

WYOMING EDUCATION FINANCE  
ISSUES REPORT

Reconsideration of Wage Rate Cost Adjustments

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## **Reconsideration of Whether Data on Relative Wage Rates Should be Incorporated In An Index to Estimate Regional Education Cost Differences Within Wyoming**

### **I- Background**

The May 1997 Management Analysis and Planning, LLC (MAP) report to the Wyoming Legislature (*A Proposed Cost-Based Block Grant Model for Wyoming School Finance*, by James W. Guthrie, et. al.) was based on available national research about educational adequacy, consultations with professional experts in Wyoming, and data on expenditures, prices and costs available in the fall or early winter of 1997<sup>1</sup> when the MAP report was prepared. The judgments and data on which MAP's recommendations were based were specific to the time when the research was conducted and the report transmitted. As new data become available, it is appropriate to consider whether these new data permit improvements in the methodologies previously utilized.

Subsequent to the Legislature's modification and enactment of MAP's recommendations, plaintiffs in *Campbell County School District et. al. v. State of Wy. et. al.* challenged the Legislature's enactment. In documents and testimony, the plaintiffs claimed, *inter alia*, that MAP and the Legislature should have utilized a "relative wage index" to estimate differences in the costs of providing education in different geographic regions of the State of Wyoming. This suggestion was

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<sup>1</sup> Throughout, this memorandum refers to a school year by the year in which that school year ends. Thus, "1997" should be read to mean "school year 1996-97".

not adopted by the Judge in his Order of December 31, 1997. Nonetheless, while the Court has not required the Legislature to make such a modification in its methodology, the Court has not prohibited the Legislature from doing so if further consideration leads to a conclusion that this would be desirable.

Minutes of a conference call of the Legislative Service Office's working group on the "regional cost of living" of November 13, 1997 state that:

There should be some comparison of actual salaries paid for certified and classified staff and salaries paid for persons in similar occupations or in occupations requiring similar skills and training in different communities/areas of the state. The purpose here is to determine whether the Wyoming cost of living index (WCLI) reflects actual experience and practice, i.e. if it costs more to live in one town as opposed to another, the salaries and pay rates of similar positions should reflect that both in the school system and in other employers' pay rates.

There is some issue of which comes first: higher salaries or higher cost of living.

The Legislative Service Office has asked MAP to consider this suggestion from the Working Group and, if warranted, to revise its proposed methods for estimating regional differences in education costs within the State of Wyoming to take account of this suggestion. This memorandum responds to that request by the Legislative Service Office. As in previous work MAP has performed for the State of Wyoming, this memorandum emphasizes that absolute precision is not possible in the calculation of regional differences in the cost of education. Appropriate estimates of regional cost differences combine careful analyses of data with professional judgment about how these data should be interpreted. Alternative interpretations will often be available. This memorandum is intended to assist Wyoming policymakers in making these interpretations, but can offer no certainty that one "best" interpretation will be obvious or that careful

professionals will always agree about how to choose between several reasonable interpretations.

## **II - MAP's Preference for a Regional Cost Index Based on Wage Data.**

MAP concurs with the theory underlying the Working Group's suggestion. When MAP researched and prepared its May 1997 report, the first method MAP considered for regional adjustment of teacher salary costs was to develop an index based on the relative wages of college-educated workers in different regions in Wyoming. Such an index could be helpful because there should be a strong relationship between costs of professional labor employed by school districts and the prices actually paid by other industries that employ comparable workers. In the absence of gender-barriers to occupational entry, if salaries of accountants, for example, were to rise rapidly relative to teacher salaries, over the long run more college students in Wyoming and neighboring states would major in accounting, and fewer would major in education. Eventually, the supply of teachers would decline and the supply of accountants would rise, resulting in an increase in teacher salaries and a decrease in accountant salaries.

An index based on relative wages paid in different regions of the state to all college-educated workers might have been a good proxy for the teacher salary portion of a cost of education index, because there are many college-educated professions which are more competitive than teaching and where salaries are more a function of pure market conditions. For example, while there may be one school district in a community which hires all (or nearly all) teachers who live in that community, there may be many firms hiring accountants. Thus, the price of

accountants would be more subject to pure economic factors than the price of teachers.

The above paragraphs illustrate MAP's theory of the relationship of teacher salaries to the salaries of other college-educated professionals. The same considerations apply, however, to the relationship of the salaries of school districts' non-professional labor to the salaries of those working in comparable occupations in the private sector.

### **III - The Initial Impracticality of Constructing an Index Utilizing Wage Data**

In preparing its May 1997 report, MAP discovered that, while theoretically preferable, it was not practical to develop such an index for two reasons. One is that there are many Wyoming communities where there are relatively few college-educated workers, besides teachers, employed. An index based on college-educated labor might be a practical alternative in a state comprised largely of metropolitan communities, but not in a state where most communities are rural.

To establish the initial salary (in the first year of implementation of the MAP model) for teachers in Wyoming, therefore, MAP could not rely on existing salaries paid to teachers throughout Wyoming, because most of these salaries are paid in labor markets where there are relatively few alternative employment opportunities for college-educated professionals. Therefore, MAP utilized data from only a few selected communities (Albany and Laramie Counties) which are relatively more metropolitan than the typical Wyoming community. Because there are *relatively* more employment opportunities for college-educated

professionals in these communities, and *relatively* greater supply of college-educated professionals in these communities, MAP presumed that competitive labor market conditions were more closely approximated in these communities than in the state as a whole. (We emphasize the "relative" superiority of data from these communities, because even in these communities, professional labor markets are less developed than in more metropolitan communities in other states.) However, because these relatively competitive labor markets are not typical of Wyoming communities, actual teacher salary data across the state could not be utilized to estimate real differences in costs faced by districts in different communities.

Similar considerations apply with less force to non-professional labor. While there are not as many non-professional occupations represented in Wyoming communities as there would be in more metropolitan communities, there are many Wyoming communities where schools compete with other local employers for non-professional labor. Therefore, MAP proposed that the initial cost (in the first year of implementation of the MAP model) of non-professional employees, on average, be estimated by utilizing the actual salaries paid, on average, to non-professional school employees. This method assumed that, while some districts may pay salaries to non-professional employees which are higher than market conditions require, other districts may pay salaries to non-professional employees that are lower than market conditions would require (for example, because in these communities there are relatively fewer alternative employment opportunities). Because non-professional labor represents a smaller share of school district expenditures than professional labor, any deviation of this estimate from a theoretically pure determination of the cost of non-professional labor would have little impact on the overall funding of the model.

Although MAP utilized existing average non-professional school employee wages to estimate the initial cost to school districts of hiring such employees, such data could not be used to estimate differences in school district costs from community to community. As noted, a statewide average of such wages may include individual district wages which are either too high or too low for pure market conditions. Use of a statewide average assumes that these deviations will cancel out, or if they do not, will have little impact on the overall result. But such a consideration cannot apply to use of the deviant conditions themselves for purposes of a geographic adjustment.

A second reason that MAP's initial recommendation was not consistent with the Working Group's suggestion is that, for those (relatively few) college-educated professionals that do reside throughout Wyoming, there was no existing data source for salaries actually paid to professional workers in different parts of the state. The Wyoming Department of Employment did publish a regular report with analysis of salary levels throughout the state. However, this report, similar to that required of all states by the Federal Government (known as "ES 202" data) is based on standard industrial classifications, not occupations. Thus, using these data, one could discern relative salaries of employees in the newspaper industry (SIC code 271) in different regions of the state, but this industrial classification includes not only professional workers like reporters, but printers, newspaper delivery truck drivers, etc. No existing data source existed from which relative salaries of college-educated workers in different regions of the state could be calculated. Because the relationship of salaries paid to college-educated workers in different regions may vary greatly from the relationship of

salaries paid to other workers, it would be misleading to base an index for education on the salary variations between industrial classifications in Wyoming.

For example, if a community had an excess supply of newspaper reporters, and the salaries of newspaper reporters began to fall, this would tend to depress the salaries of teachers as more newspaper reporters sought teaching positions. But if a community had an excess supply of newspaper delivery truck drivers, this would not tend to affect the salaries of teachers. It is true that if a truck driver shortage drove up the salaries of newspaper delivery truck drivers, some teachers might leave the teaching profession for jobs as newspaper delivery truck drivers, but it would generally require a very large salary differential for this to begin to occur. Because newspaper reporters and teachers share a common professional labor market, but newspaper delivery truck drivers and teachers do not, the exchange of personnel between professions (and changes in decisions of college students about majors) occurs more fluidly than the exchange of personnel between professional and non-professional workers. Therefore, differences in costs of hiring teachers in different regions of the state could not properly be estimated by examining differences in salaries in the newspaper industry (SIC 271) in different communities, unless additional data were available on the salaries of different occupations within that industry in different communities.

Wyoming's ES-202 report provides data for annual salaries, and in doing so it combines wages of part-time and full-time employees. This also made the report unusable for the purpose of estimating regional differences in salary levels. Some communities have many more part-time workers as a share of total employment than others, and thus their average monthly or annual salaries will

be depressed even if their hourly wages are high. Resort communities, for example, employ many part-time and seasonal workers in service occupations. Thus, a resort community that might have relatively high wage costs for professional workers will also have relatively low average annual wages for all employees. For this reason it would also be inaccurate to estimate relative wage costs for professional workers by utilizing relative average annual wages between communities that have different mixes of full- and part-time employees.

This problem is related to the fact that the sectoral mix of employment differs from region to region. Even without differences in full- vs. part-time workers, counties with relatively more employment in high wage sectors than others may have different relative costs. For example, even if all employees were full-time, a county with a relatively large mining industry will have higher average wage costs than a county with a relatively large hotel and restaurant industry. But this does not mean that the costs of teachers are necessarily higher in the former than in the latter county.

Finally, the ES-202 data include information on salaries only, not total compensation (including benefit payments). It is not possible to estimate regional differences in the costs of hiring teachers with such data, because many districts offer superior benefit packages in lieu of salary. If the practices of other employers are inconsistent in this respect, the costs of hiring teachers from place to place would not bear a consistent relationship to the salaries (without benefits) of other employees in different communities. This would be a serious deficiency, but less so, if there were data on occupational wages, because benefit practices for employed professionals might be more similar from location to location. But

it is a more serious deficiency when employees in different categories are lumped together in a standard industrial classification sectoral total.

Therefore, in its May 1997 report, MAP did not feel that it could rely on wage data to estimate regional differences in the costs of providing education in Wyoming. MAP relied upon a second method. Rather than attempt to determine the relative economic costs of college-educated labor in different regions of the state, a determination was made of the salary levels which districts would have to offer in order to provide professional workers, like teachers, with comparable standards of living, represented by consumer price levels. As a proxy for varying costs of employing teachers, MAP chose to develop an index of varying consumer prices paid by those teachers. However, were adequate data available, MAP's preference would have been, and remains, to use a relative wage index to estimate different costs of providing education from community to community.

#### **IV - The Relationship of Wage Data to Consumer Price Data**

MAP's index, based on differences in consumer prices, does indirectly reflect wage differences. For example, if general wage levels in a community are high, these will be reflected in other consumer prices. If a retail store has to pay high wages to its sales help, these will be reflected in higher prices for food, clothing, and other consumer products that are priced in a consumer price index. But to go farther, and actually attempt to incorporate wage data in the index when there are no reliable data which can be used to do so, would create distortions that would do considerable harm to the equity of distributing funds to Wyoming school districts.

## **V - The BBC Proposal**

As noted above, in *Campbell County School District et. al. v. State of Wy. et. al.*, plaintiffs urged the state to adopt, in part, a wage-based index for making regional cost adjustments. Consultants to the plaintiffs, Brown, Bortz and Coddington, Inc. (BBC), developed such an index utilizing the Wyoming Department of Employment ES-202 data. This index reflects the deficiencies described above and, as a result, does not meet a test of reasonableness. Most observers of Wyoming economic conditions, for example, agree that costs are generally higher in Teton County than in the rest of the state. However, BBC's "relative wage index" found that Teton's costs were below average, 93 percent of the statewide average. The most costly regions of the state, by this method, are Sweetwater County (132 percent of the statewide average) and Campbell County (128 percent of the statewide average). The reason for this counter-intuitive result is apparent.

Low average wages in Teton result from a predominance of low-wage service workers in Teton County in the tourist industry -- hotel maids, restaurant workers, etc. Therefore, average wages in Teton County are lower than in other counties where the occupational distribution is not so skewed by low wage service workers. Teton has its greatest employment in SIC 70 (Hotels and Other Lodging Places), SIC 58 (Eating and Drinking Places) and SIC 79 (Amusement and Recreation Services). In 1994 (the most recent year for which MAP had data when it prepared its initial report), these sectors were responsible for about 27 percent of all wages paid in the county in that year. In the state as a whole, wages in these three 2-digit sectors were only 5 percent of total wages paid. The

average annual wage paid in SIC 58 in Teton County was \$11,874; in SIC 70 was \$12,880; and in SIC 79 was \$23,200. The average statewide wage (all sectors) was \$22,000. Thus, average wages in Teton County are depressed by the type of employment prevalent in the county, and, if such an index were utilized by Wyoming, it would result in reduced school funding for Teton. The fact, however, that Teton County has a lot of "eating and drinking places" and "hotels and other lodging places" has no relevance to the costs of education in that community.

In Sweetwater County, on the other hand, the high "relative wage index" number results from the fact that the largest 2-digit SIC employment in the county is SIC 14 (nonmetallic minerals, except fuels). In 1994, nonmetallic minerals wages in Sweetwater County were 27 percent of total wages paid, and the average nonmetallic minerals wage was \$51,118. Statewide, this high wage sector represented only 4 percent of total wages paid. Similarly, Campbell County has a very high "relative wage index" number because the most important 2-digit SIC employment in Campbell County is SIC 12 (coal mining). In 1994, coal mining wages in Campbell County were 37 percent of total wages paid in the county, and the average coal mining wage was \$54,982. Statewide, this high wage sector also represented only 5 percent of total wages paid.

To calculate regional differences in the costs of teachers, therefore, we need not data on average wages for all occupations combined in Teton, Sweetwater or Campbell Counties, but average wages for professional workers in these counties, and these data do not exist.

## **VI - The Ohio Method**

One state, Ohio, has utilized a wage-based measure to adjust school expenditures for regional cost differences, rather than a consumer price measure. Using state Bureau of Employment Services (ES-202) data, the Ohio Department of Education calculates the average weekly earnings for each county in the following sectors: agriculture and forestry, mining, construction, manufacturing, transportation and utilities, wholesale and retail trade, finance-insurance-real estate, services, and state and local government.

An overall county-weighted average wage is then calculated by assuming that each county has the same share of employment in each sector as does the state as a whole. This weighting prevents a distortion in average wages from being created by the varying mix of sectors in each county. In other words, without this weighting, a county's average earnings might be low primarily because a large share of its employment was in a low-wage sector (like retail trade), even though its wages for similar types of employees were not lower than elsewhere. (Note that the important thing about this adjustment is that it calculates each county's average earnings as though that county had the same mix of sectoral employment as every other county. Using the statewide average to derive this standard mix is unimportant to the method. The postulation of any standard sectoral mix would do the job of preventing comparisons from being distorted by different mixes of employment by sector in different counties. The ideal standard would be one which adjusted each county's sectoral mix to the mix of sectors whose employment types most closely resembled the employment types found in elementary and secondary schools.)

Ohio then makes another adjustment which is uniquely possible in that state. Ohio has 88 counties, almost all of which are roughly square in shape, so a county map of Ohio looks something like a checkerboard. The Department of Education, therefore, can make the assumption that the labor market of each county consists not only of the workers in that county, but of workers in all of the counties that surround it. Consequently, education calculations for each county are based on a "cost of doing business factor" calculated from the average of the weighted average earnings for that county, as well as the weighted average earnings for each contiguous county.

Average wages of these contiguous county groups vary by as much as 15 percent. The Ohio General Assembly, however, has determined that it would not be appropriate to adjust school district revenues by so large a cost-of-doing-business factor. Therefore, the Ohio Legislature initially decided to establish the maximum range as 7.5 percent. The distribution of cost of doing business factors was then pro-rated within a 7.5 percent range, so the highest cost school district received only 7.5 percent more basic per pupil state revenue than the lowest cost district. Subsequently, the range of variation was increased to 10 percent.

When Ohio uses average wages, it performs two essential operations which are not present in the BBC formula and which would be impossible to reproduce in Wyoming.

First, Ohio weights the wages in each county by the relative importance of each 2-digit SIC sector in the state as a whole. This operation requires, for meaningfulness, each county for which the operation is performed to have a distribution of industries which is roughly reflective of the state as a whole. (For

example, it would not lend accuracy to the adjustment if a county with only a few professional workers had the wages of these workers weighted for the relative importance of professional workers statewide.) If there are many counties with insignificant numbers of workers in sectors which are important statewide, this weighting procedure would be suspect. It can be trusted only if there are significant numbers of workers in each 2-digit sector in each county, even if the relative importances of these sectors differ from county to county. A state like Ohio, industrialized and relatively uniform geographically, lends itself to such an adjustment; Wyoming does not.

The Ohio system was developed by Matthew Cohen of the Ohio Department of Education. He explained the rationale for the methodology in a 1981 paper, "The Cost of A Basic Educational Program in Ohio: A Proposal for State Funding of Public Schools." The paper states that "adjusting [i.e., weighting by statewide relative importances] for statewide employment eliminates discrepancies caused by single industry areas." Further, the paper states that county wage data "do not reflect economic markets, but rather arbitrary county divisions... In order to establish a notion of an area wide market structure..., [E]ach county is averaged with its adjacent counties in determining a final adjusted average weekly wage." Because of Ohio's checkerboard-like county jurisdictional lines, the wages in any county can be presumed to be influenced by surrounding county conditions. Clearly, such a procedure is not available for inferring an implicit "economic market" in mostly rural Wyoming, where counties vary greatly in size and jurisdictional boundaries are irregular.

Finally, as noted above, because its reliance on imperfect wage data still produces suspect results, Ohio simply refuses to utilize any index number that

results in an adjustment higher than about 10 percent. Matthew Cohen of the Ohio Department of Education recently told the author of this memo that he had found MAP's analysis of its methodology persuasive, and the State of Ohio was now considering whether to cease relying on sectoral (as opposed to occupational) wage data for adjusting education expenditures.

## **VII - Occupational Data Now Available**

The U.S. Department of Labor has initiated a program under which each state is now collecting and reporting wage data by occupation. The program is paid for by the Federal Government as a federal-state cooperative program funded by the federal BLS and the Employment and Training Administration (ETA), initially for the purpose of "Alien Labor Certification," to determine prevailing wage rates for employers requesting to employ immigrant aliens and non-immigrant aliens working in the United States. Wyoming's first report of wage data by occupation was published in late 1997, and it will continue.

While this new source may hold eventual promise of providing wage data by occupation for purposes of estimating regional cost differences in providing education in Wyoming, it is too early to utilize these data now. First, the data do not include information on benefits and, as indicated above, because employers have inconsistent practices with respect to dividing employee compensation between wages and benefits, relative wage information between regions may be misleading if it is taken to represent relative compensation information. The Bureau of Labor Statistics has proposed in the current budget now before Congress, new funding for state collection of data on benefits, to accompany the new collection of occupational wage data, but it is impossible to say whether

Congress will appropriate these funds or, if it does so, how quickly such data collection may begin.

Second, the new Wyoming report of occupational wages aggregates data to 6 regions in the state. These are:

1. Northwest Region, including Park, Big Horn, Washakie, Hot Springs and Fremont Counties.

2. Southwest Region, including Sublette, Teton, Lincoln, Uinta and Sweetwater Counties.

3. Northeast Region, including Sheridan, Johnson, Campbell, Crook and Weston Counties.

4. Central-Southeast Region, including Converse, Carbon, Niobrara, Albany, Platte and Goshen Counties.

5. The Casper Metropolitan Statistical Area, including Natrona County.

6. The Cheyenne Metropolitan Statistical Area, including Laramie County.

These six broad regions aggregate occupational wage information from communities in quite different economic circumstances. For example, utilizing the consumer price-based index that MAP has recommended for estimation of regional differences in costs of education personnel (the "Revised Net WCLI-2"),

school districts in Park County have an index number of 102.8, while school districts in Fremont County have an index number of 97.8, yet districts in both counties would have the same index number (that of the Northwest Region) if the new occupational wage data were used. Similarly, school districts in Sheridan County have a "Revised Net WCLI-2" index number of 103.5, while school districts in Weston County have an index number of 98.5, yet districts in both counties would have the same index number (that of the Northeast Region) if the new occupational wage data were used. School districts in Teton County have a "Revised Net WCLI-2" index number of 117.9, while school districts in Sweetwater County have an index number of 101.9, yet districts in both counties would have the same index number (that of the Southwest Region) if the new occupational wage data were used. School districts in Carbon County have a "Revised Net WCLI-2" index number of 103.3, while school districts in Converse County have an index number of 99.5, yet districts in both counties would have the same index number (that of the Central Southeast Region) if the new occupational wage data were used.

We conclude, therefore, that aggregation of occupational data in the new report is at too high a level to permit adjustment of differences in costs among 48 Wyoming school districts to the degree of specificity required by Wyoming policymakers.

Because of these limitations MAP has not attempted to create a relative wage index for occupational groups based on these new occupational data. However, the type of data now available can be illustrated by examining data for accountants, an occupation used for explanatory purposes above. In addition we

illustrate the data with information about another professional occupation, "public relations specialists and publicity writers."

The new report shows the statewide average starting wage for accountants and auditors to be \$10.54, and the mean wage to be \$14.12. In the Northwest Region, the starting wage is 69 percent of the state average and the mean wage is 80 percent of the state average. In the Southwest Region, the starting wage is 106 percent of the state average and the mean wage is 122 percent of the state average. In the Northeast Region, the starting wage is 89 percent of the state average and the mean wage is 129 percent of the state average. In the Central-Southeast Region, the starting wage is 47 percent of the state average and the mean wage is 89 percent of the state average. In the Casper Metropolitan Statistical Area, the starting wage is 81 percent of the state average and the mean wage is 92 percent of the state average. In the Cheyenne Metropolitan Statistical Area, no data were available.

The new report shows the statewide average starting wage for public relations specialists and publicity writers to be \$13.18, and the mean wage to be 16.52. In the Northwest Region, the starting wage is 97 percent of the state average (compared to 69 percent for accountants) and the mean wage is 95 percent of the state average (compared to 80 percent for accountants). In the Southwest and Northeast Regions, no data are available. In the Central-Southeast Region, the starting wage is 48 percent of the state average (compared to 47 percent for accountants) and the mean wage is 90 percent of the state average (compared to 89 percent for accountants). In the Casper Metropolitan Statistical Area and in the Cheyenne Metropolitan Statistical Area, no data are available.

Because we have not examined all professional occupations, these data are only suggestive. Certainly, including more occupations would result in lesser average variation than is found by examining only two occupations. Nonetheless, these data reflect such extreme variation that we should be very cautious in using them to estimate the true cost differentials for professional workers from region to region. We suspect, but cannot be certain, that the extreme variation reflects not only that an index based on all available professional occupations has not been calculated, but also that data for the two occupations that have been examined are based on sample sizes too small to be reliable for this purpose. Note that the variation in index numbers in the "Revised Net WCLI-2," from bottom (Fremont County) to top (Teton County), is only 21 percent; without Teton County, the variation is from bottom (Fremont County) to top (Sublette County) is only 10 percent.

If, as this new U.S. Department of Labor project develops, Wyoming explores the aggregation of occupational data at even lower levels of geographic detail, it will likely find that, for many occupations, sample sizes will be too small to permit publication of data or confidence in the results. To protect the identity of firms that cooperate by furnishing wage data, the Department of Employment will not publish information for any industry group consisting of fewer than three employers, or for any occupation in an industry with fewer than 1,000 employees. There will be many occupational groups that will not meet this standard for publication at the county level in Wyoming.

Therefore, while it may be worthwhile to re-examine this issue at some time in the future once the collection of occupational data has become

established, there is no reason to expect our conclusions to change about the utility of such data for the purpose of estimating regional education cost differences. Other states (like Ohio) may have better success in this regard, because of greater population and a more even distribution of occupational types.

### **VIII - In Conclusion**

In conclusion, MAP's conclusion, in its May 1997 report, remains valid that Wyoming is unable to utilize wage data to estimate regional differences in the cost of education. While additional data have since become available, they are still insufficient for purposes of constructing a regional cost of education index that would permit Wyoming policymakers to estimate differences in cost between 49 school districts, or even between 23 counties. Therefore, following this reconsideration, MAP continues to recommend that the personnel components of Wyoming's education funding be adjusted for regional differences utilizing the "Revised Net WCLI-2" index.