficulty experienced by the Teton County School District in attracting teachers, due to the high cost of housing, does not seem to be excessive in comparison to difficulties in attracting teachers faced by the rest of the state, and that the increment for Teton salaries generated by the net-WCLI seems, superficially, to be adequate to enable the Teton district to staff its classrooms. It is possible that, because of the inherent imprecision of this endeavor, adoption of the "revised-net-WCLI-2" will increase the variation in Wyoming education funding to the extent that variation in teacher quality will also be induced. We urge the state to monitor the effects of this "revised-net-WCLI-2" so that any such induced quality variations can quickly be identified and the methodology reconsidered, if need be.

Only a few states attempt to adjust education spending for geographic cost variation. But of those that do, the problem of avoiding excessive geographic cost adjustments for education is not unique to Wyoming. Other states with geographic cost adjustment policies for education have faced this problem and they each (except for Florida, where the problem is still under consideration) have attempted to develop methods of addressing it. In each case, the method is designed to attenuate the variation generated by district-level data. Because Wyoming is relatively sparsely populated, it does not have the option of utilizing data from adjacent districts in making a geographic adjustment. Therefore, Wyoming policymakers must be especially careful to avoid utilizing geographic adjustments, based on local data, that may exaggerate the true cost differences.

One step that can be taken to avoid erratic fluctuations in the geographic cost adjustment is to use a rolling three-year average of "revised-net-WCLI-2" index numbers rather than only the most recent data.

One step that can be taken to avoid erratic fluctuations in the geographic cost adjustment is to use a rolling three-year average of "revised-net-WCLI-2" index numbers rather than only the most recent data.

In conclusion, MAP recommends changing the methodology for geographic cost adjustments, as it relates to the price of housing, by including non-rental subcomponents of the housing component of the WCLI. And MAP recommends a rolling average be used for the full geographic cost adjustment, not the most recent data alone. This is, however, a very complex and imprecise issue, and MAP is prepared to reconsider these recommendations if additional reasons or new data are brought forward.