Regional Cost Adjustment in Wyoming

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Regional Cost Adjustment Study Report

Executive Summary:

While the Constitution of Wyoming calls for equity in opportunity of education, current education financing in Wyoming allows adjustments to school district funding for uncontrollable cost differences in the provision of education across districts. These adjustments are not equal, and yet have been ruled constitutional because the courts have recognized that not all districts face equivalent education cost conditions. One source of cost variations occurs due to regional cost variations in salary levels. In response to a court-ordered requirement to design a cost-based system of school funding, Management Analysis & Planning Associates, L.L.C. (MAP), a consulting firm with expertise in public school finance was contracted to develop a school finance system for the State of Wyoming. Their efforts resulted in a comprehensive funding model, developing prototypical instructional models and defining specific expense adjustments for district cost variations. MAP's recommendations called for the use of a modified form of the Wyoming Cost of Living Index (WCLI)- removing housing and medical costs and using the resulting index to estimate regional cost adjustments, which are applied to salary costs. In a judgment written in February 2001, this funding adjustment was determined to be unconstitutional. Courts held that removal of the housing and medical components from the WCLI *"undermined its validity"*. Further, the Court ordered *"statewide average salaries must be adjusted for the full cost-of-living differences using either the entire WCLI or another reasonable formula which includes a full housing component, including the rental of shelter costs, and a medical component to cover costs not included in the benefits portion of the salary component."* In response to this ruling, regional cost adjustments in the funding model were revised to use the WCLI including housing and medical components.

Even after these changes were made to the regional cost adjustment in response to the Court's decision, the political controversy surrounding the issue of regional cost adjustment in the State remains. Though it is agreed that some form of regional cost adjustment is appropriate in Wyoming, agreement has not been reached regarding the form this should take beyond the court requirement that any adjustment be cost-based. Several methods are commonly used in other states to adjust for regional cost variations. The underlying assumption made is that equivalent education outcomes can be achieved across districts if equal resources are made available to purchase the inputs to produce them. Regional adjustments are made to accomplish this goal. The problem is to define methods of estimating these cost variations so that proper adjustments can be made. Two broad approaches have generally been taken to accomplish this task:

(i)   Estimating regional cost of living differences across districts.
(ii)   Estimating regional cost of education differences across districts

The most common methodology to identify underlying education cost differences is to estimate differences in the cost of living from place to place. It is presumed when using his type of adjustment that cost of living variations are the main determinant of differences in salary demands across districts. Two methods are commonly used to

estimate the impact of living costs on regional salary differences: estimation of general worker wage levels in the region as an indicator of underlying cost of living pressures, and the "market basket" approach, which directly estimates variations in the local prices of goods that are assumed to determine local salary demands. Previous studies have determined that suitable wage data does not exist in Wyoming to create a wage index that would be useful in making regional cost adjustments for education funding. For this reason the WCLI was adopted for use in defining these adjustments.

In Wyoming, after baseline funding levels are determined for each district, personnel costs are multiplied by the WCLI value estimated for the county the district is located in. If these index values are greater than 100, the district funding is increased, and if it is less funding is decreased. In this way, the adjustment mechanism increases funding to areas where living costs are high, which is presumed to drive up salaries in those locations, and it is reduced in districts with lower costs of living. To avoid sudden decreases in school funding, a temporary hold-harmless provision currently exists in school funding across the State, allowing districts to be guaranteed previous funding levels if the school finance model reduces funding they receive.

This report identifies a systematic pattern of under-funding when the current regional adjustment mechanism is applied; smaller school districts are the predominant type of district to experience this problem and this occurs for several reasons. The first is the fact that living costs in Teton County are so high they cause the index values in other areas of the state to fall as the WCLI creates a price index that measures relative price differences around the State. When other district's WCLI values are lowered, their school funding is decreased. The second reason smaller districts are under-funded is that the adjustment method used in the model does not account for amenity effects. Smaller districts generally have lower than average cost of living levels primarily because housing costs in these areas are very low. Cost of living, however, is not the major contributor to salary costs in these areas. In small areas, remoteness and a lack of amenities will drive up the salary required to attract teachers. Amenities also distort funding levels in districts with very high WCLI values, potentially causing districts to be over-funded. In Wyoming this occurs in Teton County where housing prices are much higher than anywhere else in the State. The high abundance of amenities in this area, however, are the reason for these high prices and also imply teachers are potentially willing to reduce salary demands for the opportunity to live and work in the area. Overall, the problem with the WCLI as it is used in regional cost adjustment is the lack of control it has for variations in amenity levels across the State and this distorts school-finance outcomes. Small remote regions are generally under-funded while resort communities tend to be over-funded.

An alternative methodology of estimating regional cost variations is to use a statistical adjustment using actual cost data. To avoid the incentive problems of administrators using their expenses to influence future funding, estimating the cost of education is not conducted by comparison of actual district expenditures, but instead using a statistical technique called regression analysis. In education finance, regression analysis can be used to account for and estimate the impact of amenity differences on regional variations in the cost of education, something that cost of living approaches cannot accomplish. This is an especially attractive feature of this methodology when

there are wide variations in the amenity differences across school districts and counties in Wyoming.

For Wyoming, two approaches are possible in the statistical estimation of education costs. The first is to estimate the cost of providing a comparable level of education *services* across districts. This requires a direct estimation of the cost of the required inputs to produce the desired level of education services. Since in Wyoming the regional cost adjustment is to be applied in the existing funding formula to personnel costs, this would require the estimation of the resources each district would require to hire staff capable of producing those services. The second approach is to estimate the cost of comparable educational *outcomes*. This is a more complicated estimation of the expenditure required to achieve a target level of educational attainment as it estimates both input price and productivity effects on education costs. Such estimations are not presented in this report, but will be the basis of an additional report submitted in June 2003.

All methods of regional cost adjustment available to Wyoming will require the use of WCLI data to account for the importance of goods costs across regions. This report finds that use of the WCLI is problematic for several reasons. First, there are pre-existing bias problems with the WCLI that should be corrected if it is to be used for policy analysis or school finance. These problems can cause housing costs in particular and the overall index outcomes in general to be incorrectly measured. Several recommendations are made here to improve the reliability of the WCLI. These include:

- That Afton, Wyoming be included in the sample sites used to measure prices around the State. Use of the current WCLI survey sites cause an inaccurate estimate of goods prices in this area, which has detrimental effects for the education funding of Lincoln County District #2.
- That a consumer expenditure survey be conducted in Wyoming. The current construction of the WCLI likely over-weights the importance of housing in the index relative to Wyoming consumption patterns. This has important implications for school finance and regional planning, and the data should be corrected for this possible bias.
- That automobiles be priced statewide in the index. Currently, they are only priced in Cheyenne thus a potentially important source of price variation across the State is not measured by the WCLI.
- That data collection methods be defined to ensure rental equivalence in the housing price component of the WCLI. To control for variations in housing rental quality across the State, the procedures used by the Bureau of Labor Statistics could be adopted. This would eliminate and important source of bias in WCLI data and could have significant implications for school finance if it changes index outcomes.

Total estimated cost of all WCLI recommendations is estimated to be less than $25,000 annually, and would result in higher quality data better suited for use in defining education-funding levels.

The second problem with using the WCLI to index counties stems from the fact that traditional methods of adjustment lead to distorted estimates of regional cost. Even

if all of the recommendations described in this report to improve this index were adopted, it may still be the case that using the WCLI in regional adjustment as it is traditionally used, may be improper for Wyoming. While districts with high living costs will have to pay higher salaries to attract teachers, those districts with a relatively small population or fewer amenities may also be required to pay teachers higher salaries. Those small or remote districts required to make such adjustments in salary are likely to also record low WCLI values as the cost of housing in areas people find less attractive to live is generally low.

Due to the influence cost of living and amenity effects have on salaries in Wyoming, the linear adjustment method proposed in the State school-funding model should be discarded. Instead, it is the recommendation of this report that an amenity-cost of living adjustment, or "amenity adjustment" be used that accounts for both costs of living and amenity effects on salary demands in Wyoming. This is accomplished by statistically estimating a relationship between salary levels in the State and the WCLI, and then creating an adjustment index using the estimation results. Simulations presented here suggest such an adjustment would increase total school funding by less than 1% over current levels, but reduce under-funding payments to districts (as measured by their hold-harmless funding) over 60% relative to the original regional adjustment methods proposed. A caveat remains with the suggested adjustment mechanism; the methodology may create incentives for administrators to increase starting salary to influence their district's funding levels. For this reason, this report recommends that within the next year a more rigorous statistical adjustment be defined that maintains the ability to account for salary demands in all regions of the State, while also minimizing incentives for discretionary district decisions that impact regional adjustment estimations.

This report is presented in seven sections. Section I provides a background, describing the recent history of education finance in Wyoming and the problem of regional cost adjustment. Section II describes how regional cost adjustments are performed in other states, while Section III describes how the MAP model originally and currently proposes these adjustments be performed in Wyoming. In Section IV, the potential adjustment methods open to Wyoming are discussed. Since WCLI data will be necessary in any regional adjustment analysis the State may choose to make, it is recommended an investment in improving the price data the State gathers should be made. Section V details the potential WCLI improvements that could improve its estimate of cost of living changes. It is important to recognize this data is fundamentally important to State policy-making as well as in estimating school finance adjustments regardless of the methodology employed. Section VI describes a series of simulations using various WCLI indexation adjustments for regional cost variations. The results indicate that the use of traditional cost of living adjustments are fundamentally flawed when used in Wyoming, overcompensating some districts while drastically under-funding others. This section then details an alternative method of adjustment and simulations are presented describing its potential for use in performing regional cost adjustments. Following the simulations, the data requirements are outlined for potential alternative statistical adjustment methodologies that could be used on a permanent basis. These will be developed and presented in the final report to be submitted in June 2003. Finally, in Section VII, some concluding remarks are offered.

I. Background.

While the Constitution of Wyoming calls for equity in opportunity of education, current education financing in Wyoming allows adjustments to school district funding for uncontrollable cost differences in the provision of education across districts. These adjustments are not equal, and yet have been ruled constitutional because the courts have recognized that not all districts face equivalent education cost conditions. These differences may arise from two general sources of cost variation:

(i) Need: Differences in provision of educational services and programs by district. These arise due to differences in the composition and demographics of the student population, for example with respect to special needs and language proficiency. The provision of special programs to meet these needs may increase costs and may require districts to hire teachers with specific qualifications and experience, which may also influence costs.

(ii) Regional differences that affect district production costs of education yet are outside of a district's control. These may arise from
- (a) Price: Input cost differences may arise due to local energy or labor cost variations. Labor costs may differ if districts have higher living costs, are more remote, or if local amenities or other local advantages make positions in certain areas more desirable.
- (b) Productivity: Regional productivity differences may be present across districts. These are often referred to as differences in potential "economies of scale". These can arise due to the presence of small schools or districts, which may require a higher average level of inputs per student to provide an equivalent quality of education. Population density differences may influence costs through their impact on available economies of scale in the provision of education, transportation and operating costs, raising costs in less densely populated areas.

In response to a court-ordered requirement to design a cost-based system of school funding, Management Analysis & Planning Associates, L.L.C. (MAP), a consulting firm with expertise in public school finance was contracted to develop a school finance system for the State of Wyoming. Their efforts resulted in a comprehensive funding model described in Guthrie, *et al* (1997). This model develops prototypical instructional models and defines separate expense adjustments for both types of cost variation described above. In general, this proposal has been upheld as constitutional and acceptable as a means of defining a cost-based education finance model, however, in a judgment written in 2001 several funding adjustments in the model were determined to be unconstitutional, specifically provisions describing

- Inflation adjustment
- Administrative and classified salaries
- Maintenance and operations
- At-risk students

- Vocational education
- Classified wages
- Small districts
- Small schools
- Regional cost adjustments.[1]

Smith (2002) describes MAP's suggested responses to these issues. With respect to regional cost differences, MAP's recommendations called for the use of a modified form of the Wyoming Cost of Living Index (WCLI) to be used to adjust salaries paid by each district for cost of living differences. Originally, MAP recommended the WCLI be used after the effects of rental housing and medical costs were removed. Courts held that removal of the housing and medical components from the WCLI *"undermined its validity"*. In its ruling of February 23rd 2001, the Court ordered *"statewide average salaries must be adjusted for the full cost-of-living differences using either the entire WCLI or another reasonable formula which includes a full housing component, including the rental of shelter costs, and a medical component to cover costs not included in the benefits portion of the salary component."* As described in Wolkoff (2002), in response to this ruling MAP recommended a revised regional cost adjustment mechanism utilizing all components of the WCLI. The exact mechanism originally proposed by MAP and the revised recommendations are described in more detail below. In the current education funding formula used in Wyoming, regional cost adjustments for differences across districts in the cost of inputs are to be applied to personnel costs only, or approximately 82% (Guthrie et al, 1997) of the funds allocated to a district. Given the current model of school funding defined, other adjustments for small schools and small school district productivity differences (scale economies) may also be needed to account for additional factors affecting a district's cost of delivering education.

In 2002, the Wyoming Legislature authorized a study to determine if an alternative index could be defined to provide a "reasonable formula" to measure differences in costs that affect salaries across districts.[2] This report constitutes the initial report describing possible modifications to the WCLI to improve it and its use in school finance. Future research considering both small productivity and input cost differences may be appropriate for Wyoming. A final report to be completed no later than June 1, 2003 may consider such issues in more detail.

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[1] State of Wyoming et. al. v. Campbell County School District et. al., February 23, 2001. Text of this ruling is available online at http://legisweb.state.wy.us/2001/schoolFinance/01decision.htm.

[2] Session Laws of Wyoming, 2002, Chapter 76, School Finance Amendments (Original Senate File No. 51, pp. 151-174) Section 13: Regional Cost Adjustment Study, pp. 28-29. Engrossed copy online: http://legisweb.state.wy.us/2002/schoolfinance/schfinance.htm.

II.   Estimation of Regional Differences in Education Costs: an Overview.

An ideal measure of regional cost differences would allow identification of cost trends over time, and would differentiate between quality changes required by local areas or the State and input and production cost effects. The science of estimating regional differences in the cost of providing an equivalent quality of education is still primitive.[3] Several methodologies have been used in different areas of the country but none of these methods can be judged as absolutely superior to the alternatives. Methodological differences employed across states reflect differences in approach, as well as data limitations and political considerations. Further, no methodology can be judged to be absolutely precise, therefore it is inevitable that some districts affected by regional funding adjustments will argue regional cost estimates do not accurately reflect their true costs regardless of the methodology used. Nevertheless, use of a well-considered mechanism of estimating regional costs differences will improve the funding adjustments required to ensure an equitable delivery of education.

Nationally, there has been a growing demand for better methods of estimating regional costs differences in education. This has arisen for three reasons: (i) the "market" for education inputs required to produce education services is not competitive.[4] If it were, expenditures on these inputs would reflect the true costs of education and could be used to estimate underlying cost differences. Since these markets are not competitive, however, although expenditures may be influenced by actual cost differences, they may also reflect discretionary choices by school districts that do not reflect these costs. Resource allocation must differentiate between actual costs and discretionary choices. (ii) Allowing education funding to be determined by actual expenditures would remove the incentive for districts to minimize their costs and deliver education services efficiently, thereby increasing the general cost of education to taxpayers. (iii) the principle of educational equity requires that, given the potential existence of education cost variation, adjustment needs to be made. Ten states, including Wyoming, make some form of regional adjustment for differences in input costs and variations in potential small school and district scale diseconomies.[5] Methodologies employed by state to make these adjustments vary as described in Table 1.

Of the states listed in Table 1, all but one (Nevada) make input cost adjustments, while five states (Alaska, Colorado, Nevada, Texas and Wyoming) make adjustments that recognize the existence of scale economy differences across districts. Of the nine states that utilize a regional input cost adjustment, four (Alaska, Colorado, Florida and Wyoming) utilize a price index, while three use wage data (Massachusetts, Ohio and

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[3] Note, for the purposes of this analysis it is assumed that when regional variations in programs offered, adjustments for these are taken care of elsewhere in the funding formula.

[4] Markets for educational inputs such as teachers and school personnel are not competitive. For example, educational staff are specialized, and often highly unionized, while school districts are often the dominant or only consumer of this specialized labor in many areas. For these reasons, prices at any point in time may not reflect the true values underlying them and may differ across regions due to the relative influences of such factors. Absent such market "imperfections", prices would tend to equalize across localities to the "competitive market price", the lowest price possible given costs.

[5] Ten states, Alabama, Georgia, Minnesota, Mississippi, New Mexico, Oregon, Utah, Washington, West Virginia and Wyoming also make adjustments to districts based on differences in the training and experience levels of staff (Thompson and Silvernail, 2001).

Tennessee) to adjust district funding for personnel. Of the remainder, Virginia's adjustment is not indexed but legislated, while Texas uses a single adjustment that accounts for both input and scale economy effects. The differences in how states approach the problem of regional cost variation is illustrative of the problems faced in defining such adjustments. Some adjustments, like that used in Texas, use complex statistical estimation to determine the cost of education across districts. Others use simpler adjustments based on regional wage or price conditions or direct legislation of a fixed adjustment. While it is true that the more complex the adjustment, the more controversial it is likely to be, it could also be argued that the simpler the adjustment the less likely it is to account for true cost differences. Most states recognize the complexity of the issue requires cost-based considerations to ensure efficiency and equity. Given the political implications of resource redistribution in school funding decisions, some states have ensured that districts may only benefit from such adjustments (Colorado, Florida, Ohio and Virginia) by allowing regional cost variations only to increase funding, and another (Massachusetts) ensures that such considerations cannot negatively impact disadvantaged areas. Given trends and court decisions across the county in the last two decades, the importance and demand for identifying better regional adjustment methodologies will grow as more states adopt such adjustments in the future. Wyoming's efforts will influence future state's decisions as problems this state faces are common to many regions just beginning to consider such adjustments.

Table 1: Survey of State Regional Adjustments for Input and Productivity Differences

State	Adjustment Methodology
Alaska	Two adjustments are made. An input cost adjustment is made using a cost of living index for each of the 54 districts in the state. The second adjustment accounts for the scale economies that can be realized in larger districts by imposing an adjustment based on the cost of "instructional units" in districts relative to those in Anchorage.
Colorado	Two adjustments are made. The Legislative Council of Colorado constructs a cost of goods index measuring differences in the costs of housing, goods and services across different regions of the State. Index values across the regions, which range from 1.007-1.630 are applied to the personnel portion of the statewide base allocation. A second "personnel cost factor" is also applied to districts to adjust for economies of scale.
Florida	Only an input adjustment is made using a moving 3-year average of the Florida Price Level Index produced annually by the executive office of the Governor. This is applied in the state funding formula to each of the 67 districts. Index values are limited to a range of 1.000 and 1.2279.
Massachusetts	Only an input adjustment is made using a "wage adjustment" factor. This wage index is computed using all occupations in 25 regional areas and is used to adjust for differences in cost of living and salary expectations across the State. In 1998, the adjustment factor ranged between 0.834 and 1.073. Additionally, no district with a high incidence of poverty can be assigned an adjustment factor less than 1.00.

Nevada	A productivity adjustment is made for scale economies across districts in the State and local wealth. Districts are classified as large, centralized, rural and small, with adjustments made using a district's cost per pupil relative to the statewide average for similarly classified districts.
Ohio	Only an input adjustment is made using a "cost of doing business" factor constructed with wage data describing all workers in the State. Using the fact that Ohio's counties are all rectangular in shape, an index value for each district is defined using the average weekly wages in the county in which each district is located and the average weekly wages in each of the four contiguous counties. Index values are then rescaled to values ranging from 1.00 to 1.089 to be used to compute each district's school funding support.
Tennessee	An input adjustment only is made using a comparison of average local non-governmental wages and average statewide non-governmental wages. This "costs of positions" adjustment is then used in the State's funding formula.
Texas	One adjustment is made to account for both input and scale economy differences across districts in the State. Using a comprehensive methodology that uses regional district data including geographic location, size, area, density, educational characteristics, economic conditions, beginning teacher's salaries, and factors such as enrollment growth that impose pressure on facility needs, a statistical estimation is performed to construct a Cost of Education Index, which is then used to adjust district funding.
Virginia	An input cost adjustment is made for the seven county and two city districts near Washington, DC to reflect the higher cost of living in that area. Instructional salaries are increased by 9.83% while support salaries are increased by 19.07%.
Wyoming	Both input and scale economy adjustments were part of the original school-funding model, however, both adjustment methodologies were ruled unconstitutional in February 2001. The original input adjustment recommended using the State's Wyoming Cost of Living Index, collected by the Economic Analysis Division of the Department of Administration and Information to adjust for differences in personnel costs. A separate adjustment was then applied in the school funding formula for small schools and districts. Since both adjustments have been ruled necessary as part of any cost-based funding model, there will be some form of adjustment in the final school funding model though their specific form has yet to be decided.

Sources: Fowler and Monk (2001), Thompson and Silvernail (2001), Smith (2002).

III. Regional Cost Adjustment in Wyoming: The MAP Proposal

Complete and detailed discussion of the school-funding model proposed by MAP is outside the scope of this report. For a complete description, see Guthrie *et al* (1997).[6] To incorporate a regional cost adjustment, prototype models based on historic data were use to estimate base salary levels and total prototype personnel costs. MAP presumed that Albany and Laramie County personnel costs were likely the outcome of the most competitive labour market in the State due to their proximity to Colorado and the Denver metropolitan area and therefore should constitute the reference case for personnel expenses. To estimate a reasonable geographic adjustment, since personnel costs determined the majority of a school district's costs it was further presumed that salary agreements would be determined by local cost of living considerations thus a geographic cost adjustment utilizing a cost of living index was recommended.[7] To implement such an adjustment, MAP recommended that a modified version of the Wyoming Cost of Living Index (WCLI) be used.[8] At the time, the WCLI defined a cost of living index value for each of Wyoming's 23 counties (relative to the statewide average) by pricing 140 separate items representing housing, transportation, food, recreational and personal care, medical and apparel expenses for a hypothetical consumer in 15 sample sites.[9] In the intervening period and partially in response to the needs of the school-finance model, the WCLI has been expanded to allow data collection in all 23 counties of the State. This change has increased the number of sample sites from 15 to 27, and county WCLI values are defined by outcomes in their sample center, or if there are two centers in a county, by the population weighted average value of measured prices in the two centers. This survey is carried out every six months, in the second and fourth quarters of the year.

When constructing an education cost index for Wyoming, MAP noted that housing costs differ widely in the State and that higher housing prices, especially in the Jackson area, reflect an "amenity value" that is determined by beneficial local attributes that will also influence salary decisions. MAP reasoned that because natural amenities in Teton County and to a lesser extent, other resort areas of the State, increase housing costs but also increase the attractiveness of employment positions, increasing personnel funding to compensate for housing cost variation would create a "double compensation" in these areas. Such an adjustment, they argued, would subsidize salaries for differences in goods prices *and* amenity benefits people enjoy when locating in such places, creating an unfair funding advantage for such regions. To overcome this problem, MAP recommended dropping the housing component from the WCLI when making geographic cost adjustments. MAP also recommended dropping the medical expense category from

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[6] While estimating the costs required to provide adequate and equal education, the model did not dictate how districts should allocate education funds. These decisions are left to local district officials

[7] MAP also considered the use of a labour-cost wage index, however, they determined that the data to construct such an index for Wyoming is unavailable. This is commented upon further in the sections following.

[8] This index is constructed from data collected by the Economic Analysis Division of the Department of Administration and Information.

[9] Counties in which the sample site was located received an index value based on the cost of the basket of 140 goods at that sample site. The remaining eight counties received index values imputed from the costs at these 15 sites and based on an assessment of local similarities between unmeasured counties and those measured.

the indexation used for school funding, as they argued that teacher's health benefits are relatively uniform across the State and that the WCLI captured local medical cost disparities that were unlikely to affect the average education employee. To implement a regional cost adjustment, MAP recommended the following 3-step methodology:

- Defining county goods price differences by using WCLI data after removal of housing and medical expenditure categories and adjusting the weights of the remaining expense categories (transportation, food, recreational and personal care, and apparel expenses) to maintain their total expenditure.
- Defining regional education cost adjustment factors by rescaling these new county WCLI values relative to the population-weighted average cost of surveyed items in Laramie and Albany Counties, which served as the index reference (this index value was assigned an index value of 1.0).
- Adjusting personnel costs for each of the 48 school districts in the State by multiplying these costs by their county index value. Any index value greater than 1.0 would increase that district's funding, while values below this figure would reduce funding relative to prototype levels.

In 1997, the resulting index MAP developed had a 16.4% variation between districts in the lowest (Fremont) and highest (Teton) counties, with districts in Laramie and Albany counties realizing little or no geographic adjustments as the prototype models in the funding formula used salaries in these areas to define reference salaries. In 1998, responding to comments and criticisms made regarding this methodology, MAP revised their recommended geographic cost adjustment procedure (MAP, 1998). Reports critical of the original adjustment procedure argued that the housing expense category of the WCLI included expenses that are not influenced by amenity values, such as heating and utility costs, and such items should remain in the index since geographic variations in these expenses may influence local salary decisions. MAP's revised index procedure allowed for these criticisms by recommending only exclusion of the actual shelter component from the WCLI, as well as medical expenses in a modified-WCLI used to determine regional cost adjustments.[10] To avoid sudden changes in the district funding due to survey variations, MAP also recommended using a 3-year rolling average of WCLI values (the average of the previous six WCLI survey outcomes) to define regional cost adjustment factors. Implementing these changes, the resulting regional variation between the lowest and highest cost counties (Fremont and Teton Counties respectively) in the index rose from 16.4% to 20.6%. MAP indicated concern that this was the maximum variation they deemed acceptable without additional empirical study.

After the Court's ruling of February 23, 2001, MAP revised their procedure yet again as described in Wolkoff (2002). Although critical of the Court's decision, to comply with it MAP saw no other alternative but to include both the full housing and medical components of the WCLI in their geographic cost adjustment. Using the most recent WCLI surveys and the Laramie-Albany county average as the comparative base,

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[10] This revision removed only rental costs of housing from the index with all other sub-components of the housing category retained, including heating and utility costs, and the costs of furnishings and housekeeping supplies, etc. The revised index maintained the relative importance of the all components included to reflect their relative costs in the actual WCLI survey.

MAP estimated that this methodoloy would increase Teton school district's funding by an additional $2 million and Laramie #1's by $70,000, while reducing all other districts' total funding by over $20 million (Wolkoff, 2002). The impact of including all items in the indexation procedure also had the effect of changing the relative order of index values as described in Table 2. MAP attributed the extreme change in education funding levels due to the inclusion of housing and medical costs to two reasons:

1) Albany and Laramie Counties have higher housing prices than the statewide average, which had the effect of increasing the reference base to which all other county's goods costs were compared. This lowered most other county's index values and therefore reduced the regional education cost adjustment districts within these counties received.

2) The 3-year WCLI average from the fourth quarter of 1997 through the second quarter of 2000 had a variation between its highest (Teton) and lowest (Weston) cost counties of 46.7% when all items were included. Since this 30.1% variation of the index was primarily due to the very high cost of housing in Teton County relative to the rest of the State, including housing costs in the adjustment primarily benefited Teton County.

Table 2: WCLI Average- 4Q1997 to 2Q-2000

County	Index value w/o Shelter and Medical	Index value with Shelter and Medical	Change due to index redefinition
Albany	99.0	103.3	4.3
Big Horn	99.5	93.1	-6.4
Campbell	97.7	98.9	1.2
Carbon	103.5	97.6	-5.9
Converse	97.5	94.4	-3.1
Crook	98.7	95.5	-3.2
Fremont	97.7	95.7	-2.0
Goshen	95.8	92.9	-3.0
Hot Springs	100.8	95.3	-5.5
Johnson	103.0	101.2	-1.8
Laramie	97.5	102.4	4.9
Lincoln	101.3	95.6	-5.8
Natrona	99.8	98.3	-1.5
Niobrara	98.7	91.7	-7.0
Park	101.0	98.7	-2.3
Platte	98.2	95.1	-3.0
Sheridan	103.7	102.0	-1.7
Sublette	103.7	105.6	2.0
Sweetwater	102.2	100.4	-1.7
Teton	110.8	132.9	22.0
Uinta	102.5	100.7	-1.8
Washakie	97.5	93.9	-3.6
Weston	95.0	90.6	-4.4

Source: Black (2001)

To partially offset the decrease in total school funding across the State, MAP recommended that the reference base in their adjustment mechanism be changed from the average of the Laramie-Albany County WCLI values to the state-wide WCLI average value. Doing so increases statewide school funding by $9 million, as it lowers the index base and inflates the index values for districts with lower housing costs than in Laramie and Albany Counties.

IV.   Regional Cost Adjustment Methodologies

While MAP made changes to the regional cost adjustment in response to the Court's decision in February 2001, the political controversy surrounding the issue of regional cost adjustment in the State remains. Though it is agreed that some form of regional cost adjustment is appropriate in Wyoming, agreement has not been reached regarding the form this should take beyond the court requirement that any adjustment be cost-based. As shown in Table 1, several methods are commonly used in other states to adjust for regional education input cost variations. The underlying assumption made is that equivalent education outcomes can be achieved across districts if equal resources are made available to purchase the inputs required to produce them. Regional adjustments are made to accomplish this goal. The problem is to define methods of estimating these cost variations so that proper adjustments can be made. Two broad approaches have generally been taken to accomplish this task:
   (i) Estimating regional cost of living differences across districts.
   (ii) Estimating regional cost of education differences across districts

IV.1   Cost of Living Adjustments

The most common methodology to identify underlying education cost differences is to estimate differences in the cost of living from place to place. It is presumed when using this type of adjustment that cost of living variations are the main determinant of differences in salary demands across districts and directly contribute to differences in the cost of education regionally. Two methods are commonly used to estimate the impact of living costs on regional salary differences: estimation of general worker wage levels in the region as an indicator of underlying cost of living pressures, or the "market basket" approach, which directly estimates variations in the local prices of goods that are assumed to determine local salary demands. In practice, cost of living adjustments are implemented in school finance decisions in three ways: a legislated adjustment, regional wage indexation, or through the use of a local price index that measures local goods prices.

IV.1.1 Directly Legislated Cost-of-Living Adjustments

Such adjustments take the form of a fixed salary bonus given to specific regions as compensation for local cost of living differences. As described in Table 1, only one state, Virginia, uses a directly legislated adjustment for education cost conditions outside a district's control.   While these adjustments are simple to administrate, such a methodology is least likely to accurately reflect cost variations among districts and therefore ensure equity in educational opportunity. If equity, or in the case of Wyoming both equity and a funding mechanism that is cost-based are desired, it is very unlikely such an adjustment will meet these objectives. Given difficulties of estimating local cost conditions, however, such an adjustment may be acceptable if general agreement can be reached regarding its implementation since it is often the case that those involved in such decisions have little faith in the cost estimates presented to them. While unlikely to

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satisfy a court, this method could be a potential solution in Wyoming if districts and policymakers could come to an agreement over the form of the legislated adjustments.

IV.1.2 Wage Level Indexation

Regional variations in wage levels may also indicate underlying differences in the cost of living. Because direct observation and compensation for actual salary costs could create incentives for administrators to make salary decisions to influence their future funding levels, a proxy for such wage costs would be preferred. Local salaries in other occupations could be used to estimate required education salaries, as all workers will demand higher wages in areas with higher costs of living. One source of bias in using wages as a proxy for education salary costs, however, is the choice of occupations defined as comparable professions to teachers. To minimize this bias, theory suggests that comparable professional salaries be used to estimate teacher wages. The working assumption that a constant relationship between the salaries of teachers and other professional workers exists and that this relationship is invariant across regions is critical to using this method of estimation.

To construct an adjustment index and to ensure that the relationship between professional labor costs and teachers remains constant across districts requires that the composition of other professionals used to proxy teacher salaries remains constant across regions. This composition requirement may be difficult to control for though, as even within specific occupational categories, professional compensation may vary across industries within that classification. Further, compensation information often does not include benefit information, which may influence wage demands. To ensure index movements actually measure general professional salary trends and not industry- specific patterns, a large data sample suitably adjusted for benefits would be necessary. In practice, however, such care is not taken in places where wage indexation is used. Massachusetts, Ohio and Tennessee have implemented wage indexation, but each of these states does not address the sample problems such an index should control for. Each state creates an index using all workers, not just professionals or workers with qualifications and training most similar to those required of teachers, and limited provision is also made with respect to regional differences in occupational mixes. Wage variations such indexes might capture may therefore not address the underlying labor market conditions within a region so much as the conditions across specific industries. In Wyoming the sparse population and limited number of professionals in various counties makes the use of a wage index very difficult. These are described in greater detail in Gerking (1999) and Wolfoff (2002). Specific problems in defining a regional adjustment mechanism based on wage data include

- Limited regional population density- Due to the limited population density in Wyoming, too few regions can be defined to adequately adjust education costs for regional differences. For example, professional wage data is collected for only six regions in the state-Cheyenne, Casper, Northwest, Southwest, Northeast, and central Southeast.
- Lack of adequate data- Although the Wyoming Department of Employment collects occupational wage data that could be used to construct an index, there is too little

industrial detail within occupation categories to control for differences in the industrial mix within regions. Greater industrial detail is not available because of confidentiality requirements.

- Lack of fringe benefit data- Inadequate wage data in the state makes it difficult to adjust for changes in the growth of fringe benefits, or differences in the compensation practices in different industries across the State.

Overall, these problems cannot be overcome easily, and as a result other methods have received greater attention in defining potential regional adjustment mechanisms in Wyoming.

IV.1.3 "Cost of Living" Indexation

This methodology is widely used and generally accepted when compensation adjustments are made for changes in the "cost of living". For example, in 2003, social security payments in the United States will be increased by 1.4% to adjust for inflation in the national economy as measured by the annual change in the Bureau of Labor Statistics' (BLS) Consumer Price Index (CPI). In the case of education inputs, it is assumed that an index like the WCLI can accurately measure the cost of inputs used to produce education outcomes. Such an index estimates changes in the cost of living by pricing a fixed basket of goods priced on a regular basis. This is only a reasonable estimate of cost of living variations if the basket of goods accurately represents a consumer's actual consumption basket. This last point is relevant to school finance, as these indices were not designed to measure the cost of the basket of necessary inputs required to produce acceptable education outcomes, and accurately reflect the costs of such inputs to the degree that costs of consumer goods are correlated to those of education inputs. If, as is the case in Wyoming, such adjustments are only made to personnel funding, the potential bias of such an assumption may be less severe, as considerations of the costs of consumer goods are likely of primary importance when determining reasonable salary and employee compensation levels.

The theory behind the use of an index such as the WCLI or the CPI to measure changes in the cost of living is simple. A standard basket of goods is defined and priced on a regular basis. The composition of the basket is defined to reflect the consumption of a hypothetical consumer. Assuming that consumption of goods contributes to an individual's welfare or total satisfaction (referred to as "utility" by economists) and that more consumption equates to more utility or a higher standard of living, for a given income the cheaper the basket of goods is, the lower the "cost of living". The academic exercise performed when defining the "cost of living" is the determination of the expenditure required to achieve a fixed level of well-being or utility from the consumption of a fixed combination of goods. By holding constant the level of satisfaction or utility experienced by an individual, the price of obtaining that level of satisfaction can be measured. When attempting to measure variations in the cost of a basket of goods across areas, it is of paramount importance to ensure that the quantity and quality of the goods in each area's baskets are identical. If this is not controlled for, one area's basket will actually create more satisfaction than the other. All else equal, a basket

with more and better goods will have a higher price, thus biasing estimates of "the cost of living" differences across places.

More important conceptually and with respect to the practical use of the WCLI in education funding, is the consideration of where the prices of goods are surveyed. It is presumed that a location with a higher cost of living will require higher compensation to ensure an equivalent teacher quality across districts. Changing the surroundings a given basket of goods is consumed in, however, could greatly change the total level of satisfaction an individual experiences consuming that basket and therefore the price one is willing to pay for it. If the price of a basket of goods across places increases, one must be aware that this price increase could be occurring because (i) prices are actually higher in one area over another, or (ii) the basket in areas with more amenities has higher quality items in it. Since the purpose of regional input cost adjustments is to ensure districts have equal access to equivalent teachers, teachers should be able to derive equal satisfaction from their earnings and the first effect should be compensated for. When baskets in some areas contain higher quality goods due to the influence of amenities, however, teachers should not be compensated for the price differences caused by this effect. In these areas, the consumption basket creates more utility because it effectively has more and better goods (due to the amenities) in it. If the full basket price were compensated for, teachers in these areas will enjoy higher utility than elsewhere, and all else equal, more teachers will compete for jobs in these areas, undermining the equal access principle that is the purpose of regional input cost adjustments in education.

How to determine when prices are affected by local price differences and when they are being affected by amenities, however, is difficult. Some locations may suffer from higher prices due to underlying cost conditions and the existence of better amenities. One method of rectifying this problem is to price only a basket of goods not affected by the presence of amenities. Though it is often impossible to define all of the goods affected by amenity variations, certain goods can be identified. Housing is one obvious example as the quality of land a house is built on is affected by its proximity to local amenities. The effect of amenities is apparent in Table 2, where the WCLI index value for all items in Teton County is 132.9 (including housing), and 110.8 when housing and medical services are not included in the index.[11] Although the index values in both categories are higher for Teton County than anywhere else, the difference increases when housing is included and this is likely due to the amenity effect.

Given these considerations, the appropriate level of compensation required for education cost differences in Teton County is unclear. Some people may be willing to substitute consumption of some goods included in the WCLI basket for the opportunity to live in Teton County without a loss in personal well-being. An adjustment in Teton County by the full-extent indicated by the WCLI would then over-compensate personnel willing to make such substitutions as adjusted salaries would support teacher welfare levels that were higher than elsewhere in the State. Alternatively, to what degree does a very tight market for housing affect housing prices in Jackson? This would be an influence that would drive prices up and that should be compensated for to ensure teachers access to housing, a primary determinant in the level of satisfaction they experience. While dropping the housing category from the WCLI will reduce the

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[11] Note that MAP also suggested medical services be dropped from the index. The variation in WCLI values with and without the medical component, however, is minimal.

possibility of overcompensating an area for amenity differences, it could also lead to under-compensation in areas with average amenity levels, but where housing is relatively more scarce and expensive. Erring on the side of caution to protect such areas in the State, the Courts required that housing must be included in the WCLI if it is used for school finance.

How much compensation is required then to ensure equivalent "standards of living" are available to teachers? Using the all-items WCLI to estimate and adjust for regional personnel cost variations could be assumed to define the upper limit of the adjustments required to live in resort communities, such as Jackson, as the impact on well-being of amenities is not considered in the construction of the index. "Fair compensation" for higher prices in amenity-rich communities should be less than the actual difference in measured prices as estimated by the WCLI if teachers are willing to sacrifice some personal consumption to live in these areas. The degree that it should be reduced though, is unclear. Further, one should not delete items from the measured basket to control for amenity effects if these same items (whether in the community in question or in others) are also influenced by factors that should be compensated for. Doing so could create the potential for under-compensation. Therefore, since some goods are affected by both local cost variations requiring compensation and amenity effects that should not, cost of living indexation is problematic across areas that have great variations in the types of amenities available. Where amenities available to consumers are relatively constant across regions, this methodology may be preferred due to its simplicity, however, given the biases inherent when such homogeneity is not present, as is the case in Wyoming, alternative methods may be more appropriate to estimate regional cost differences.

IV.2 Cost of Education Adjustments

While more complicated to define, estimating the cost of education using actual cost data is attractive since indirect proxies such as wages or cost of living indices are not relied on to estimate costs. Instead, actual cost data is used to define variations in regional costs. To avoid the incentive for administrators to use their expenses to influence future funding, estimating the cost of education is not conducted by comparing actual district expenditures, but instead by using a statistical technique called regression analysis. This is a well-accepted and powerful tool in identifying not only causal variables that affect outcomes, but also in estimating the relative influence of these factors on such outcomes. In education finance, regression analysis can also be used to account for and estimate the impact of amenity differences on regional variations in the cost of education- something that cost of living approaches cannot accomplish. This is an especially attractive feature of this methodology when there are wide variations in the amenity differences across school districts and counties in Wyoming. Additionally, once a statistical method estimating costs across districts is accepted and defined, no expertise by government or local administrators is needed to apply the results beyond what is needed to apply adjustment methods used traditionally.

While the advantages of using regression analysis to estimate regional cost differences are significant, there are still disadvantages to such an approach. First, the statistical technique of regression analysis is complex, and therefore the construction of

an index to adjust for regional education cost variations is not transparent. Consideration of this methodology and any interpretations of results may be too complex to debate in a public forum. Despite this, regression analysis is the cornerstone of much government policy work across the nation and it is a generally accepted methodology in many applications. Further, it has already been used in the Wyoming school-funding model to determine baseline-funding levels for school districts thus the methodology has been at least implicitly accepted elsewhere in the funding system. The use of regression analysis to estimate salaries, however, has not been generally applied to education finance in practice. Secondly, while careful use of regression analysis can mitigate much of the ability local administrators might have in influencing future funding decisions, since the methodology uses actual cost data and not proxies of these costs, it is not immune to such influences. The degree to which this weakness could actually be exploited though is debatable. Although it could be possible to distort funding outcomes to a district's benefit, given how data is used in a regression analysis, such efforts may be futile considering the budgets administrators face and the degree of coordination and expenditure required across all districts to influence data to a district's advantage. Further, statistical analysis can be carried out to determine the sensitivity of such indices to such attempts, and to identify methodologies to minimize the potential of such manipulation. Such efforts could effectively protect the greatest advantage of this methodology; the fact that it uses actual cost data to estimate regional cost differences. Currently, only Texas uses statistical estimates of education costs in its school financing decisions (for a description, see Taylor et al. 2000).

For Wyoming, two approaches are possible in the statistical estimation of education costs. The first is to estimate the cost of providing a comparable level of education *services* across districts. This requires a direct estimation of the cost of the required inputs to produce the desired level of education services. Since in Wyoming the regional cost adjustment is to be applied in the existing funding formula to personnel costs, this would require the estimation of the resources each district would require to hire staff capable of producing those services. The second approach is to estimate the cost of comparable educational *outcomes*. This is a more complicated estimation of the expenditure required to achieve a target level of educational attainment as it estimates both input price and productivity effects on education costs. This is accomplished by comprehensively considering the effects of regional input cost variations and scale economies simultaneously. Such an analysis could be very useful not only in adjusting for regional cost differences, but also in defining adjustments necessary to compensate for small schools and district scale diseconomies in the Wyoming education funding formula.

IV.2.1 Estimating Cost of Education Services using an Hedonic Wage Index

The basic conceptual framework employed in an hedonic wage analysis is to identify the factors that affect a teacher's willingness to accept a salary based on their own qualifications, characteristics of the district making the offer and characteristics of the community in which the district is located. Important data considerations include local amenity effects. These can be measured directly by considering such community characteristics as local climate conditions, distance to nearest metropolitan or district

centers, national parks, mountains or other natural features deemed potentially important to personnel, and population density characteristics, which allow one to proxy the presence of local service amenities such as theaters, restaurants and retail outlets. Collecting such data, and using regression techniques an equation can be defined that predicts a salary levels across the state using employee, district and community characteristics. To construct a wage index, once this relationship is estimated, each district's characteristics and those of their associated communities are used to predict salaries by region for teachers with a certain level of qualifications (possibly the average qualifications found across teachers in the State). These salaries are then used to construct an index of salary variations across the State. Such an index has the ability to predict the increases in salaries required to attract teachers to more remote districts or to those more distant from desirable amenities; an adjustment that market-basket cost of living estimation methodologies cannot account for.

If such an index were computed regularly using updated State data, it is possible that district administrators- knowing how this methodology is used to adjust salaries- might make salary decisions that will influence future salary data to their advantage. Sensitivity analysis can be used to determine how significantly such efforts could affect index outcomes. An index with little sensitivity would be preferable to one more sensitive to such efforts, however, even if such manipulation were feasible, it may be possible that indicators could be identified to determine when such efforts were being attempted. For example, if fewer teachers were hired in a district while at the same time all salaries were increased in an attempt to enhance the district's funding in the future, such an attempt might be identified by the resulting increase in average class size, especially if no sudden influx of students to the district had occurred. If such activity were detected, data could be adjusted to account for such deceptive administrative policies.

IV.2.2 Estimating Cost of Education Outcomes

Instead of focusing on the personnel costs districts must pay to produce education services, consider the costs of creating a specific education outcome in a district. An estimate of costs would consider student needs in a district, the costs of the inputs required to produce these services, *and* the costs imposed on a district caused by the existence of any diseconomies of scale that must be overcome to achieve a certain education outcome. For example, school districts must purchase inputs such as personnel (teachers, administrators, support staff) and combine them with other inputs to produce education outcomes given specific environmental factors such as student characteristics, district size and available facilities, all of which affect the productivity of the inputs. The cost of producing a given educational outcome will depend on prices, and on the quantity of inputs required, which in turn will depend on their productivity as affected by environmental factors in the district. To estimate the cost of producing a given education outcome therefore requires the identification of relevant input prices, environmental factors that affect productivity, and measures of educational outcomes across districts. If this data is available, regression methods can be used to compute a cost estimate.

Output from such statistical models describes total district costs due to uncontrollable factors including regional variations in input costs, size or student

characteristics. These models produce an index of predicted district production costs holding educational outcomes constant given variations in district characteristics such as population. Such estimates can then be used to predict the impact of regional cost differences on districts and whether diseconomies of scale are present in smaller districts and their impact on district costs. This information could be used to estimate the regional and small school adjustments required to obtain equivalent education outcomes using actual State cost and outcome data.

IV.3　Potential Adjustment Procedure Changes

As described in the preceding pages, the task of defining a regional adjustment that accurately accounts for true variations in district input costs across the State is a complex task. Courts have required that cost adjustments be cost-based, eliminating the possibility of a legislated adjustment without such analysis. Several traditional methods to estimate these cost variations are possible, and a number of them have been used by other states in their school funding models. In particular, these methods attempt to identify factors that affect wage demands across a state due to regional variations in the cost of living. All states except Texas accomplish this using a wage or price index. The problem of estimating Wyoming's regional cost variations, however, is made more difficult than in other states by several factors including low population densities and regional amenity differences, implying the State may need to define its own method of regional adjustment. Wyoming population densities are so low that defining a wage index is impossible due to data limitations. A cost of living index could be used, but due to lack of homogeneity in local amenities across the state, such an index could be problematic due to the biases it could be affected by. Given this, two alternative methods have been described that might better estimate regional cost differences, however, examples of such methods have not been computed. Actual indices will be computed in the supplemental report of June 1st 2003, provided this data is available and these methods prove workable.

In the interim, this report will detail a recommendation to be used as a temporary adjustment method. This adjustment, termed "the Amenity Cost-of-Living Adjustment," or "amenity adjustment" is a hybrid, using a statistically estimated relationship between the WCLI and starting salary levels paid in the State. The method likely cannot be used in the long-term due to the potential for discretionary decisions influencing the data used to perform this adjustment. The adjustment can be used presently, however, as current data is free of such influences. The following sections proceed as follows: First, potential WCLI revisions and improvements are suggested to improve its estimate of cost of living changes. It is important to recognize this data is fundamentally important to State policy-making as well as in estimating school finance adjustments, regardless of the methodology employed. In the section following this review, a series of simulations are described using various WCLI indexation adjustments for regional cost variations. The results indicate that the use of traditional cost of living adjustments using the WCLI are fundamentally flawed when used in Wyoming, overcompensating some districts while drastically under-funding others. In the section following the simulations, the nature of the adjustment problem is described, and an amenity adjustment methodology is described that could overcome the shortcomings present in current methods of

adjustment.   Simulations are also conducted to estimate the implications of this adjustment method on school-funding levels.   Finally, the data requirements of the alternative statistical adjustment methodologies described are outlined for the simulations to be developed in the final report presented in June 2003.

V.   WCLI: Potential Improvements in the Collection of Price Data in Wyoming

The WCLI is Wyoming generated data, something the State is rightly proud of. This data is critical in regional development planning, as it is required to understand patterns of development and its impact, as well as cost issues of concern to citizens across the State. For this reason, this data should continue to be collected, and the methods used in it improved when possible to ensure accuracy whether it is used for school-finance or not. The WCLI was created some time ago to allow Wyoming-specific tax policies to be adjusted for regional differences in the "cost of living". Technically speaking, the WCLI does not measure the cost of living, but the cost of a given basket of goods across each of Wyoming's 23 counties over time. Using price data (including taxes) collected for a fixed basket of goods, a county index is generated every six months to describe regional differences in goods prices across the State and inflation rates for five State regions.[12] For policy-makers, such data is irreplaceable as, along with data on income levels or total economic output, it is required for careful regional development planning and monitoring of local business and living conditions. This data is also very important to the citizens of Wyoming and there is significant anecdotal evidence of its importance in private regional economic decision-making. For example, landlords often use WCLI housing prices to determine rents in their areas. Local banks and credit unions also use the data to determine regional economic conditions, as do many businesses to estimate wage and price conditions when making business and planning decisions.[13]

The usefulness of such data, however, depends on its accuracy. If the data is biased in some way, decisions made using it may also be biased, which could be detrimental to planning in both the public and private sector. In what follows, the improvements suggested should in no way be misconstrued as criticisms of the survey- they are instead meant to sharpen its accuracy. The relevance of the suggested changes in the WCLI are unchanged regardless of how it continues to be used for school-finance due to its importance elsewhere in the State and the necessity to ensure the data is as accurate as possible.

V.1   Reconsideration of WCLI Sample Sites

As previously described, the WCLI is computed by surveying prices for 140 separate items in 27 cities and towns across all 23 counties of the State. These prices are collected by paid enumerators in each of the sample sites twice per year. Once raw price data is collected, it is returned to Cheyenne for use in computing the regional price index for that sample period. Sample sites are selected to allow at least one sample site in each county. The sample sites are listed in Table 3, along with their populations in 1990 and 2000 and the percentage change in these populations over the decade. The current set of survey sites accounted for 62% of the State population in 1990, however, changing

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[12] Official inflation rates are not computed by county due to the possibility that sample variations could cause large inflation estimate variations over short periods. To avoid such sample variation, regional inflation figures are computed using changes in the index values of all counties in a region.

[13] The anecdotal uses of the WCLI come from the Economic Analysis Division of the Wyoming Department of Administration and Information as described in private meetings with Buck McVeigh and Justin Ballard. Their impressions, given the inquiries they receive, suggest that the use of this data is widespread in the State, in both the public and private sector.

demographics in the State have reduced that to 60% in 2000. The sites surveyed are meant to represent regional centers people travel to on a regular basis to purchase goods and services and are chosen on the basis of having a population of over 5,000. If no such town exists in a county, the largest town in the county is surveyed. Additionally, if there is a second site in the county with a population within 85% of the surveyed site, it is also surveyed.[14] Figure 1 describes the locations of the survey sites within their counties across the State of Wyoming.

To define a county's relative cost of goods, it must be the case that the surveyed site is a local retail center, and that its housing and other fixed goods are representative of prices in the county based on its population. With respect to school finance, the current MAP suggested methodology uses the index value assigned to each county as the region's cost of living estimate. This index value is then used as a multiplier to determine the total personnel funds each district in the county is allocated. Districts in counties whose WCLI value is greater than 100 receive more than the baseline value, while those with WCLI values less than 100 receive less than the baseline-funding amount.

For example, if Teton County's index value is 141, districts in Teton County receive 41% more than the personnel funding the school-finance formula specifies, while if Niobrara's WCLI value is 87.5, districts in that county receive 12.5% less than the personnel funding defined in the school-funding model. Given this adjustment methodology, it is very important that the survey site in a county has costs that are representative of those in the school districts in the county. In general, this will more likely be true if the survey site is centrally located as the basket methodology is constructed on the presumption that all residents of a county shop in that regional center.

Given the limited population of Wyoming covered by the sample sites, it could be the case that due to local geography and the size of a county's boundaries, a significant proportion of a county's population lives in an area where price characteristics are not represented by that county's survey site. In such cases, consumers likely shop at a center other than the one assumed in the WCLI index- either inside or outside the county. In general, most of the 27 county survey sites in the current WCLI appear to minimize this potential as each is either centrally located within a county, or readily accessible by major highway. Each of the sites is also not separated from major population centers in the county by geographic barriers. Shopping patterns of consumers, however, are unknown and vigilance must be maintained to ensure that prices surveyed are on average representative of those experienced by consumers in a county. If it is the case that geographic barriers cause a significant population within a county to shop in a center other than the county survey site(s), this should be accounted for by adding more sites to the survey sample. If the center is in another county, population weights representative of the portion of the county population using this alternative center could be used to create a county price weight in the same manner used for counties with multiple survey sites.[15]

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[14] In counties with multiple survey sites, the computed cost of the basket is the population-weighted average of prices surveyed in both locations.

[15] Some consumers may shop in retail centers outside the State, and if the number doing so is significant, one could argue such centers should be included in the WCLI survey. The presumption made in this report is that competition will cause in-State prices to fall and these areas can be excluded from consideration, using current sample sites as proxies for the effect of out-of-State prices.

Table 3: WCLI Survey Sites and Populations*

	Census Year	Population		
		1990	**2000**	**% Change**
Wyoming		453589	493782	8.9
County	**City/Town**	**1990**	**2000**	**% Change**
Albany	Laramie	26687	27204	1.9
Big Horn	Greybull	1789	1815	1.5
	Lovell	2131	2361	10.8
Campbell	Gillette	17545	19646	12.0
Carbon	Rawlins	9380	9006	-4.0
Converse	Douglas	5076	5288	4.2
Crook	Sundance	1139	1161	1.9
Fremont	Lander	7023	6867	-2.2
	Riverton	9202	9310	1.2
Goshen	Torrington	5651	5776	2.2
Hot Springs	Thermopolis	3247	3172	-2.3
Johnson	Buffalo	3277	3900	19.0
Laramie	Cheyenne	50008	53011	6.0
Lincoln	Kemmerer	3020	2651	-12.2
Natrona	Casper	46765	49644	6.2
Niobrara	Lusk	1504	1447	-3.8
Park	Cody	7897	8835	11.9
	Powell	5292	5373	1.5
Platte	Wheatland	3271	3548	8.5
Sheridan	Sheridan	13904	15804	13.7
Sublette	Pinedale	1181	1412	19.6
Sweetwater	Green River	12711	11808	-7.1
	Rock Springs	19050	18708	-1.8
Teton	Jackson	4708	8647	83.7
Uinta	Evanston	10904	11507	5.5
Washakie	Worland	5742	5250	-8.6
Weston	Newcastle	3185	3065	-3.8
Total Population Surveyed		281289	296216	5.3
Additional Survey Sites Suggested				
Lincoln	Afton	1630	1818	11.5

* 2000 Census figures incorporate official revisions.
Source: Department of Administration and Information, Economics Analysis Division.

Figure 1: WCLI Sample Sites and School District Boundaries
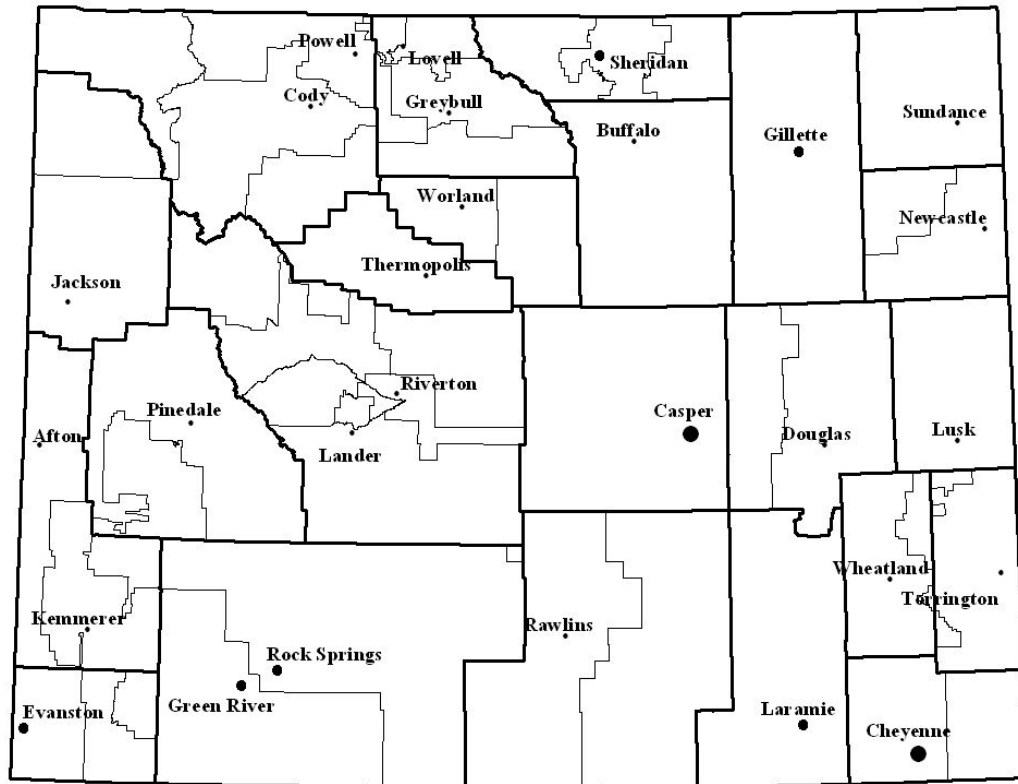
      As noted above, current WCLI survey sites are likely representative of prices most consumers in their county experience. The exception, however, appears to be in Lincoln County. This county, located centrally on the western boundary of the State between Uinta and Teton Counties, is bordered to the east and west by mountains causing traffic patterns within the county to be predominantly north-south. Lincoln's two largest communities are Kemmerer in the south, and Afton in the northern portion of the county. The communities are 96 miles apart and traveling between the two towns requires traversing the Salt River Pass at an elevation of 7610 feet. This pass effectively creates two separate population centers in the county; the Star Valley area which includes Afton, Thayne and Alpine in the north, and the area to the south of the Salt River Pass that includes Kemmerer, Diamondville, Cokeville and La Barge. Culturally and economically, these two population centers are quite different, with the Star Valley a resort and agricultural community, and the Kemmerer area an arid region with a resource-based economy. Average assessed valuation of homes in the Star Valley is currently $81,700, while in Kemmerer the average assessed home value is $42,500 (Hirschi, 2002). Lincoln County's population is 14,753, and is growing at a rate of 15.4%. Growth rates differ substantially by county region though, with communities in the north growing at a rate of 45.6%, a rate among the highest in the nation, and communities in the southern portion experiencing population declines (Taylor and Lieske, 2002).

Figure 2: Dispersion of WCLI Values

Wyoming Comparative Cost of Living Index - 2Q02
(with surveyed communities in each county)
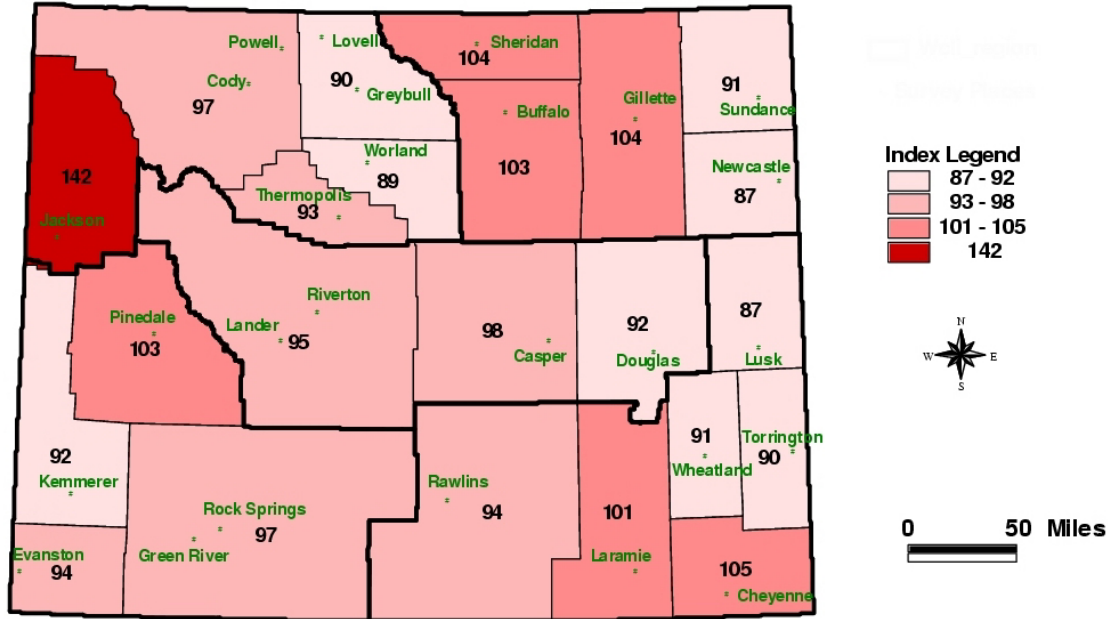
Prepared by Wyoming Department of A & I, Economic Analysis Division

Figure 2, the current WCLI survey by county, also indicates a pattern of goods prices. Prices are lowest in the eastern half of the State, and increase the closer a county is located to the northwest corner of the State. The exception to this general trend appears to be Lincoln County, which is indicated as a low cost county, although it borders Teton, the highest cost county in Wyoming. The map is indicative of the misleading impression sampling only one site in the south of Lincoln County creates. As one moves further north, if counties surrounding Lincoln are indicative of price patterns in Lincoln County, prices should rise. The current sampling site in the county, however, is unable to capture such a pattern and creates a misleading impression of price conditions in the Star Valley.

By all measures, the Star Valley region in the north of Lincoln County is a large population center geographically separated from the rest of Lincoln County. Assuming that consumers in this area are represented by prices in Kemmerer is likely erroneous, especially when housing is included in the market basket. Since the next closest major community (Jackson) is 69 miles away to the north, Afton has grown into the regional center for the Star Valley. It has a population larger than three centers already surveyed in the WCLI and is almost identical in size to Greybull, also a WCLI survey site.

WCLI Recommendation 1:

The set of WCLI survey sites should be expanded to include Afton.

To compute a WCLI value for Lincoln County after the addition of Afton to the survey set, current procedures for counties with multiple sites should be used; creating a basket price average by population weighting the basket prices in both communities. If non-school finance policies are to make use of WCLI in regional policy decisions, use of the average value across these two communities should be considered carefully, as unlike any other readily identifiable areas in other counties, the two areas surrounding the survey sites suggested for Lincoln County are significantly different culturally and economically.

For the purposes of school finance, however, the use of a WCLI value for school districts in Lincoln County is more complex. Figure 1 describes the school district boundaries in Wyoming (lighter lines within county boundaries). There are three school districts in Lincoln County: Lincoln Districts #1 (Kemmerer) and #2 (Afton) and Sublette #9. Sublette #9 (which includes the community of La Barge) uses the Sublette County WCLI value for its regional adjustment. For the Lincoln districts, the appropriate weighting procedure to use is not clear since Lincoln #2's district boundary extends into the southern portion of the county. Consideration of Average Daily Membership (ADM) in Lincoln #2, however, suggests a potential adjustment. Lincoln #2 is comprised of two separate and distinct communities, Cokeville and Star Valley (Tolman and Hirschi, 2002). The portion of Lincoln #2 that extends into the southern part of Lincoln County includes schools in the Cokeville area with an ADM=198. The rest of the school district is located in the Star Valley and has an ADM=2095, or 91% of the current district student population. This report recommends that the regional adjustment applied to Lincoln #2 should be the ADM-weighted average value of the WCLI price levels in Afton and Kemmerer. In effect, for Lincoln #2 the WCLI methodology for counties with two sites is suggested, using current ADM values in the two areas in Lincoln #2 as population weights. Lincoln #1, since it is fully contained in the county region south of the Star Valley, would use only the WCLI value in Kemmerer. This adjustment methodology is consistent with the WCLI methods used elsewhere in the State, and using current ADM values will adjust Lincoln #2 according to price differentials between the north and south part for the county weighted by school attendance. If population trends continue and the Star Valley continues to grow relative to Cokeville, the regional adjustment will increase the influence of price levels in Afton in the regional adjustment.

Estimated Cost to Implement this Recommendation: $2000/year.

Implementation of this recommendation would require hiring an enumerator to conduct the price survey in Afton, and the additional resources in Cheyenne to supervise the enumerator and collate additional data.

V.2   Adjusting for Bias Problems in the WCLI

As it is constructed currently, the WCLI data may not reveal the true nature of price differences in Wyoming due to several problems in both the methodology used to define the "market basket" priced, and due to sampling problems. Both of these issues will create biases in the resulting index, which result in a regional comparative index that could overstate price differences among regions if they are not corrected for.

V.2.1 Composition of the WCLI Basket

The composition of a priced basket of goods must reflect the average preferences of the individual, or group of individual's preferences it is meant to represent. With a given budget, if the average consumer in the State would prefer a different basket of goods or a basket whose composition is in different proportions to those in the measured basket, the estimate of the "cost of living" or cost of achieving a certain level of satisfaction will be biased when compared across regions. The weights on the categories of goods in the WCLI basket are fixed by mapping weights used in the BLS Consumer Price Index (CPI) from national trends, which in turn is determined from national consumption patterns.[16] These weights describe the proportion of an average national consumer's budget that are spent in different expenditure categories such as housing, transportation, recreation, etc. It is quite likely that the CPI weights are not representative of the average Wyoming consumer's expenditure patterns and there are several reasons for this. First, the CPI is an "urban consumer" index, that is, it surveys expenditure patterns of people and prices in urban areas with populations of 30,000 people or more. In the West, the minimum size of a surveyed population area is 50,000. The closest western site to Wyoming surveyed is Greeley, Colorado. By comparison, of the 27 sites surveyed in the WCLI, only one is even large enough to be considered in the western CPI sample (Cheyenne) and only two sites (Casper and Cheyenne) are larger than the smallest center surveyed nationally for the CPI. Further, considering all of the WCLI sample sites as reported in Table 3, in total they account for 60% of Wyoming's population, while 40% of the population in the State lives in an area not surveyed, in towns or villages with populations smaller than 1000 people, or outside of any town or city. The rural nature of the State may cause consumption patterns in Wyoming to differ from national urban patterns.

What impact does this have on the CPI weights versus those the WCLI should use (the actual average proportions of a Wyoming consumer's budget spent on the measured expenditure categories)? Although it can't be ascertained exactly without a survey, we can surmise there is a high likelihood that the current weights used in the WCLI are misrepresentative of consumer's expenditure patterns in Wyoming. Consider Table 4, which shows the CPI weights used by the WCLI, referred to as the CPI-U weights. These weights describe the average expenditure patterns of a consumer in the nation. Average consumption patterns are affected by many factors, but in particular, the size of the city lived in, the region of the country lived in, and whether all types of consumers (including unemployed, retired people on fixed incomes, part-time workers and those on a full-time wage) or only those with a full-time salary are considered. Table 4 shows how the national weights change when the national sample is restricted to full-time workers (CPI-W), and how the average full-time western consumer's weights (WEST-W), those sampled across the metropolitan areas of Denver, Phoenix, Honolulu, Portland Oregon, San Diego, Los Angeles, Seattle, Anchorage and San Francisco differ from the national averages. Also included are the average weights for consumers with full-time employment in the Denver area (DENVER-W). The last column describes full-time

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[16] The WCLI does not use the exact CPI weights, and instead maps the eight expenditure categories used in the CPI into six expenditure categories by combining some of the CPI component groups.

worker's expenditure weights (TOWNS-W) from the smallest regions sampled in the country- places with 30,000-50,000 in the South and Midwest regions of the BLS Consumer Expenditure Survey (CES).[17]   The final row of each column in the table indicates the relative importance of these categories in the CPI-U and CPI-W indices.

Consider the category with the largest weight in the CPI and WCLI: housing. The difference between housing cost in Teton and the rest of Wyoming impacts the WCLI values significantly. The higher the housing weight in the index, the greater the difference Teton's WCLI value is relative to all others in the index. The higher Teton's index value is relative to all other communities, the higher the statewide average becomes relative to other county's index values. Since Teton's prices increase faster than most places, over time the rising index value for Teton will cause the statewide average to increase faster than other place's values in the index. This will cause more and more county index values to fall as time passes and the index base "grows away" from them. This is very important in school finance because, as the regional adjustment is currently defined, personnel costs for each district are weighted by their county's WCLI value, and values below 100 reduce funding while places with values over 100 receive increased funding relative to the school-funding formula baseline.

Table 4: Expenditure Proportions by Place and Full-time Employment Status

	CPI-U	CPI-W	WEST-W Cities over 1,500,000	WEST-W Cities/Towns 50,000 to 1,500,000	DENVER-W Denver-Boulder-Greeley	TOWNS-W Towns under 30,000
Category Weights						
Food and Beverages	15.719	17.229	17.041	18.675	14.938	16.018
Apparel	4.399	4.831	4.918	5.201	4.638	5.012
Housing	40.873	38.141	41.531	36.637	41.342	34.206
Transportation	17.055	19.393	18.944	19.479	19.461	22.061
Medical	5.810	4.620	3.774	4.594	4.585	5.534
Recreation/Personal Care	6.019	5.649	4.903	6.187	5.738	5.885
Education/ Communication	5.813	5.637	4.920	5.335	4.996	6.527
Other Goods and Services	4.312	4.499	3.970	4.163	4.276	4.758
Regional Weight in National Surveys (CPI-U/CPI-W)			17.79%/ 15.66%	6.51%/7.09%	1.37%/1.36%	5.57%/ 6.52%

Source: Constructed from data in current CPI Tables 1-7 using 1999-2000 Weights.

As can be seen in table, with the exception of western cities with populations over 1.5 million and the Denver area, housing as a percentage of total expenditure is higher in the all-consumer sample (CPI-U) than in the samples restricted to full-time workers. Further, as population in centers is reduced, the proportion of total expenditures required for housing does also.   In centers with populations between 30,000-50,000, the share of total expenditure is 16.3% lower than that in the CPI-U, which is used to construct the WCLI. With respect to school finance, where personnel are full-time workers, it is

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[17] Places in this population class are only sampled in the South and Midwest regions of the survey.

important to see how the WCLI values change when the full-time worker CPI shares are used, and how the WCLI values change as the sample is limited to the smallest population areas in the sample. Tables 5a-5c describe the most recent WCLI survey results (2Q-2002) and simulations describing how the index values change when using CPI-U weights, CPI-W and TOWN-W weights respectively.

From Table 5a, the county WCLI values for all items and within component categories are shown. Using the all-item results, Teton prices are 63.4% higher than those of the lowest cost county in the survey, Niobrara. While prices are higher in all categories, the source of the extreme variation in prices between Teton and the rest of the counties in the index is due to the much higher cost of housing in Teton County. Using these WCLI values and the reference salary used for personnel costs (statewide average starting salaries paid = $25,349), teacher salaries in Teton would be compensated to a level of $35,899 ($25,349 x 1.4162), while Niobrara salaries would only be compensated up to $21,967.

Table 5a: WCLI Using CPI-U Weights, (2Q-2002)

	CATEGORY:						Recreation &
Counties	All Items	Food	Housing	Apparel	Transport.	Medical	Personal Care
Teton	141.62	109.0	178.8	126.3	103.4	110.8	111.0
Laramie	104.71	108.1	110.4	90.1	98.0	101.3	96.1
Sheridan	104.22	105.9	103.0	114.0	101.4	108.6	104.4
Campbell	104.16	99.7	111.6	87.7	98.1	96.6	101.1
Johnson	103.15	107.8	101.0	130.2	99.9	89.9	104.3
Sublette	102.87	100.8	99.5	125.5	102.0	102.1	110.3
Albany	101.06	95.0	103.5	102.6	100.8	103.2	97.4
Natrona	98.48	100.6	98.0	103.9	100.0	93.7	95.5
Sweetwater	97.36	98.3	95.2	96.5	99.0	104.3	99.8
Park	96.85	101.6	90.4	107.9	101.7	100.6	102.9
Fremont	94.72	91.3	93.0	87.1	101.3	99.9	98.1
Uinta	94.25	95.2	90.3	95.9	99.7	102.1	96.9
Carbon	93.99	106.6	85.2	91.0	101.3	96.7	103.9
Hot Springs	92.93	104.3	78.9	106.3	101.2	105.7	111.7
Converse	91.99	90.8	86.6	90.9	100.2	99.3	101.2
Lincoln	91.74	91.0	85.2	102.0	99.3	88.1	106.5
Crook	90.66	95.6	81.4	94.7	102.1	97.2	100.6
Platte	90.54	100.2	77.9	109.0	100.4	97.1	103.7
Goshen	90.30	92.9	81.4	101.1	100.3	97.0	100.5
Big Horn	89.82	93.4	77.7	118.0	99.9	97.1	102.8
Washakie	88.81	90.9	76.2	114.2	100.2	103.5	101.6
Weston	87.18	86.6	76.9	89.6	101.3	105.0	99.8
Niobrara	86.66	89.8	73.0	108.6	100.2	104.7	98.8

Notes: WCLI weights in this simulation are: Food (14.7%), Housing (46.3%), Apparel (5.8%), Transport (17.1%), Medical (5.8%), Personal Care (10.3%).
Source: Department of Administration and Information, Economics Analysis Division.

If the WCLI were to use the national CPI-W expenditure shares, the county index values are changed somewhat and the total variation between the highest and lowest

index values falls to 61.5%. This reduces the salary compensation implied by the current school finance formula for Teton to $35,567, and for Niobrara to $22,021. The sensitivity of the index values to using the national full-time worker's expenditure shares is low. The reason for this, as indicated in Table 4, is that the national sample still weights housing heavily, due to the fact that 55.4% of the national sample is collected from consumers in centers with populations over 1.5 million, with an additional 38.1% of the sample drawn from areas with local populations between 50,000 and 1.5 million. As housing prices nationally are much higher in densely populated urban areas, housing weights do not change significantly when restricting the index to full-time workers, even though full-time wage earners generally spend less of their household income on housing.

Table 5b: WCLI Using CPI-W Weights, (2Q-2002)

Counties	All Items	Food	Housing	Apparel	Transport.	Medical	Personal Care
Teton	140.31	108.6	180.7	127.0	103.4	109.8	111.2
Laramie	104.59	107.9	111.0	89.6	98.0	101.0	95.6
Sheridan	104.19	106.2	103.2	114.0	101.3	109.0	103.9
Campbell	103.84	99.7	112.0	87.1	98.1	96.8	100.7
Johnson	103.57	108.1	101.0	131.9	100.0	89.7	105.0
Sublette	102.95	101.0	99.3	126.7	102.3	102.3	110.7
Albany	100.77	94.8	103.2	103.2	100.7	103.5	98.6
Natrona	98.53	100.5	97.9	104.7	99.9	93.7	95.1
Sweetwater	97.22	98.2	95.0	97.8	99.0	104.8	98.9
Park	96.99	101.4	90.1	107.6	101.9	100.8	102.9
Fremont	94.71	91.6	92.7	86.1	101.4	100.1	99.1
Uinta	94.08	95.0	90.1	94.8	99.6	102.0	96.2
Carbon	94.26	106.5	84.9	89.9	101.3	96.4	104.0
Hot Springs	93.15	104.5	78.0	106.3	101.2	105.9	112.3
Converse	92.24	91.0	86.5	90.6	100.2	99.5	102.4
Lincoln	91.93	91.3	85.1	103.3	99.3	87.6	104.6
Crook	90.97	95.4	81.2	95.0	102.2	96.7	100.6
Platte	90.82	100.3	77.0	107.4	100.5	96.9	104.8
Goshen	90.38	93.3	80.5	99.2	100.3	97.1	102.0
Big Horn	90.51	93.7	77.6	118.1	100.1	96.9	104.5
Washakie	89.10	91.5	75.1	114.7	100.3	103.2	103.3
Weston	87.34	87.1	76.0	89.8	101.4	105.7	100.5
Niobrara	86.87	90.1	72.3	107.8	100.4	104.2	99.3

Notes: WCLI weights in this simulation are: Food (16.2%), Housing (43.6%), Apparel (5.9%), Transport (19.4%), Medical (4.6%), Personal Care (10.1%).
Source: Computed by author using CPI-W weights.

When the WCLI is computed using the portion of the national sample from the smallest population areas, however, the proportion of housing in total expenditure falls, while total expenditures across other categories ride correspondingly. From Table 5a, prices for expenditure categories other than housing in Teton are much closer to those in the rest of the State thus when weights in these areas increase, the index difference between Teton and the lowest county in the index will fall. This is illustrated in Table 5c, where the use of the TOWN-W weights from Table 4 result in an index with only a

54% variation between the highest and lowest cost counties. Niobrara is no longer the county with the lowest index value, and is replaced by Weston. Salary compensation per teacher for Teton falls to $34,373, and rises in Weston to $22,327. Niobrara funding per teacher rises to $22,419.

Table 5c: WCLI Using CPI-W Weights from Cities under 50,000, (2Q-2002)

	CATEGORY:						Recreation &
Counties	All Items	Food	Housing	Apparel	Transport.	Medical	Personal Care
Teton	135.60	108.9	176.5	126.9	103.2	109.5	111.1
Laramie	103.33	108.3	110.2	89.6	98.1	100.9	95.2
Sheridan	103.68	105.9	103.2	114.0	101.3	109.0	104.3
Campbell	102.73	99.6	111.4	87.2	98.2	96.8	100.8
Johnson	103.00	107.7	100.7	131.8	100.0	90.3	106.3
Sublette	102.59	100.7	98.9	126.6	102.1	102.4	112.2
Albany	100.04	95.0	102.4	103.1	100.6	103.3	98.3
Natrona	98.11	100.6	97.8	104.7	99.9	93.8	94.8
Sweetwater	97.32	98.5	95.7	97.8	99.1	104.6	99.0
Park	97.14	101.4	90.6	107.6	101.7	100.8	103.4
Fremont	94.73	91.2	93.1	86.2	101.3	100.1	99.2
Uinta	94.48	95.4	91.1	94.8	99.6	101.6	96.0
Carbon	94.59	106.6	85.8	90.0	101.2	96.3	104.1
Hot Springs	93.72	104.0	78.7	106.3	101.2	106.3	112.6
Converse	92.66	90.7	87.4	90.6	100.2	99.6	102.0
Lincoln	92.69	90.8	86.8	103.2	99.4	88.1	104.7
Crook	91.69	95.2	82.3	94.9	102.0	97.2	100.5
Platte	91.36	100.2	77.6	107.4	100.4	97.2	104.9
Goshen	91.12	92.8	81.7	99.2	100.3	97.4	102.1
Big Horn	91.96	93.3	80.1	118.1	100.0	97.5	105.4
Washakie	89.86	90.8	75.8	114.7	100.3	103.6	103.8
Weston	88.08	86.4	76.8	89.8	101.3	105.7	100.6
Niobrara	88.44	89.4	74.8	107.8	100.3	104.4	99.4

Notes: WCLI weights in this simulation are: Food (15.0%), Housing (40.3%), Apparel (6.2%), Transport (23.0%), Medical (5.2%), Personal Care (9.8%).
Source: Computed using CPI-W weights from Class D population centers.

Conclusions from this exercise are important for the WCLI methodology used in the State. There is a significant change in the WCLI when weights closer to those that might be expected in Wyoming are used. Further, there is no region surveyed in the national sample where regional characteristics are similar to Wyoming's. Given this fact, to ensure that the WCLI accurately represents the average consumer in Wyoming, it is very important data be gathered to ensure that expenditure patterns of the Wyoming consumer are represented in the index.

WCLI Recommendation 2:

A Consumer Expenditure Survey should be conducted in Wyoming to determine the appropriate basket weights to use in the WCLI. This survey should

be conducted at least twice per decade to determine changes in expenditure patterns across consumers.

The importance of such a survey cannot be understated. Since the WCLI survey sites do encompass most retail centers in the State, but only 60% of Wyoming's population, it is very important that such a survey be conducted to determine not only the consumption patterns of Wyoming consumers, but also the time spent traveling to retail centers for rural residents. Such information could be used to estimate a rural cost of living index for residents living outside survey sites by imputing their travel costs into the index. It would also allow an estimate of the amount of expenditure that occurs in neighboring states. Additional stratification of the survey sample for full-time workers comparable to those used in the CPI-W sample would also be useful to determine how income levels affect expenditure patterns in the State. Since this data is required no matter what regional adjustment method is used in school-finance, better data regarding the cost of goods in Wyoming is imperative to properly estimate regional adjustments.

Over time, as consumer's expenditures change, continued surveys would allow the composition of the WCLI basket to be updated to reflect changes in relative prices. If this is not accounted for, *substitution bias* will result; that is, since the same collection of goods in the same proportions is priced in every survey, the definition of the basket will not change to reflect how the spending patterns of an individual on a fixed budget adapts when the relative prices of goods change. New goods could also cause such a bias. If goods become available that were not available before, such as computers, cell-phones or DVD players, if the basket of goods used to measure cost of living is not changed to reflect new goods that enter an agent's consumption patterns, then the price of the basket will no longer reflect the expenditure required to attain a certain level of well-being. In the WCLI, such biases will occur whenever consumption patterns change that are not accounted for in the composition of the basket. Regular consumer expenditure surveys would allow correction for these issues.

Estimated Cost to Implement this Recommendation: $10,000/yr.

To implement a consumer survey will require an estimate of the required sample size necessary to ensure that the findings are representative of the typical Wyoming consumer. A consumer expenditure survey will require respondents to document their expenditures over a period of time using a diary, and such inconvenience will require that respondents be paid to ensure accuracy and participation. Personnel will also be required to administrate the survey. An approximate survey cost of $50,000 is likely, but given that the survey would only occur twice per decade, the costs can be pro-rated to an annual value.

V.2.2 Sampling Bias in the WCLI Basket due to Automobiles

Sampling bias could take two forms in the current sampling methodology employed in the WCLI. The first could occur if a significant portion of actual price variation in Wyoming were not captured in the index. In particular, the current survey only prices automobiles in Cheyenne. Currently, automobile purchases account for (have

a weight of) 8.6% of expenditures in the WCLI basket. Since Cheyenne is likely one of the most competitive markets for vehicles in the State, it is possible more remote areas of the State have higher prices. As Laramie County index values are usually just over 100 in the survey (104.71 in the most recent survey, 2Q-2002), it is possible that sampling cars statewide could result in some county WCLI values increasing where prices are higher.

WCLI Recommendation 3:

WCLI price sampling should be conducted across the State to account for variations in automobile purchase costs.

It is ironic that the current survey tracks prices of such minor household expenditures as dog food and shampoo, yet variations in auto prices across the State are not accounted for. Such an oversight undermines the confidence, if not the validity of WCLI in measuring price variations across the State. To update the survey methodology, the automobile survey methods used by the BLS could be adopted. The measure of car prices is problematic since the price posted is often not paid. BLS procedures account for this. BLS methodologies for pricing automobiles are found in the BLS Handbook of Methods, Chapter 17 (http://www.bls.gov/opub/hom/homch17_a.htm). An alternative would be to use data provided by County Treasurer offices in the State for taxes paid on new cars. In areas or sample sites where car dealers are not present, or dealerships are limited, a methodology could be developed where car prices are measured only in major population centers and regional centers with populations over a given level. Since it is unlikely all sample centers have numerous car dealerships, and for major purchases people often travel some distance to make a transaction, a subset of WCLI sites could be surveyed for car-pricing.

Estimated Cost to Implement this Recommendation: $5,600/yr.

To implement this change, some resources will be required to collect automobile price data. Other resources will also be required to define methods of measurement that are appropriate for Wyoming. If enumerators are required to collect this data, this may require an additional reimbursement above their current fees, while additional processing time may be required in Cheyenne offices. Assuming 28 sample sites and an additional $100 required per enumerator per sample period to collect this additional data, the cost of this recommendation could be approximately $5,600/yr.

V.2.2 Sampling Bias in the WCLI Basket due to Quality

A second source of sampling bias is a lack of control over the quality of goods surveyed. If the quality of the goods in the basket change, it cannot be compared to previously measured baskets as differences in quality will affect the level of satisfaction the goods in the basket create. It is important that all goods in the index be strictly controlled for quality where possible. While many smaller items being priced can be checked to ensure that brand equivalence is considered when collecting price data, where

such problems might be of serious concern is in housing costs. Amenity values can be considered a form of quality bias, however it is impossible to separate consumption value from amenity value in goods such as land and housing. An important source of quality variation may also be caused by variations in service levels provided by retailers across the State. Some consideration should be made regarding the tracking of the type of retail outlets where enumerators are pricing goods.

To price housing in the WCLI, rental prices only are considered to ensure that differences in the asset value of housing across the State do not influence prices. Since only consumption prices are desired, rents are an appropriate means of estimating shelter costs. Currently, WCLI guidelines for rental pricing are found in Chapter 2 (Price Collection), Section 3 of the Wyoming Cost of Living Index Policies and Procedures handbook (http://eadiv.state.wy.us/wcli/policies.pdf):

> Section 3. Rental Data. The Division will collect monthly rental values on the following: apartments, houses, mobile homes, and mobile home lots. Apartment, house, and mobile home lot rents will be collected from the classified section of the local newspaper for every city in which price data are collected, the enumerators will collect rental values by contacting local rental companies. Mobile home lot rents will be collected by the enumerators by contacting appropriate businesses and asking for the rent value of the business' mobile home lots. The rental data will be collected for the three months of the quarter for which the WCLI is being conducted.
>
> Apartment rent data will be collected on two bedroom, unfurnished dwellings, excluding gas and electric utilities. Housing rent data will be collected on two or three bedroom, single-family homes, excluding gas and electric utilities. Mobile home rent values will reflect total monthly rental expenses, including lot rent. Mobile home lot rent data will be collected on single-wide lots, including water.

Several problems occur with housing data as collected. In some areas it is often the case too few rentals are advertised to observe a reasonable sample of rental rates. When this occurs, local real estate and rental agents are consulted to determine reasonable rental rates in the area. When rental rates are priced, little control is imposed on the quality of the housing that the rent is reported for. Attributes of a rental unit that could greatly impact rental prices observed include size, appliances included, age, and general condition of the property. When two prices are observed in different sites for what is thought to be an equivalent unit of housing, there is no control over whether observed price differences are due to differences in rental prices generally across the two sites, or due to the fact that one unit is superior in quality to the other. In areas where there may be systematic differences in housing quality, this could lead to a bias in the housing costs reported. For example, if Teton County housing is usually larger, newer and includes more conveniences than housing presumed "equivalent" in Cheyenne, the price variation observed will be due to underlying housing price differences between areas *and* the quality differences of the housing being compared.

WCLI Recommendation 4:

WCLI rental price sampling should be conducted using procedures to ensure that housing is equivalent across survey sites.

A solution to these problems is to implement rental-pricing policies as used by the BLS for the CPI. Facing the same problem, Federal price enumerators use a pool of rental tenants whose properties have been chosen to be equivalent or as close to equivalent as possible over several dimensions of quality. When rental unit prices are collected from advertising, a site inspection is conducted to ensure the unit being priced is equivalent to others in its class in the price survey. Description of BLS procedures for controlling rental equivalence can be found at http://www.bls.gov/cpi/cpifact6.htm. Additionally, procedures should be reviewed to ensure other items in the index are being tracked for variations in quality. Some procedures should also be implemented to track the types of retail outlets that goods are priced in, though at this time no recommendation is made regarding quality adjustment based on such differences. BLS methodologies for pricing goods and consideration of retail outlets are found in the BLS Handbook of Methods, Chapter 17 (http://www.bls.gov/opub/hom/homch17_a.htm).

Estimated Cost to Implement this Recommendation: $5,600/yr.

To implement this change, some resources will be required to collect additional rental price data. Some resources will also be required to define additional methods of measurement that are appropriate for Wyoming and to identify a pool of rental tenants who can be polled regarding rents paid. If enumerators are required to collect this data, they may require an additional reimbursement above their current fees. Also, this additional data and oversight would require additional time and resources in Economics Analysis Division offices in Cheyenne. Assuming 28 sample sites and an additional $100 required per enumerator per sample period to collect this additional data, the cost of this recommendation could be approximately $5,600/yr.

V.3   Summary of WCLI Recommendations:

- Addition of Afton as a survey site
    - Estimated cost: $2000/yr.

- Additional sampling of automobile prices across the State
    - Estimated cost: $5600/yr.

- Implementation of procedures to ensure rental equivalence
    - Estimated cost: $5600/yr.

- Consumer expenditure survey conducted every five years or more frequently
    - Estimated cost: 10,000/yr.

Total value of recommended procedural changes: $23,200/yr.

VI.   Using the WCLI for Regional Cost Adjustment

Consider how the current regional adjustment methodology works. After a district's baseline funding levels are computed using the Wyoming school finance model, an adjustment is applied to each district's baseline personnel costs. This adjustment is a simple multiplier; taking total personnel funding and multiplying it by the WCLI value for the county in which a district is located. This adjustment is used to account for regional cost variations caused by goods prices, ensuring that teachers will be able to afford the same basket of goods across districts. Such an adjustment is meant to allow each district equal access to the pool of teachers searching for employment in Wyoming. Without such an adjustment it is argued, those places with lower "costs of living" will be able to attract better teachers as dollars paid in salaries will "go farther". In a competitive market, these districts will attract the best teachers first, while more expensive districts will struggle to attract teachers due to high living costs. The WCLI value used to scale each district's personnel funding is computed using the last six WCLI surveys. This ensures that sudden decreases in the costs of goods (either actual or due to a sampling error) in a district will not result in sudden decreases in education funding. The disadvantage of using a three-year rolling average is that sudden and permanent increases in actual prices, which would require an immediate increase in teacher salaries, will not be funded fully for three years.

Currently, the Wyoming funding model, which is being phased in to allow districts to adjust to funding level changes, has a "Hold-Harmless" provision for all districts. This provision extends through the 2003 and 2004 school years (SY03 and SY04) and guarantees SY02 funding levels if new funding model outcomes result in a funding decrease.[18] This provision was politically controversial, however, given that several adjustments in the model are still being defined, it allows for a period of reflection and adjustment without compromising the quality of education in districts where the potential and sudden changes in funding were implied. Since delivering education services requires significant planning, preliminary funding guarantees have been made using the new funding model and early WCLI data from the fourth quarter of 1998 (4Q-1998) through the second quarter 2001 (2Q-2001). These guarantees are shown in Table 6. Preliminary results estimate $718.1 million for statewide expenditures for total education funding.[19] This includes over $9 million in hold harmless payments paid across 22 of the 48 school districts in Wyoming. Of these 22 districts, only three (Johnson #1, Laramie #2, and Sheridan #1) have WCLI values greater than 100, suggesting that the hold harmless adjustment may partly stem from the regional adjustment mechanism as currently defined in the remaining 19 districts. In general, the adjustment mechanism currently used underfunds those districts assumed to have low costs of living.

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[18] This hold harmless provision does not apply to funding reductions caused by a drop in enrollment as measured by the average daily membership (ADM) in a district.

[19] This estimate does not include deferred payments to districts or capital costs.

Table 6: Preliminary Funding Guarantees (WCLI values 4Q-1998 to 2Q-2001)

County/District		City/Town	No HH	With HH	HH Payment	Index Values
Albany	#1	Laramie	$32,326,595	$32,326,595	$0	104.33
Big Horn	#1	Cowley	$6,792,024	$7,925,947	$1,133,923	91.17
Big Horn	#2	Lovell	$5,669,295	$5,738,448	$69,153	91.17
Big Horn	#3	Greybull	$4,368,267	$4,807,595	$439,328	91.17
Big Horn	#4	Basin	$3,572,556	$4,008,295	$435,739	91.17
Campbell	#1	Gillette	$57,422,632	$57,422,632	$0	101.00
Carbon	#1	Rawlins	$14,392,258	$14,693,469	$301,211	96.83
Carbon	#2	Saratoga	$8,619,363	$9,562,683	$943,320	96.83
Converse	#1	Douglas	$13,136,946	$13,136,946	$0	93.50
Converse	#2	Glenrock	$6,887,414	$6,985,239	$97,826	93.50
Crook	#1	Sundance	$10,230,400	$11,501,374	$1,270,974	94.00
Fremont	#1	Lander	$15,281,008	$15,281,008	$0	95.33
Fremont	#2	Dubois	$2,878,646	$2,903,734	$25,088	95.33
Fremont	#6	Pavillion	$4,499,193	$4,499,193	$0	95.33
Fremont	#14	Ethete	$6,726,261	$6,726,261	$0	95.33
Fremont	#21	Ft. Washakie	$3,606,257	$3,606,257	$0	95.33
Fremont	#24	Shoshoni	$3,342,808	$3,675,735	$332,927	95.33
Fremont	#25	Riverton	$18,782,624	$18,782,624	$0	95.33
Fremont	#38	Arapahoe	$3,582,121	$3,582,121	$0	95.33
Goshen	#1	Torrington	$15,851,850	$15,968,862	$117,012	91.33
Hot Springs	#1	Thermopolis	$6,786,229	$6,786,229	$0	93.50
Johnson	#1	Buffalo	$10,647,654	$10,725,322	$77,667	101.50
Laramie	#1	Cheyenne	$95,714,854	$95,714,854	$0	103.17
Laramie	#2	Pine Bluffs	$9,202,359	$9,320,535	$118,177	103.17
Lincoln	#1	Kemmerer	$6,529,356	$6,920,035	$390,679	94.00
Lincoln	#2	Afton	$17,043,042	$17,452,040	$408,998	94.00
Natrona	#1	Casper	$87,719,076	$87,719,076	$0	97.83
Niobrara	#1	Lusk	$3,956,054	$4,633,872	$677,818	89.50
Park	#1	Powell	$12,907,104	$12,907,104	$0	98.33
Park	#6	Cody	$17,275,543	$17,275,543	$0	98.33
Park	#16	Meeteetse	$1,846,128	$1,846,128	$0	98.33
Platte	#1	Wheatland	$10,983,223	$10,983,223	$0	93.67
Platte	#2	Guernsey	$2,749,637	$2,841,322	$91,685	93.67
Sheridan	#1	Ranchester	$7,783,011	$8,459,718	$676,707	102.50
Sheridan	#2	Sheridan	$25,008,060	$25,008,060	$0	102.50
Sheridan	#3	Clearmont	$2,004,308	$2,004,308	$0	102.50
Sublette	#1	Pinedale	$5,777,927	$5,777,927	$0	105.33
Sublette	#9	Big Piney	$5,562,766	$5,562,766	$0	105.33
Sweetwater	#1	Rock Springs	$37,050,351	$37,050,351	$0	99.17
Sweetwater	#2	Green River	$23,659,446	$23,659,446	$0	99.17
Teton	#1	Jackson	$22,014,516	$22,014,516	$0	138.50
Uinta	#1	Evanston	$23,841,436	$23,841,436	$0	98.83
Uinta	#4	Mtn. View	$6,132,306	$6,442,049	$309,743	98.83
Uinta	#6	Lyman	$6,871,413	$6,950,470	$79,056	98.83
Washakie	#1	Worland	$10,790,944	$10,790,944	$0	92.17
Washakie	#2	Ten Sleep	$1,642,397	$1,642,397	$0	92.17
Weston	#1	Newcastle	$6,795,509	$7,456,811	$661,302	89.33
Weston	#7	Upton	$2,793,025	$3,177,713	$384,688	89.33
Total:			**$709,056,195**	**$718,099,216**		
Hold Harmless Amount:				**$9,043,022**		

Source: Wyoming Legislative Services Office.

One distortion not accounted for in the adjustment mechanism is the influence of amenity differences across counties. The premise that people will demand higher salaries in places where prices are higher and accept lower salaries where prices are lower ignores other factors that affect a teacher's willingness to accept employment in one district versus another. Since teachers can choose where to spend their careers, those unimpressed by employment opportunities in smaller or more remote areas may demand higher salaries to accept positions. Further, prices are influenced downward, particularly for housing, when an area is less amenity-rich and more remote, reducing the measured cost of living (WCLI value). For these reasons, consideration of the WCLI as used in the current regional adjustment may under-compensate such areas where a premium has to be paid to attract teachers. Given the apparent relationship in Table 6 between low WCLI values and hold harmless payments, adoption of the current adjustment methodology used should be approached cautiously, especially if the hold-harmless payments are due to the explanation above as it imposes systematic under-funding to schools with low WCLI values and higher actual personnel costs.

Consider Table 7, which describes district funding levels if WCLI values utilize the most recent survey results. The index values used in this simulation are computed using values from 4Q-2000 to 2Q-2002. Use of the four more recent WCLI values instead of the previous six illustrates how recent trends that could be expected to continue in WCLI values will affect school district funding. In this simulation, 22 districts still claim hold-harmless funding, which rises to over \$10.3 million. Total funding across all districts, however, falls to \$717.8 million. Clearly apparent is the influence of Teton County, where prices have risen faster than in the rest of the State, increasing their WCLI from 138.5 to 141. This has caused the statewide average WCLI value to rise, causing WCLI values to fall where price increases have been slower than average, while increasing values in places where inflation has occurred at a faster rate than in Teton. The latter effect has increased Johnson County's WCLI value, and the district no longer claims hold-harmless funding, while districts in Laramie and Sheridan Counties claim less. The former effect, however, has reduced WCLI values for 19 other districts and increased their hold-harmless funding, while reducing Hot Springs County funding to the degree that it now claims hold harmless monies. The WCLI adjustment creates funding distortions, and trends in the data are magnifying these distortions over time.

The decreases in district funding caused by the school funding formula and the regional adjustment method being used, as well as potential future distortions caused by continued above-average inflation in Teton County, will be very controversial if maintained. In other states such as Colorado, regional adjustment has been implemented by defining the reference county (that with a value = 100) as the county with the lowest prices surveyed such that only positive adjustments can occur. Using this indexation method in Wyoming, the WCLI from 4Q-2000 to 2Q-2002 was rescaled, using the index value for Niobrara to define the base (the index value was set to 100 from its previous value of 87.5) and values for all other counties inflated to maintain their proportional differences. Results of these expenditure predictions are listed in Table 8.

**Table 7: Funding Levels at Recent WCLI Values (4Q-2000 to 2Q-2002)**

County/District		City/Town	No HH	With HH	HH Payment	Index Values
Albany	#1	Laramie	$31,929,545	$31,929,545	$0	102.50
Big Horn	#1	Cowley	$6,783,738	$7,926,121	$1,142,383	91.00
Big Horn	#2	Lovell	$5,662,339	$5,738,653	$76,314	91.00
Big Horn	#3	Greybull	$4,363,093	$4,807,705	$444,612	91.00
Big Horn	#4	Basin	$3,568,197	$4,008,327	$440,130	91.00
Campbell	#1	Gillette	$58,593,322	$58,593,322	$0	104.00
Carbon	#1	Rawlins	$14,201,247	$14,696,594	$495,346	95.00
Carbon	#2	Saratoga	$8,511,451	$9,566,261	$1,054,810	95.00
Converse	#1	Douglas	$12,993,489	$12,993,489	$0	92.00
Converse	#2	Glenrock	$6,814,417	$6,986,560	$172,143	92.00
Crook	#1	Sundance	$9,997,389	$11,507,112	$1,509,722	90.75
Fremont	#1	Lander	$15,272,260	$15,272,260	$0	95.25
Fremont	#2	Dubois	$2,876,981	$2,903,754	$26,772	95.25
Fremont	#6	Pavillion	$4,496,570	$4,496,570	$0	95.25
Fremont	#14	Ethete	$6,722,516	$6,722,516	$0	95.25
Fremont	#21	Ft. Washakie	$3,604,573	$3,604,573	$0	95.25
Fremont	#24	Shoshoni	$3,340,867	$3,675,812	$334,945	95.25
Fremont	#25	Riverton	$18,771,829	$18,771,829	$0	95.25
Fremont	#38	Arapahoe	$3,580,454	$3,580,454	$0	95.25
Goshen	#1	Torrington	$15,785,593	$15,970,251	$184,658	90.75
Hot Springs	#1	Thermopolis	$6,752,332	$6,772,382	$20,050	92.75
Johnson	#1	Buffalo	$10,774,272	$10,774,272	$0	103.25
Laramie	#1	Cheyenne	$96,098,770	$96,098,770	$0	103.75
Laramie	#2	Pine Bluffs	$9,237,437	$9,320,246	$82,808	103.75
Lincoln	#1	Kemmerer	$6,449,347	$6,924,246	$474,899	92.25
Lincoln	#2	Afton	$16,825,297	$17,452,276	$626,979	92.25
Natrona	#1	Casper	$87,514,822	$87,514,822	$0	97.50
Niobrara	#1	Lusk	$3,898,889	$4,635,168	$736,278	87.50
Park	#1	Powell	$12,854,734	$12,854,734	$0	97.75
Park	#6	Cody	$17,205,049	$17,205,049	$0	97.75
Park	#16	Meeteetse	$1,838,220	$1,838,220	$0	97.75
Platte	#1	Wheatland	$10,793,093	$10,793,093	$0	91.25
Platte	#2	Guernsey	$2,700,473	$2,841,322	$140,849	91.25
Sheridan	#1	Ranchester	$7,836,493	$8,459,266	$622,773	103.50
Sheridan	#2	Sheridan	$25,177,154	$25,177,154	$0	103.50
Sheridan	#3	Clearmont	$2,018,279	$2,018,279	$0	103.50
Sublette	#1	Pinedale	$5,737,214	$5,737,214	$0	104.25
Sublette	#9	Big Piney	$5,522,691	$5,522,691	$0	104.25
Sweetwater	#1	Rock Springs	$36,698,041	$36,698,041	$0	97.75
Sweetwater	#2	Green River	$23,436,789	$23,436,789	$0	97.75
Teton	#1	Jackson	$22,306,650	$22,306,650	$0	141.00
Uinta	#1	Evanston	$23,370,356	$23,370,356	$0	96.00
Uinta	#4	Mtn. View	$6,013,961	$6,446,017	$432,056	96.00
Uinta	#6	Lyman	$6,737,156	$6,956,196	$219,039	96.00
Washakie	#1	Worland	$10,644,588	$10,644,588	$0	90.25
Washakie	#2	Ten Sleep	$1,617,948	$1,617,948	$0	90.25
Weston	#1	Newcastle	$6,751,306	$7,457,955	$706,649	88.50
Weston	#7	Upton	$2,776,229	$3,178,100	$401,871	88.50
Total:			**$707,457,463**	**$717,803,552**		
Hold Harmless Amount:				**$10,346,089**		

Table 8: Funding Levels, Lowest WCLI Value = Base (4Q-2000 to 2Q-2002)

County/District		City/Town	No HH	With HH	HH Payment	Index Values
Albany	#1	Laramie	$35,100,789	$35,100,789	$0	117.14
Big Horn	#1	Cowley	$7,430,041	$7,912,574	$482,534	104.00
Big Horn	#2	Lovell	$6,204,907	$6,204,907	$0	104.00
Big Horn	#3	Greybull	$4,766,642	$4,799,079	$32,436	104.00
Big Horn	#4	Basin	$3,908,244	$4,005,829	$97,585	104.00
Campbell	#1	Gillette	$64,391,025	$64,391,025	$0	118.86
Carbon	#1	Rawlins	$15,615,224	$15,615,224	$0	108.57
Carbon	#2	Saratoga	$9,310,280	$9,539,777	$229,497	108.57
Converse	#1	Douglas	$14,250,450	$14,250,450	$0	105.14
Converse	#2	Glenrock	$7,454,006	$7,454,006	$0	105.14
Crook	#1	Sundance	$10,926,871	$11,484,222	$557,351	103.71
Fremont	#1	Lander	$16,700,719	$16,700,719	$0	108.86
Fremont	#2	Dubois	$3,148,826	$3,148,826	$0	108.86
Fremont	#6	Pavillion	$4,924,910	$4,924,910	$0	108.86
Fremont	#14	Ethete	$7,334,030	$7,334,030	$0	108.86
Fremont	#21	Ft. Washakie	$3,879,565	$3,879,565	$0	108.86
Fremont	#24	Shoshoni	$3,657,755	$3,663,128	$5,372	108.86
Fremont	#25	Riverton	$20,534,613	$20,534,613	$0	108.86
Fremont	#38	Arapahoe	$3,852,697	$3,852,697	$0	108.86
Goshen	#1	Torrington	$17,258,113	$17,258,113	$0	103.71
Hot Springs	#1	Thermopolis	$7,351,186	$7,351,186	$0	106.00
Johnson	#1	Buffalo	$11,841,479	$11,841,479	$0	118.00
Laramie	#1	Cheyenne	$105,853,384	$105,853,384	$0	118.57
Laramie	#2	Pine Bluffs	$10,128,723	$10,128,723	$0	118.57
Lincoln	#1	Kemmerer	$7,051,859	$7,051,859	$0	105.43
Lincoln	#2	Afton	$18,465,047	$18,465,047	$0	105.43
Natrona	#1	Casper	$96,049,723	$96,049,723	$0	111.43
Niobrara	#1	Lusk	$4,256,168	$4,627,070	$370,901	100.00
Park	#1	Powell	$14,108,417	$14,108,417	$0	111.71
Park	#6	Cody	$18,892,591	$18,892,591	$0	111.71
Park	#16	Meeteetse	$2,027,542	$2,027,542	$0	111.71
Platte	#1	Wheatland	$11,818,672	$11,818,672	$0	104.29
Platte	#2	Guernsey	$2,965,671	$2,965,671	$0	104.29
Sheridan	#1	Ranchester	$8,627,261	$8,627,261	$0	118.29
Sheridan	#2	Sheridan	$27,677,323	$27,677,323	$0	118.29
Sheridan	#3	Clearmont	$2,224,853	$2,224,853	$0	118.29
Sublette	#1	Pinedale	$6,296,913	$6,296,913	$0	119.14
Sublette	#9	Big Piney	$6,073,607	$6,073,607	$0	119.14
Sweetwater	#1	Rock Springs	$40,170,818	$40,170,818	$0	111.71
Sweetwater	#2	Green River	$25,631,550	$25,631,550	$0	111.71
Teton	#1	Jackson	$24,660,420	$24,660,420	$0	161.14
Uinta	#1	Evanston	$25,650,539	$25,650,539	$0	109.71
Uinta	#4	Mtn. View	$6,586,792	$6,586,792	$0	109.71
Uinta	#6	Lyman	$7,387,006	$7,387,006	$0	109.71
Washakie	#1	Worland	$11,629,080	$11,629,080	$0	103.14
Washakie	#2	Ten Sleep	$1,782,404	$1,782,404	$0	103.14
Weston	#1	Newcastle	$7,421,931	$7,440,606	$18,674	101.14
Weston	#7	Upton	$3,031,043	$3,172,222	$141,180	101.14
Total:			$776,311,712	$778,247,242		
Change from Table 7 value:			$68,854,249	$60,443,690		
Hold Harmless Amount:				$1,935,530		

This indexation "without losers" would result in hold-harmless costs falling to $1.9 million, as only nine districts now claim it. Total education costs to the State, however, increase significantly with total school funding rising by $60 million to over $778 million. The WCLI value for Teton County rises to 161.14, implying an increase in funding of 61.14% above baseline funding levels, and all districts but Niobrara experience an increase in personnel funding above the baseline levels. Given the baseline funding model defines what prototype schools *should* cost to run (absent small district and small school adjustments), this simulation may identify those districts whose costs are not reflected in the prototype models, and require additional scale economy adjustments. While the regional adjustment used in Table 8 would be least controversial from the perspective of reducing school funds to districts, it is unlikely that the 8.4% increase in total school funding would be easily accommodated in the State budget given other funding priorities.

Figure 3: Comparison of WCLI Values over the Last Four Surveys
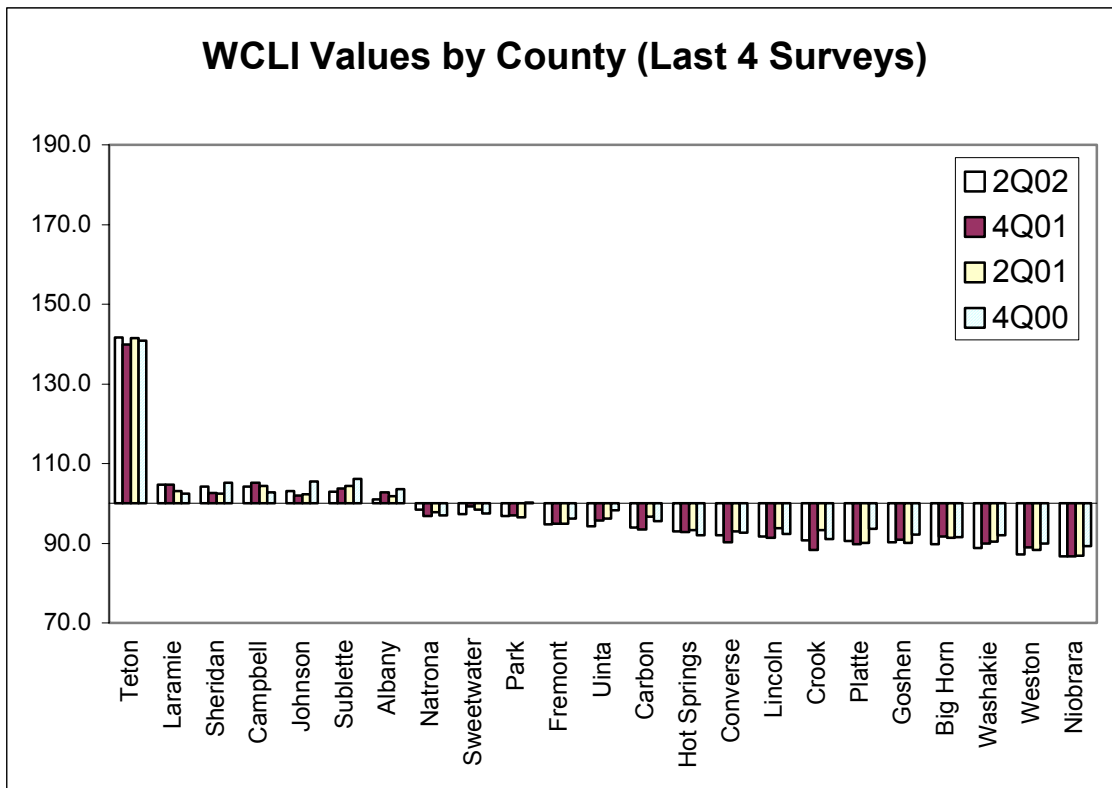

Note that using the county with the lowest price to define the base of the adjustment index eliminates the distortions caused by the very high WCLI value in Teton County at the cost of an increase total school funding. The influence of Teton County could also be removed if this county is treated as an outlier. Figures 3 indicates just how different the WCLI values are for this county relative to all others. Using the WCLI over all items as shown, price differences across the State progress smoothly from lower to higher cost counties with the exception of Teton. Given the values described in Tables 5a-5c, the high WCLI value in Teton is due to high housing prices there. The extent of this difference is demonstrated in Figure 4, where relative housing prices by county are

shown. Again, housing cost differences progress smoothly across the State from lower to higher cost counties. The exception is Teton County where average index value of housing costs is 244% higher than that measured in the lowest cost county (Niobrara), and 164% higher than in the second highest cost county (Campbell).

Figure 4: Comparison of WCLI Housing Values over the Last Four Surveys
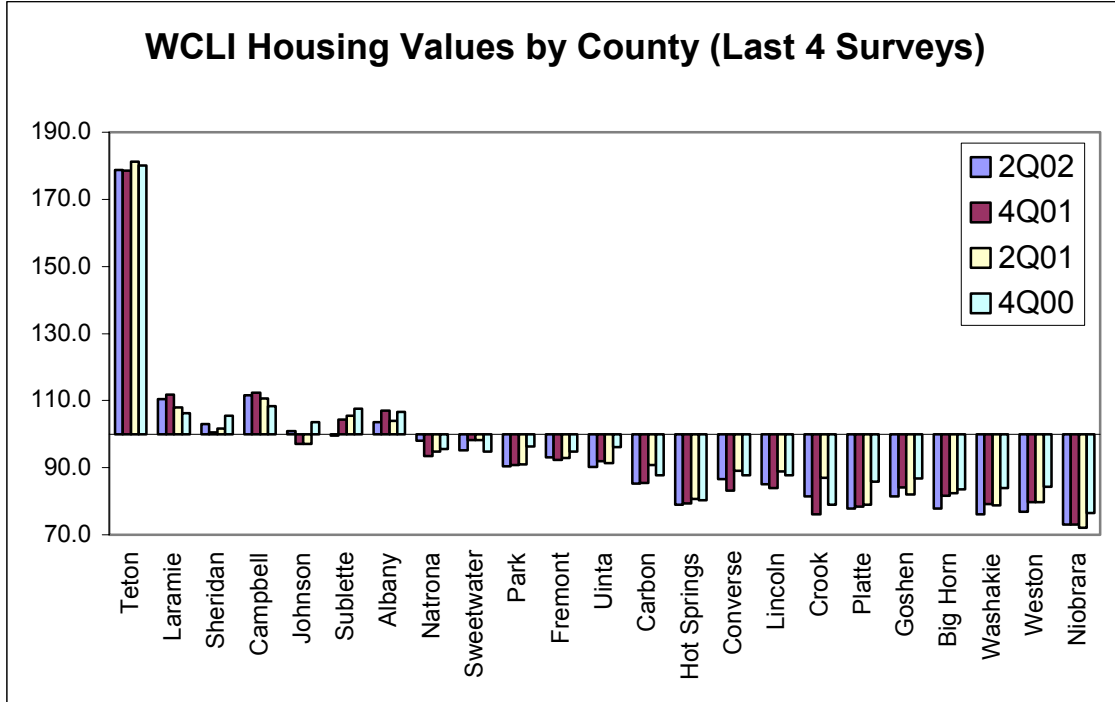
Figure 5: Comparison of WCLI Values With and Without Teton County
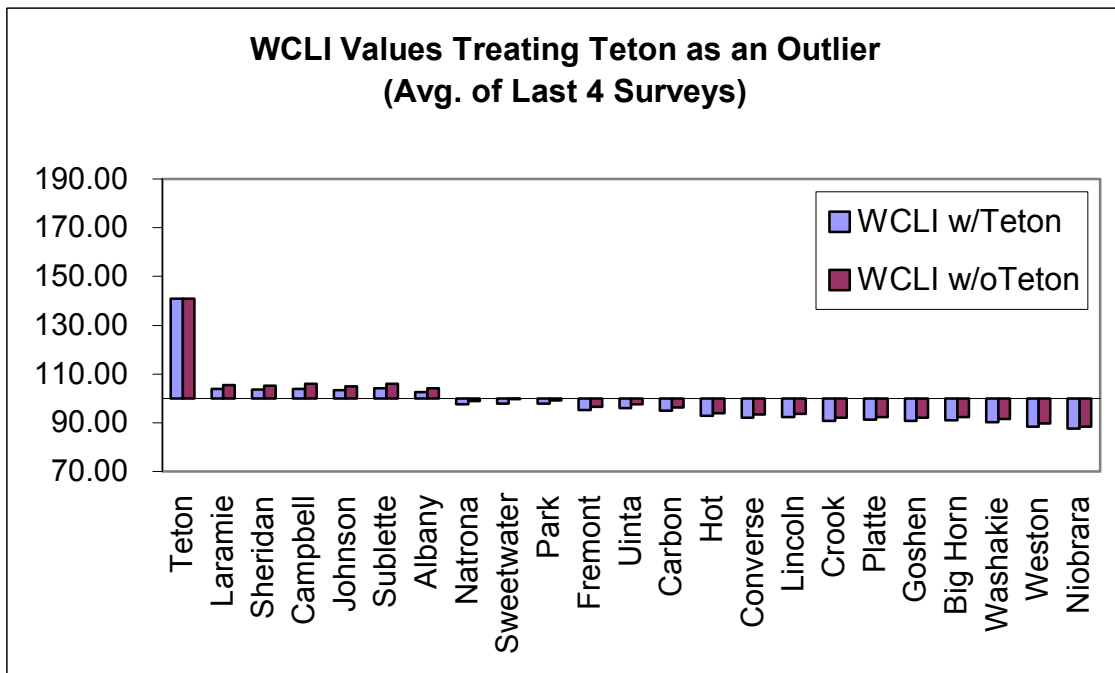
Table 9: Funding Levels Treating Teton County as an Outlier (4Q1999-2Q2002)

County/District		City/Town	No HH	With HH	HH Payment	Index Values
Albany	#1	Laramie	$32,260,629	$32,260,629	$0	104.0
Big Horn	#1	Cowley	$6,846,091	$7,924,814	$1,078,723	92.3
Big Horn	#2	Lovell	$5,714,683	$5,737,111	$22,428	92.3
Big Horn	#3	Greybull	$4,402,026	$4,806,873	$404,847	92.3
Big Horn	#4	Basin	$3,601,003	$4,008,086	$407,083	92.3
Campbell	#1	Gillette	$59,315,602	$59,315,602	$0	105.9
Carbon	#1	Rawlins	$14,329,604	$14,694,494	$364,889	96.2
Carbon	#2	Saratoga	$8,583,967	$9,563,857	$979,890	96.2
Converse	#1	Douglas	$13,112,380	$13,112,380	$0	93.2
Converse	#2	Glenrock	$6,874,913	$6,985,465	$110,552	93.2
Crook	#1	Sundance	$10,092,002	$11,504,782	$1,412,780	92.1
Fremont	#1	Lander	$15,410,472	$15,410,472	$0	96.6
Fremont	#2	Dubois	$2,903,284	$2,903,450	$167	96.6
Fremont	#6	Pavillion	$4,538,015	$4,538,015	$0	96.6
Fremont	#14	Ethete	$6,781,683	$6,781,683	$0	96.6
Fremont	#21	Ft. Washakie	$3,631,180	$3,631,180	$0	96.6
Fremont	#24	Shoshoni	$3,371,528	$3,674,585	$303,057	96.6
Fremont	#25	Riverton	$18,942,389	$18,942,389	$0	96.6
Fremont	#38	Arapahoe	$3,606,795	$3,606,795	$0	96.6
Goshen	#1	Torrington	$15,938,283	$15,967,050	$28,767	92.1
Hot Springs	#1	Thermopolis	$6,806,661	$6,806,661	$0	94.0
Johnson	#1	Buffalo	$10,886,340	$10,886,340	$0	104.8
Laramie	#1	Cheyenne	$97,263,634	$97,263,634	$0	105.5
Laramie	#2	Pine Bluffs	$9,343,872	$9,343,872	$0	105.5
Lincoln	#1	Kemmerer	$6,510,451	$6,921,030	$410,580	93.6
Lincoln	#2	Afton	$16,991,591	$17,452,095	$460,505	93.6
Natrona	#1	Casper	$88,443,074	$88,443,074	$0	99.0
Niobrara	#1	Lusk	$3,924,317	$4,634,591	$710,275	88.4
Park	#1	Powell	$12,969,435	$12,969,435	$0	99.0
Park	#6	Cody	$17,359,444	$17,359,444	$0	99.0
Park	#16	Meeteetse	$1,855,541	$1,855,541	$0	99.0
Platte	#1	Wheatland	$10,868,719	$10,868,719	$0	92.2
Platte	#2	Guernsey	$2,720,028	$2,841,322	$121,294	92.2
Sheridan	#1	Ranchester	$7,926,818	$8,458,502	$531,683	105.2
Sheridan	#2	Sheridan	$25,462,736	$25,462,736	$0	105.2
Sheridan	#3	Clearmont	$2,041,875	$2,041,875	$0	105.2
Sublette	#1	Pinedale	$5,800,772	$5,800,772	$0	105.9
Sublette	#9	Big Piney	$5,585,252	$5,585,252	$0	105.9
Sweetwater	#1	Rock Springs	$37,147,598	$37,147,598	$0	99.6
Sweetwater	#2	Green River	$23,720,905	$23,720,905	$0	99.6
Teton	#1	Jackson	$22,306,650	$22,306,650	$0	**141.0**
Uinta	#1	Evanston	$23,612,489	$23,612,489	$0	97.5
Uinta	#4	Mtn. View	$6,074,789	$6,443,977	$369,188	97.5
Uinta	#6	Lyman	$6,806,164	$6,953,252	$147,089	97.5
Washakie	#1	Worland	$10,739,117	$10,739,117	$0	91.5
Washakie	#2	Ten Sleep	$1,633,739	$1,633,739	$0	91.5
Weston	#1	Newcastle	$6,819,475	$7,456,191	$636,717	89.8
Weston	#7	Upton	$2,802,131	$3,177,503	$375,372	89.8
Total:			**$714,680,147**	**$723,556,031**		
Hold Harmless Amount:				**$8,875,884**		

A strong case can be made that Teton County is not like any other in the State, and that adjustments for the remaining counties in the State should not include the influence of Teton values. This can be accomplished by computing the statewide average cost of the WCLI basket across the remaining 22 counties, and using this average to define the reference base of a new adjustment index, while assigning Teton County its actual WCLI value. County index values computed in this way are shown in Figure 5, along with unmodified WCLI index values for comparison. The distortions to the index caused by including Teton County prices are apparent. Index values over the last four surveys increase for all of the remaining 22 counties when Teton is not included, increasing potential school funding levels, while Teton County is held harmless at its original WCLI value. The implications for school funding performing a regional adjustment treating Teton County as an outlier in this way are shown in Table 9.

When Teton is treated as an outlier, the resulting WCLI values rise as shown in Figure 5. This increases funding to the remaining 22 counties, with total school-funding expenditures rising by $5.75 million over the case when Teton is included in the index base (Table 7). Teton County funding remains unchanged, while due to the increased funding elsewhere, hold-harmless payments decrease by $1.47 million. While three fewer districts remain under-funded relative to outcomes when Teton is not treated as an outlier, from these results it is clear that removing the effects of Teton County from the indexation used for regional cost adjustment does not eliminate the under-funding that some districts experience.[20] Under this indexation scenario, 19 districts experience a funding decrease relative to their guaranteed amounts. The pattern of under-funded districts is also maintained, as 18 of the 19 districts receiving hold-harmless funding have index values under 100.

Overall, one could consider the indexation scenarios in Tables 8 and 9 as the limiting cases of how funding would be affected if Teton County were not allowed to affect the index values of the other counties in Wyoming. Defining the index base by the county with the lowest priced survey basket is the highest cost approach. This method eliminates most hold-harmless payments, but it does so by increasing total school funding expenditures by over $60 million. Alternatively, treating Teton County as an outlier is the lowest costs means of removing the distortion this county imposes on the index. Both approaches are cost based to the degree that the WCLI represents the geographic variation in uncontrollable personnel costs districts face. It is unclear, however, that this presumption is true. Given the funding results from the adjustment scenarios described, and the fact that under-funding always emerges predominantly in districts with WCLI values under 100, an alternative method of making regional cost adjustments seems warranted. This alternative should be capable of reducing the number of districts that are under-funded relative to historic levels, while keeping total education expenditures to a fiscally responsible level. To accomplish such an adjustment requires that factors affecting personnel costs other than the cost of goods be considered.

Consider the factors that affect a teacher's willingness to accept a starting salary offered in a particular district. As previously argued, in addition to the cost of goods in an area, a greater abundance of amenities in a district will, all else equal, reduce the

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[20] Twenty districts actually receive less funding than the guaranteed levels, but the decrease in Fremont #2 (Dubois) is $167, thus it can be regarded as fully funded in this analysis.

salary demand a district experiences as these amenities will compensate employees for lower pay. Alternatively, more remote districts or those in smaller communities may lack amenities personnel would prefer to have access to, such as medical services and hospitals, retail outlets and entertainment, and when competing in the labor market with other communities that offer more such amenities, these areas must offer higher salaries to attract equivalent staff. Since these concerns affect not only teachers but all citizens that might consider locating in a community, those areas that are relatively less attractive will experience lower demand for housing, driving down real estate prices and reducing the measured costs of goods. While districts in expensive places with high WCLI values will need to pay higher salaries to attract equivalent personnel, those districts with lower WCLI values may need to pay higher salaries. Places with average costs of living, but with relatively more amenities would experience the opposite effect, allowing them to pay lower salaries relative to districts where it is expensive to live or where people demand a premium to relocate.
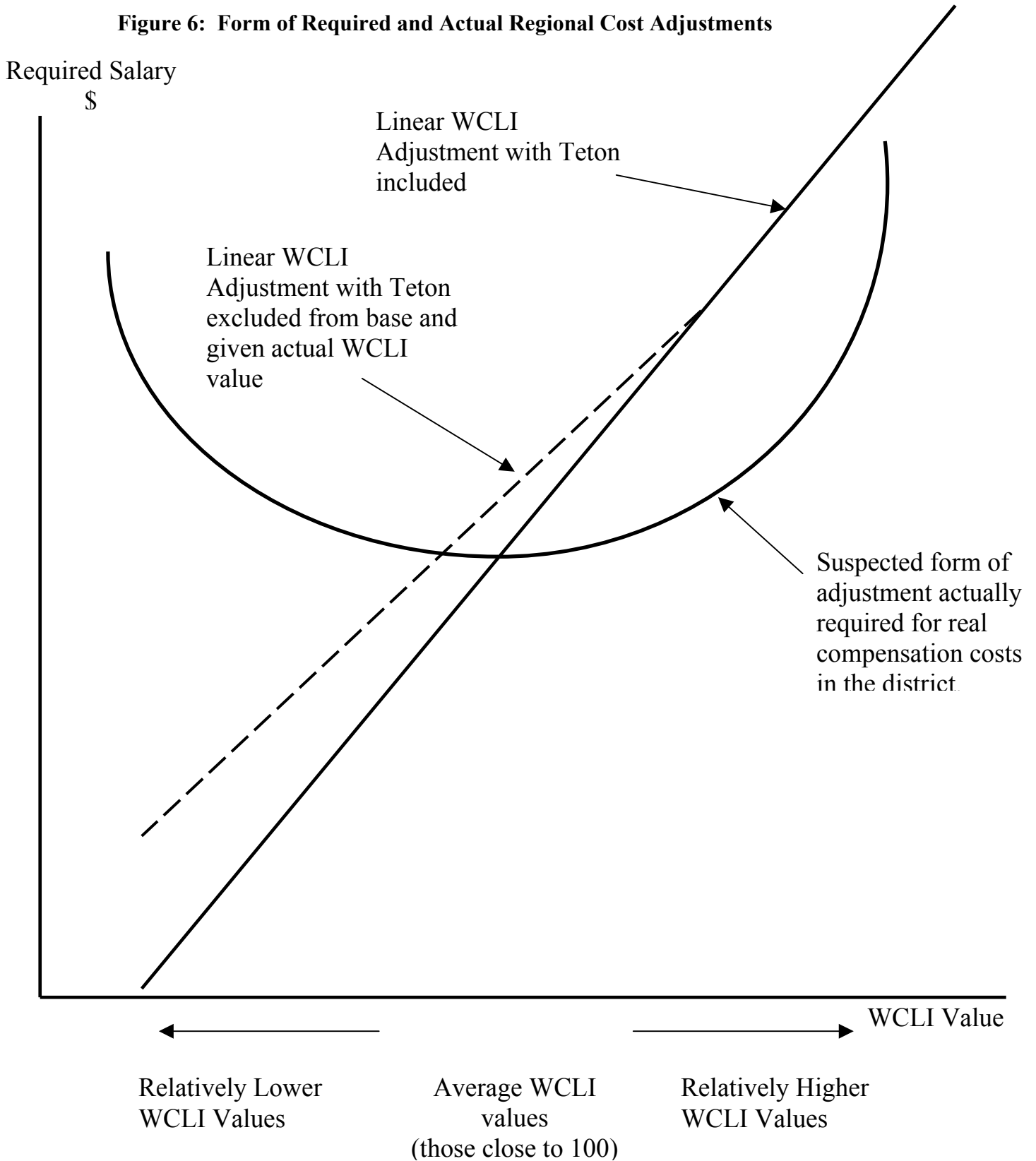
If the hypothesized relationship described between WCLI and the salaries a district is required to pay to attract teachers occurs in Wyoming, the necessary adjustment required for regional cost adjustments in the State would increase personnel funds to districts with relatively higher or lower than average measured WCLI values. Further, in a community with average goods prices, little or no adjustment would be required since these communities would not face the additional salary demands to compensate for a lack of amenities or for high prices. Figure 6 demonstrates such a "parabolic" relationship, with the U-shaped curve describing the shape of the adjustment needed. The solid line intersecting the curve shows the current adjustment mechanism in Wyoming. It creates a linear adjustment, increasing funding only for places with higher goods prices. This diagram also explains why, using this adjustment method, a systematic relationship is observed between under-funding (as measured by hold-harmless payments) and low WCLI values - there is no way such an adjustment can reimburse areas with low WCLI values that require increased salaries. Including Teton County reduces funding to such communities relative to an adjustment that treats Teton as an outlier (and then funding Teton County to the level suggested by its actual WCLI value). The dashed line intersecting the curve describes why hold-harmless payments fall when Teton County is removed from the index in this way - funding to all communities other than Teton rises. This adjustment still creates a systematic pattern of under-funding that is not solved when the influence of Teton County on the index is removed.

As a test of this hypothesis, consider how a parabolic relationship fits actual salary data in Wyoming. Only starting salaries are considered, as once teachers have made a commitment to an area, they often make connections to the community that make it more difficult to leave. Beginning teachers would face no such pressures, and therefore would require a premium to attract and maintain. Figure 7 illustrates the estimated relationship between average starting salaries by county and their associated WCLI value. The U-shaped curve represents a statistically fitted trend-line and the solid line intersecting it shows the current regional adjustment method used as described in Table 7. The dashed line indicates how this adjustment would change if Teton County were treated as an outlier as described in Table 9. All counties with data-points to the right of the linear adjustment lines receive more funding than required to maintain their current starting salaries paid. From the diagram, it is clear why treating Teton as an outlier does
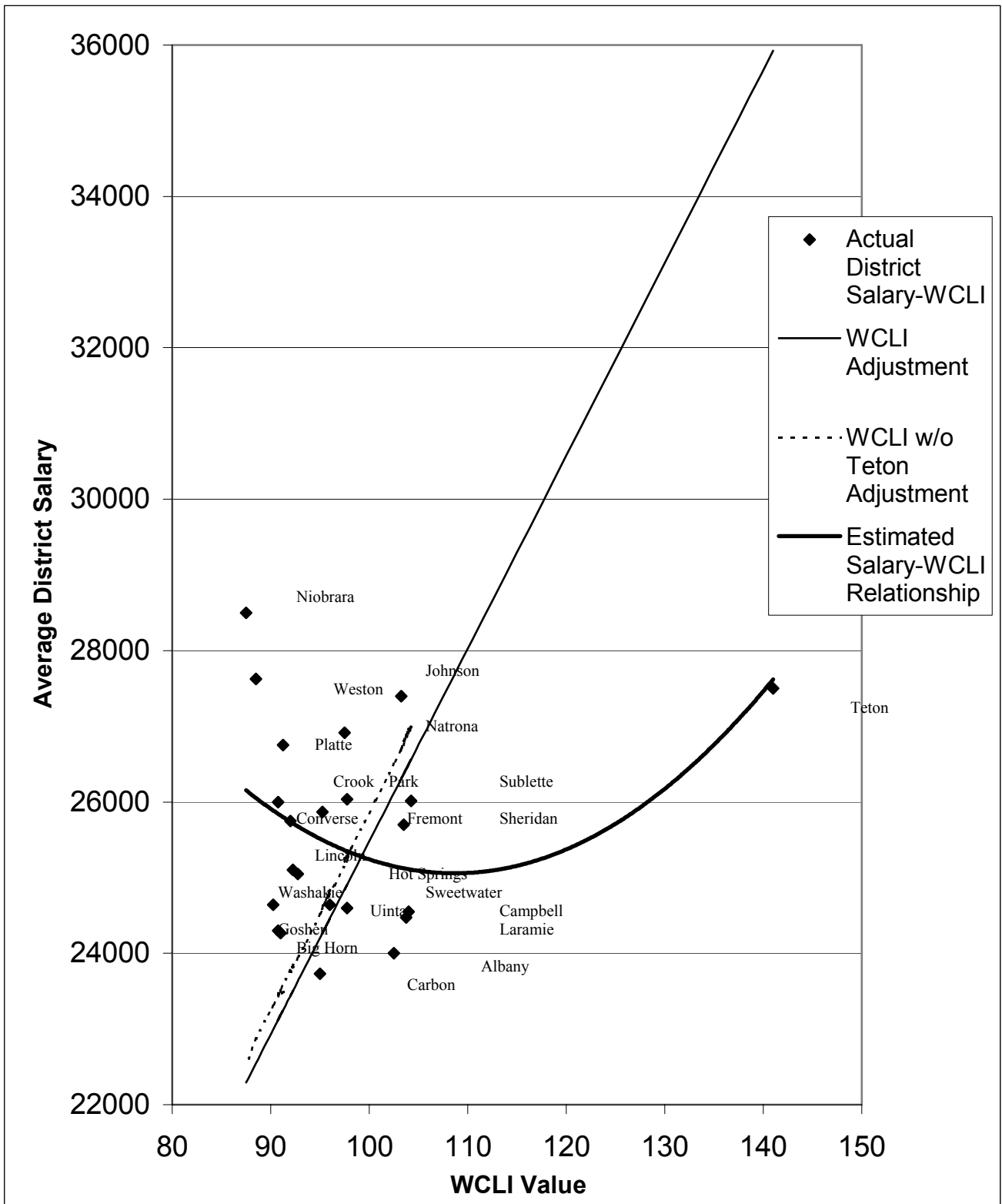
not significantly alter the under-funding situation for most districts - only one more county under this adjustment moves from the left to the right of the dashed line.

Figure 6: Form of Required and Actual Regional Cost Adjustments

Required Salary
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Linear WCLI Adjustment with Teton included

Linear WCLI Adjustment with Teton excluded from base and given actual WCLI value

Suspected form of adjustment actually required for real compensation costs in the district.

WCLI Value

Relatively Lower WCLI Values

Average WCLI values
(those close to 100)

Relatively Higher WCLI Values

Figure 7: Starting Salary-WCLI Relationship in Wyoming

Table 10: County Starting Salaries Using Linear Adjustment Methods

	WCLI Value	WCLI Value w/o Teton	Average District Salary	Salary adjustment w/ Teton	% Change using index w/ Teton	Salary adjustment w/o Teton, Teton=141	% Change using index w/o Teton
Teton	141.00	141.00	$27,500	$35,924	31%	$35,924	31%
Laramie	103.75	105.52	$24,475	$26,433	8%	$26,884	10%
Sheridan	103.50	105.19	$25,700	$26,370	3%	$26,800	4%
Campbell	104.00	105.85	$24,550	$26,497	8%	$26,969	10%
Johnson	103.25	104.80	$27,395	$26,306	-4%	$26,701	-3%
Sublette	104.25	105.94	$26,017	$26,561	2%	$26,992	4%
Albany	102.50	104.03	$24,000	$26,115	9%	$26,504	10%
Natrona	97.50	99.01	$26,914	$24,841	-8%	$25,227	-6%
Sweetwater	97.75	99.56	$24,600	$24,905	1%	$25,365	3%
Park	97.75	99.03	$26,033	$24,905	-4%	$25,230	-3%
Fremont	95.25	96.57	$25,869	$24,268	-6%	$24,603	-5%
Uinta	96.00	97.46	$24,643	$24,459	-1%	$24,830	1%
Carbon	95.00	96.23	$23,730	$24,204	2%	$24,518	3%
Hot Springs	92.75	93.95	$25,050	$23,631	-6%	$23,937	-4%
Converse	92.00	93.24	$25,750	$23,440	-9%	$23,756	-8%
Lincoln	92.25	93.59	$25,100	$23,503	-6%	$23,844	-5%
Crook	90.75	92.07	$26,000	$23,121	-11%	$23,458	-10%
Platte	91.25	92.21	$26,750	$23,249	-13%	$23,494	-12%
Goshen	90.75	92.09	$24,300	$23,121	-5%	$23,464	-3%
Big Horn	91.00	92.25	$24,265	$23,185	-4%	$23,505	-3%
Washakie	90.25	91.49	$24,643	$22,994	-7%	$23,309	-5%
Weston	88.50	89.79	$27,625	$22,548	-18%	$22,875	-17%
Niobrara	87.50	88.39	$28,500	$22,293	-22%	$22,520	-21%
Average			$25,626	$24,908	-3%	$25,248	-1%

Consider the financial implications of the linear adjustments as described in Table 10. Of those districts losing funding, the magnitude of under-funding ranges from 3%-21% when Teton is treated as an outlier. Teton County receives 31% more than needed to maintain current starting salary levels. As previously, smaller and more remote districts tend to be under-funded. When Teton is removed from the index, only nine counties receive adequate funding to maintain salary levels. Now consider the parabolic trend fitted to the data. This line has been fitted to minimize the squared distance from the predicted trend line to the actual data points.[21] Counties with data points above the curve are under-funded relative to current salary levels, while those below receive more than adequate funding to maintain salaries. If an adjustment were made using such a function, only nine counties would be under-funded relative to current salary costs, and further, the pattern of under-funding does not appear to discriminate between counties

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[21] A number of possible trend line patterns were fitted to the data, and that which yielded the "best fit" (or predicted the actual data most accurately) was the parabolic shape shown.

with relatively higher or lower WCLI values, between smaller and larger counties, or those more or less remote. It could also be argued the adjustment is more compelling because it reflects not only the actual goods costs districts face, but also the increased salary demands some might face when they are smaller or more remote.

Using the exact equation describing the parabola in Figure 7, a salary index was constructed. This "Amenity Cost of Living Adjustment" uses the predicted salary at the minimum point of the parabola as its base value, and describes the percentage difference between predicted county salaries and this value.[22] Table 11 describes the resulting district funding levels using this adjustment. Total school finance expenditures using this adjustment are $5.8 million more than those predicted in Table 7 using the most recent WCLI values over the last four surveys, however, total expenditure is only $33,467 more than the case when Teton County is treated as an outlier in Table 9. Additionally, hold-harmless payments fall under this adjustment scheme to $4.2 million, $6.1 million less than that predicted in Table 7 and $4.7 million less than the case described in Table 9. These payments decrease due to the number of districts now claiming hold-harmless payments, which falls by 5 districts to 14 under this scenario. This is eight districts fewer than the case outlined in Table 7, which uses the current funding mechanism. Teton County funding remains at a level capable of supporting current starting salaries, but $3.4 million less than that level guaranteed in Table 6. Using the originally proposed adjustment method as described in Table 10, Teton salary levels would have risen by almost 31%. The fact that the starting teacher salary in Teton in the most recent survey was $27,500 suggests the original adjustment over-compensated Teton and strongly suggests support for the hypothesis that personnel are willing to accept lower pay to access the amenities in the area. At the opposite end of the spectrum, Niobrara District #1 is still under-funded, but now only by $243,107 as opposed to the $736,278 under-funding received using the originally proposed methodology in Table 7. Given the small sizes of most of the districts still under-funded under the amenity adjustment, it is likely that a small school productivity adjustment is also needed in these areas.

The advantages of the Amenity Adjustment suggested here seem apparent and include the fact that it uses actual statewide data to estimate the required adjustment. There is, however, a potential disadvantage to the use of this method too. If it were used on a permanent basis, districts in the State would have an incentive to increase starting salaries. If all districts did so, it would shift the estimated relationship between average starting salaries by county and the WCLI upward, increasing funding levels. Such efforts would not necessarily increase funding levels significantly though, unless the proportional difference between that district's county average starting salary increased relative to salary used as the index base (computed as the predicted salary at the minimum point of the estimated parabola), however, especially for some counties, the incentive might exist to attempt to distort data outcomes in this way.

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[22] The estimated relationship describing average beginning teacher salaries by county and WCLI values using the data in Table 10 was $Predicted Salary = 53950-531.8(WCLI)+ 2.4471(WCLI)^2$. To construct the index, predicted average salaries were computed using each county's WCLI value in this equation. The minimum of the estimated parabola occurs at WCLI=108.66, yielding a predicted salary of $25,057 at this point.

Table 11: Implied funding levels using the Amenity Adjustment

County/District		City/Town	No HH	With HH	HH Payment	Index Values
Albany	#1	Laramie	$31,468,245	$31,468,245	$0	100
Big Horn	#1	Cowley	$7,382,562	$7,913,569	$531,007	103
Big Horn	#2	Lovell	$6,165,049	$6,165,049	$0	103
Big Horn	#3	Greybull	$4,736,997	$4,799,712	$62,715	103
Big Horn	#4	Basin	$3,883,264	$4,006,012	$122,749	103
Campbell	#1	Gillette	$57,115,131	$57,115,131	$0	100
Carbon	#1	Rawlins	$14,912,016	$14,912,016	$0	102
Carbon	#2	Saratoga	$8,913,001	$9,552,948	$639,947	102
Converse	#1	Douglas	$14,017,776	$14,017,776	$0	103
Converse	#2	Glenrock	$7,335,613	$7,335,613	$0	103
Crook	#1	Sundance	$10,884,981	$11,485,254	$600,273	103
Fremont	#1	Lander	$15,955,146	$15,955,146	$0	102
Fremont	#2	Dubois	$3,006,939	$3,006,939	$0	102
Fremont	#6	Pavillion	$4,701,341	$4,701,341	$0	102
Fremont	#14	Ethete	$7,014,855	$7,014,855	$0	102
Fremont	#21	Ft. Washakie	$3,736,035	$3,736,035	$0	102
Fremont	#24	Shoshoni	$3,492,358	$3,669,748	$177,390	102
Fremont	#25	Riverton	$19,614,542	$19,614,542	$0	102
Fremont	#38	Arapahoe	$3,710,602	$3,710,602	$0	102
Goshen	#1	Torrington	$17,191,748	$17,191,748	$0	103
Hot Springs	#1	Thermopolis	$7,191,642	$7,191,642	$0	102
Johnson	#1	Buffalo	$10,559,745	$10,726,458	$166,713	100
Laramie	#1	Cheyenne	$93,785,399	$93,785,399	$0	100
Laramie	#2	Pine Bluffs	$9,026,063	$9,321,991	$295,928	100
Lincoln	#1	Kemmerer	$6,923,866	$6,923,866	$0	103
Lincoln	#2	Afton	$18,116,709	$18,116,709	$0	103
Natrona	#1	Casper	$89,791,846	$89,791,846	$0	101
Niobrara	#1	Lusk	$4,381,130	$4,624,237	$243,107	104
Park	#1	Powell	$13,161,056	$13,161,056	$0	101
Park	#6	Cody	$17,617,379	$17,617,379	$0	101
Park	#16	Meeteetse	$1,884,478	$1,884,478	$0	101
Platte	#1	Wheatland	$11,714,293	$11,714,293	$0	103
Platte	#2	Guernsey	$2,938,680	$2,938,680	$0	103
Sheridan	#1	Ranchester	$7,663,158	$8,460,732	$797,574	100
Sheridan	#2	Sheridan	$24,629,121	$24,629,121	$0	100
Sheridan	#3	Clearmont	$1,972,999	$1,972,999	$0	100
Sublette	#1	Pinedale	$5,584,595	$5,712,177	$127,582	100
Sublette	#9	Big Piney	$5,372,467	$5,511,668	$139,201	100
Sweetwater	#1	Rock Springs	$37,546,571	$37,546,571	$0	101
Sweetwater	#2	Green River	$23,973,052	$23,973,052	$0	101
Teton	#1	Jackson	$18,709,188	$18,709,188	$0	110
Uinta	#1	Evanston	$24,295,612	$24,295,612	$0	102
Uinta	#4	Mtn. View	$6,246,405	$6,438,223	$191,819	102
Uinta	#6	Lyman	$7,000,853	$7,000,853	$0	102
Washakie	#1	Worland	$11,641,767	$11,641,767	$0	103
Washakie	#2	Ten Sleep	$1,784,523	$1,784,523	$0	103
Weston	#1	Newcastle	$7,571,788	$7,571,788	$0	104
Weston	#7	Upton	$3,087,983	$3,170,909	$82,926	104
Total:			**$719,410,567**	**$723,589,498**		
Change from Table 7 value:			**$11,953,104**	**$5,785,946**		
Hold Harmless Amount:				**$4,178,931**		

To avoid this incentive and also to improve the index to account for other factors affecting salaries in the State, a more rigorous statistical adjustment could be defined using some of the approaches described in Section IV.2. In the short-term, however, this adjustment would be fairer to smaller districts than that suggested originally in the school funding formula and it avoids the known distortions present in that method.

Regional Cost Adjustment Interim Recommendation:

The findings of this report indicate that in the near term an amenity adjustment as described should be used to define regional cost adjustments. In the longer term a more rigorous statistical approach should replace this adjustment method.

As described, the amenity adjustment increases total school expenditures over the most recent estimates described in Table 7 by less than 1%, but decreases hold-harmless payments by 60%. This is accomplished using State salary data to estimate whether a full "cost of living" adjustment needs to be made in every district given differences in amenities across counties. More rigorous statistical methods to estimate the determinants of uncontrollable cost variations among districts in the State would improve these estimates, but this amenity adjustment reduces apparent under and over-funding in some districts due to the impact of unmeasured or un-priced influences on salary demands. To accomplish a more rigorous statistical estimate of cost differences will require additional data to be collected regarding salary outcomes and teacher and district characteristics in the state. A partial but not exhaustive list of these data requirements is found in Table 12, but final data requirements cannot be known until these estimations are performed. One benefit of more rigorous statistical approaches is the ability to control for the quality of education received in each district, as measured by equivalent teacher qualifications or by WyCAS outcomes. While a regional adjustment attempts to ensure each district has access to equivalent quality teachers, such controls must be imposed when actual salary data is used. The amenity adjustment used here does not control for education outcomes across districts, nor does the adjustment method currently used. Additionally, improvements in WCLI measurements due to implementation of those recommendations in this report will also improve the estimated results if they remove current biases in the data.

Table 12: Data Requirements for Additional Regional Adjustment Estimations

Data Required For Future Regional Cost of Education Estimations
- Individual teacher salaries across the State.   - Benefits description by district.   - Individual teacher characteristics: gender, race, years experience, new to district, highest degree accomplished, certification status, subject specialty, administrative duties, assigned to multiple campuses, grade taught, etc.   - Beginning teacher salaries by district.   % of low income students in a district.   % of "at risk" students in district.   % of limited English-proficient students.   % of special education students.   - Average classroom size.   - District WyCAS test scores.   - District ADM.   - District population.   - District population growth rate.   - Distance to nearest natural amenities (mountains, National Parks, etc).   - Distance to nearest metropolitan center or closest major county.   - District or county wealth.   - District or county income.   - County WCLI.   - Regional unemployment rate.   - Average house price.   - Number of heating days/year.   - Sq. footage of total facilities in district.   - Measure of quality of capital facilities.   - Other data not yet unknown.

VII. Conclusions:

To ensure equality in education opportunities in the State, school districts must be funded with adequate resources to achieve State educational objectives and in a manner that ensures districts have equivalent resources to achieve these goals. Of particular concern is the question of how to define an adjustment that accurately captures regional variations in uncontrollable input costs districts face. Since the largest component of such costs is contained in personnel salaries, most methodologies attempt to identify variations in factors that affect salary demands across districts. This can be done indirectly through the use of a wage index or cost of living index, both of which assume that local differences in the cost of living will determine local salary variations. A more complicated method employs a statistical estimation of these cost variations directly. In Wyoming, only indirect methods of estimating regional input cost variations have been considered. Wage data does not exist at a fine enough level to define a useful wage index thus, in the original school finance model, a cost of living method was suggested using the State's WCLI data. Estimation of cost variations in the State using the cost of living index has proven difficult due to the presence of unmeasured amenity influences, which bias the WCLI. Originally, in an effort to avoid the problems amenities pose in the WCLI, MAP proposed that the goods category most affected by these biases, housing, be removed from the WCLI index measure, using the remaining categories to define an adjustment process. In February 2001, however, the Courts ruled that such a methodology for measuring regional cost adjustments does not meet the court-ordered requirement that school finance in the State be cost-based. In response to this ruling, MAP felt there was no alternative but to use the WCLI as measured in defining regional cost adjustments.

This report finds that use of the WCLI is problematic for several reasons. First, there are pre-existing bias problems with the WCLI that should be corrected if it is to be used for policy analysis or school finance. These problems can cause housing costs in particular and overall index outcomes in general to be incorrectly measured. Several recommendations are made here to improve the reliability of the WCLI. These include:

- That Afton, Wyoming be included in the sample sites used to measure prices around the State. Use of the current WCLI survey sites causes an inaccurate estimate of goods prices in this area, which has detrimental effects for the education funding of Lincoln County District #2.
- That a consumer expenditure survey be conducted in Wyoming. The current construction of the WCLI likely over-weights the importance of housing in the index relative to Wyoming consumption patterns. This has important implications for school finance and regional planning, and the data should be corrected for this possible bias.
- That automobiles be priced statewide in the index. Currently, they are only priced in Cheyenne, thus a potentially important source of price variation across the State is not measured by the WCLI.
- That data collection methods be defined to ensure rental equivalence in the housing price component of the WCLI. To control for variations in housing rental quality across the State, the procedures used by the Bureau of Labor Statistics

could be adopted. This would eliminate an important source of bias in WCLI data and could have significant implications for school finance if it changes index outcomes.

Total estimated cost of all WCLI recommendations is estimated to be less than $25,000 annually, and would result in higher quality data. The consumer expenditure survey would be the most expensive recommendation but would only need to be conducted twice per decade. The cost of such a survey would likely approach $50,000, but on a pro-rated basis this would result in an annual expense of $10,000/year.

The second problem with using the WCLI to index counties stems from the fact that traditional methods of adjustment lead to distorted estimates of regional cost. Even if all of the recommendations described in this report to improve this index were adopted, it may still be the case that using the WCLI in regional adjustment, as it is traditionally used, may be improper for Wyoming. Due to the rural nature of the State and local disparities in population and amenities, cost of living may not be the only factor affecting salary costs districts face. While districts with high living costs will have to pay higher salaries to attract teachers, those districts with a relatively small population or fewer amenities may also be required to pay teachers higher salaries. Those small or remote districts required to make such adjustments in salary are likely to also record low WCLI values as the cost of housing in areas people find less attractive to live is generally low.

Due to the influence cost of living and amenity effects have on salaries in Wyoming, the linear adjustment method proposed in the State school-funding model should be discarded, including any adjustments that treat Teton County as an outlier. Instead it is the recommendation of this report that an amenity-cost of living adjustment be used that accounts for both costs of living and amenity effects on salary demands in Wyoming. Simulations presented here suggest such an adjustment would increase total school funding by less than 1% over current levels, but reduce hold-harmless payments to districts over 60% relative to the original regional adjustment methods proposed. A caveat remains with the suggested adjustment mechanism- the methodology may create incentives for administrators to increase starting salary to influence their district's funding levels. For this reason, this report recommends that within the next year a more rigorous statistical adjustment be defined that maintains the ability to account for salary demands in all regions of the State, while also minimizing incentives for discretionary district decisions that impact regional adjustment estimations. These will be developed and presented in a final report to be submitted in June 2003, where it will be determined whether an acceptable statistical estimation method can be employed to define regional cost adjustments in Wyoming.

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