

The market for teachers in Wyoming: Review of the evidence

8 November 2002

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Table of Contents

| | |
|---|------|
| I. Introduction | -1- |
| II. Is there an aggregate shortage? | -3- |
| III. What determines teacher counts? | -10- |
| A. Attrition | -10- |
| B. Accession | -12- |
| C. Temporary certifications | -15- |
| D. Superintendents, principals and assistants | -16- |
| IV. Should Wyoming spend more? | -17- |
| V. Should Wyoming spend more on some people? | -22- |
| A. New teachers | -22- |
| B. Continuing teachers | -23- |
| C. Retirement-eligible teachers | -23- |
| D. Positions experiencing excess demand | -24- |
| E. Compensation and teacher quality | -25- |
| VI. Should Wyoming spend more in some places? | -28- |
| A. Rural districts | -28- |
| B. Western districts | -28- |
| VII. What might we like to know? | -29- |
| References | -31- |

I. Introduction

The purpose of this document is to review the accumulated record regarding the labor market in which the Wyoming public schools finds its teachers. For this purpose, the record consists of the following documents:

- S** "A Call to Action 2002: Focusing on the Future of Wyoming's Schools", presented by the Wyoming K-12 Education Community, and henceforth referred to as "Call to Action",
- S** "MAP Advisory Group Report to the Management Council, December 11, 2001", henceforth referred to as "Advisory Group Report",
- S** "Wyoming Education Association Response to Call for Comments for the School Finance Compensation Component Study, July 31 2002", henceforth referred to as the "WEA Response",
- S** "Wyoming Education Finance: Wyoming School District Employee Compensation", January 31, 2002, by Michael J. Wolkoff and Michael Podgursky, henceforth referred to as "Employee Compensation",
- S** "Wyoming Education Finance: Proposed Revisions to the Cost Based Block Grant", January 31, 2002, by James R. Smith, henceforth referred to as "Proposed Revisions",
- S** "Teacher Supply and Demand in the State of Wyoming", by Robert Reichardt, henceforth referred to as "Supply and Demand",
- S** "Laying the Groundwork: Information on Wyoming Superintendent and Principal Qualifications, Supply, and Demand", January 17, 2002, henceforth referred to as "Laying the Groundwork",
- S** "Blueprint: Ensuring Quality Teaching and Leadership in Wyoming", February 2002, by Debra L. Holloway, henceforth referred to as "Blueprint".

The review here is further restricted to the documented economic conditions in this labor market and their consequences. Therefore, it will will not offer interpretations or discussions

of the legal obligations that the State of Wyoming owes to its public schools. In addition, it will not attempt to provide independent verification of any of the data upon which the reviewed reports are based.

Two general observations apply to the entire record. First, the standard to which the State and its schools are being held is unclear. "Best" is used in several instances to describe that standard.¹ If the requirement is, for example, that the State and schools provide the "best" education possible with current funds, then it may even be that this requirement has already been met. If, instead, the requirement is to achieve the "best" without limit, then the only appropriate policy requires spending without limit.

Second, the record contains very little evidence regarding the relationships between any of the issues raised or policies proposed, and student outcomes. The importance of these outcomes is recognized.² However, attempts to measure them or to relate them to changes in teacher counts, experience, turnover or any other characteristic of activity in the labor market for teachers occur only in "Teacher Compensation" (pgs. 50-52). This particular exercise, though a responsible treatment of what appears to be the available data, is severely limited by their nature. Fragmentary evidence regarding statewide average test scores allow some additional, but only highly tentative, inferences.

The measurement of student outcomes is the single issue related to the process of funding Wyoming's public schools that is most in need of further elaboration. If student outcomes are not measured, then nothing can be said about the effects of funding policies on them. Consequently, nothing can be said about whether these policies achieve the goals that the State and its people have set for the students these schools serve, or those which the

¹ For example, "WEA Response" (pg. 3) quotes *State v. Campbell County*: "The constitution requires it be the *best* we can do." (source of the emphasis not given in "WEA Response").

² For example, "Cost of maintenance should not be the determining factor in closing buildings. Educational programs for students, the cost of staffing and what is best for students is the basis on which decisions are made as to whether or not to close buildings." "Call to Action", unpaginated, in the section entitled "5. Issue: Model on building by building square footage basis".

Constitution and Supreme Court apparently impose.³

Lastly, two distinctions are relevant throughout the record. First, claims to general increases in funding must be based on evidence of universal deficits in resources or achievements. Disparities between school districts require, instead, increases in funding targeted specifically at those that are disadvantaged.

Second, anecdotal evidence is relatively uninformative. The apparent implications of anecdotes depend too heavily on the reasons for which they are chosen. Systematic, or statistical evidence must be much more persuasive. It can be thought of as the consistent evaluation of all, or at least a representative sample, of the available anecdotes.

This review proceeds as follows. The next section examines the evidence bearing on the question of whether teachers are in short supply to the Wyoming public schools. The third section examines the evolution of the teacher workforce through attrition and accession. Section IV considers whether aggregate funding levels should deviate from the current trends. Section V addresses the question of differential pay. Section VI addresses the question of the extent to which funding should differ across districts. Section VII identifies the major issues that require further study, and concludes.

II. Is there an aggregate shortage?

This section explores the primary question of this review. Is there any evidence that Wyoming school districts do not have adequate numbers of teachers? The short answer to this question is no.

Table 1 displays the available evidence. The first and second columns present alternative estimates of enrollment. Despite the minor inconsistencies, both suggest the same principle conclusion. Enrollment has dropped by approximately 10% between the school years beginning in 1993 and 2000. "Supply and Demand" (pg. 5) projects a decline of similar magnitude from the latter year through that beginning in 2008. These enrollment estimates

³ In this regard, the invitation in the "WEA Response" (pg. 17) should be welcome: "The education community should not be seen as the enemy, but instead recognized as the source of the most relevant, current, and practical information about school employee compensation." Much greater efforts are needed to gather and analyze this information.

and projections are unchallenged in the record.

Table 1

Student and teacher counts

| School year beginning in | Total enrollment: | | Number of teachers: | | Students per teacher: |
|-----------------------------|---------------------------|-------------------------|---------------------------|-------------------------|---------------------------|
| | "Supply and Demand" | "Proposed Revisions" | "Supply and Demand" | "Proposed Revisions" | "Supply and Demand" |
| 1993 | 100,847 | - | 6,970 | - | 15.4 |
| 1994 | - | - | 7,038 | - | 14.9 |
| 1995 | - | - | 7,077 | - | 14.8 |
| 1996 | - | 93,792 | 7,051 | 7,486 | 14.7 |
| 1997 | - | 92,000 c | 7,042 | 7,450 c | 14.5 |
| 1998 | - | 90,000 c | 7,155 | 7,550 c | 14.2 |
| 1999 | - | 88,000 c | 7,307 | 7,700 c | 13.3 |
| 2000 | 89,551 | 85,369 | 7,217 | 7,660 | 12.4 |

Note: "c" indicates estimate.

Sources: Column 1 is from "Supply and Demand", pg. 4. Column 2 is from "Proposed Revisions" figure 1, pg. 4. Column 3 is from "Supply and Demand", table 1, pg. 6. Column 4 is from "Proposed Revisions" figure 2, pg. 4. Column 5 is from "Employee Compensation", table 4, pg. 15 for 1993-1999, imputation from columns 1 and 3 for 2000.

The third and fourth columns of table 1 present alternative estimates of teacher counts.⁴ Again, these columns differ in detail but agree in trend. While enrollment has fallen by approximately 10%, teacher counts have increased by approximately 3.5%.

⁴ The third column represents "the total number of teachers" ("Supply and Demand", pg. 6). The fourth column represents "FTE Teachers" ("Proposed Revision", figure 2, pg. 5). The differences in underlying definitions presumably explain the evident discrepancies.

Column 5 of table 1 presents the inevitable consequence of these trends. The ratio of students to teachers in Wyoming has fallen by nearly 20% over the entire period.⁵

As a first approximation, the inference must be that Wyoming public schools are not currently suffering from a shortage of teachers.⁶

Two, perhaps related, conditions might render this inference invalid. First, it would fail if even the most recent student-teacher ratio was too high to provide education of the appropriate quality. Second, it would be unwarranted if incumbent teachers did not possess the skill necessary to accomplish this objective.

There is essentially no evidence that the first condition might obtain. "Employee Compensation" (table 4, 15) reports that student-teacher ratios are lower in Wyoming than in all surrounding states, and than the average across all states. "Proposed revisions" (pg. 5) asserts that no more than two other states have student-teacher ratios below that of Wyoming. Neither of these claims are challenged.

Moreover, "Proposed Revisions" (pg. 14) and "Blueprint" (pg. 1) agree that, according to available research, reductions in student-teacher ratios do not improve outcomes for students who are not disadvantaged. This conclusion is also unchallenged.⁷ If student-teacher ratios in

⁵ "Proposed Revisions" provides values for the student-teacher ratio in the years 1996 through 1999. These values are identical to those in column 5 of table 1. However, these values are not consistent with those for the same years in columns 2 and 4. The same is true of the comparison between the student-teacher ratio for 1993 in column 5 and the student and teacher counts for that year. The original sources do not note these discrepancies.

⁶ This evidence contradicts the assumption in "Blueprint" (11 and elsewhere) that teacher numbers must be increased, and the "WEA Response" (pg. 14, "The supply already cannot meet demand"). "Costs Associated with Meeting Graduation and Accreditation Standards: Executive Summary", in "Call to Action" (unpaginated), requests additional staff, on the basis that they are required by "our new standards-based system". This is a slightly different argument, but again unsupported by any further evidence.

⁷The section below discusses the implications of the possibility that reductions in student-teacher ratios may improve outcomes for disadvantaged students. The request for reduced student-teacher ratios in "Call to Action" (pg. 8) is not accompanied by any distinction between ordinary and disadvantaged students, or by any discussion of

Wyoming are already low, and there is no indication that lower ratios would improve student outcomes, than there must be a presumption that further reductions are not required.

Crude measures of student outcomes in Wyoming are consistent with this presumption. They reveal no apparent sensitivity to changes in the student-teacher ratio. Table 2 reproduces the student-teacher ratios of column 5, table 1, in column 4. The preceding columns of table 2 present available values for average test scores among Wyoming public school students.

Table 2

Average student test scores
and student-teacher ratios

NAEP average scores:

| <u>School year</u> | <u>Grade 8 mathematics</u> | <u>Grade 4 reading</u> | <u>Grade 8 science</u> | <u>Student- teacher ratio</u> |
|------------------------|--------------------------------|----------------------------|----------------------------|---------------------------------------|
| 1990 | 272 | - | - | - |
| 1992 | 275 | 223 | - | - |
| 1994 | - | 221 | - | 14.9 |
| 1996 | 275 | - | 158 | 14.7 |
| 1998 | - | 219 | - | 14.2 |
| 2000 | 277 | - | 158 | 12.4 |

Sources: Grade 8 mathematics NAEP average score from Smith, page 10, table 5. Grade 4 reading NAEP average score from Smith, page 10, table 6. Grade 8 science NAEP average score from Smith, page 11, table 7. Student-teacher ratio from Wolkoff and Podgursky, 15, table 4 for 1994-1999, imputation from Reichardt, page 4 and Reichardt, page 6, table 1 for 2000.

implications for student outcomes.

This table demonstrates, first, that average test scores have been essentially unchanged over approximately the past decade. Second, it demonstrates that this pattern persists while student-teacher ratios have fallen. The implication is that the reduction has not improved student outcomes. It places the burden of proof on those who believe that further reductions would do so. "Blueprint" (pg. 2) makes essentially the same observation.

This suggestion is again only tentative. First, the test scores in table 2 should not be taken as comprehensive measures of student achievement. Second, table 2 provides no evidence regarding alternative explanations for the observed comparisons. For example, if recent student cohorts are less able, for other reasons, than earlier cohorts, the relative constancy in average test scores may represent an increase in the "value-added" provided by the public schools. Of course, if they are more able, this constancy would represent a decline in value-added, instead.

However, the conjunction of constant average test scores and reduced student-teacher ratios might have a different explanation. The record contains some suggestions that the quality of incumbent teachers is insufficient. The "WEA Response" asserts (pg. 9) that "(s)chool officials consistently report that they are interviewing and even hiring applicants who would not have been given an interview in previous years."⁸

This assertion is not accompanied by any evidence. However, it is sufficiently provocative to demand further examination. If true, it implies that recent increases in the numbers of teachers overstate the consequent changes in the true teaching "capacity" of the Wyoming public school system. If so, the argument for additional expansion of that capacity may have more force.⁹

⁸ The "WEA Response" reiterates this point (16): "All of the statistical arguments cannot cover up the simple fact that Wyoming used to be in the top ten, able to compete with the best districts for the best teachers in the country. Wyoming has moved to competing from a position in or near the bottom ten, hoping to compete for any certified teachers to fill critical shortages."

⁹ In this case, however, there would be no argument for increasing the compensation of incumbent teachers. To the contrary, increases should be withheld until either their adequacy is demonstrated, or they provide plausible expectations of improvement to adequacy.

Demands for additional staffing to provide for students with special needs are entitled to somewhat more attention. In summarizing existing research, "Proposed Revisions" (pg. 14) and "Blueprint" (pg. 1) agree that, in the words of the latter, "special needs populations, limited English proficient (LEP), and minority students" may benefit from reduced student-teacher ratios. However, the extent to which existing ratios should be adjusted depends on the definitions of these conditions, how many students meet these definitions in the Wyoming public schools, and where they are enrolled.

In principle, the LEP student population should be identifiable. The definition of "Limited English" in "At Risk/Limited English: Executive Summary" ("Call to Action", unpaginated) is relatively precise. Counts based on this or similar definition should therefore be useful.

The only such counts in the record consists of table 4 in "Proposed Revisions" (pg. 9). This table classifies only 2.0% of Wyoming public school students as LEP. This proportion is smaller than in all surrounding states, and barely one-fourth of the average rate across all states. Almost any conceivable increase in staffing for the purposes of meeting the needs of these students could be achieved with little impact on the aggregate student-teacher ratio in the State.¹⁰

The potential needs of the "at-risk" population are much more difficult to assess. "At Risk/Limited English: Executive Summary" ("Call to Action", unpaginated) suggests that the Wyoming Statutes and accompanying regulations may contain useful definitions of "at-risk". However, the record contains no counts of students satisfying these definitions.

Instead, the record approximates the numbers of "at-risk" students by the number of students eligible for free or reduced price lunches. To the extent that eligibility is essentially determined by income, this approximation does little more than identify poor students as "at-risk". The record does not contain any discussion regarding the validity of this identification, nor any evidence regarding the accuracy of this approximation.

In consequence, both must be suspect. Any responsible reading of the record must conclude that the numbers of "at-risk" students in the Wyoming public schools are, for practical

¹⁰ For example, assume that the student-teacher ratio in the State was initially set at 13, applicable to all students. If the ratio, as it applied to the 2% of State students designated as LEP, was then reduced to five, the aggregate student-teacher ratio in the State would fall only to 12.6.

purposes, unknown. Any assertions regarding the level of services, staffing or expenditures that they might require must therefore be regarded as unfounded. Before resources are allocated on the basis of these assertions, they should be devoted to identifying the population to whom they would be directed.¹¹

Assuming that LEP and at-risk students were appropriately identified, the question of whether they required additional teachers would depend on their actual circumstances. If they are currently in districts and classrooms with student-teacher ratios that are similar to or higher than those typical throughout the State, then the presumption should be that additional teachers are probably needed in these classrooms and districts. If, however, these students are already in classrooms with reduced student-teacher ratios, the argument for further reductions would be much less compelling.

The record is silent on these issues.¹² These students have a claim to levels of support within the educational system in excess of those devoted to students not suffering from disadvantages. However, that, in itself, does not prove that they need higher levels than they currently receive. Until evidence is offered in this regard, the case for additional teachers is

¹¹ From this perspective, the recommendation of the "EDY/LES MAP Advisory Subcommittee" ("Advisory Group Report", pg. 16) that district "at-risk" populations be estimated by the proportion of elementary school students eligible for free or reduced price lunches is beside the point. It may be true, as stated there, that the proportion of secondary students who are so eligible is difficult to measure accurately. However, neither of these proportions measure the actual quantity of interest. Whether an accurate count of eligible elementary students or an inaccurate count of eligible secondary students is a better estimate of the proportion of secondary students who are actually "at-risk of experiencing educational failure" ("At-Risk/Limited English: Executive Summary", in "Call to Action", unpaginated) can be nothing other than an open question. The efforts that would be necessary to answer it would certainly be better devoted to counting the "at-risk" population directly.

¹² The "Advisory Group Report" (pg. 13) asserts that "(t)he general diversity of students and increasing inclusion of special needs students in regular classrooms puts significant strain upon teachers to provide optimum educational opportunity and student achievement for the currently established class size of 21." This assertion, if true, would suggest that relief is appropriate. However, it is not accompanied by any evidence, either that classes are becoming more heterogeneous or that, to the extent that they are, student outcomes are suffering.

essentially unmade.

III. What determines teacher counts?

The previous section concludes that the evidence embodied in teacher counts does not suggest that the Wyoming public schools, in the aggregate, are inadequately staffed. This section examines the evolution of the teacher work force in greater detail. The purpose of this examination is to determine whether the dynamics of teacher attrition and accession reveal issues of concern that are not apparent in the aggregate counts.

The interplay of attrition and accession determines vacancies. "Supply and Demand" (table 13, pg. 19) reports that, in 2000, a total of 34 positions in academic subjects were vacant in the Wyoming public schools. This corresponds to a vacancy rate of less than one-half of one percent. The accompanying table 14 (pg. 20) indicates that average vacancy rates are less than one percent regardless of locale or region.¹³

These vacancy rates are not high by the standards in any labor market. Moreover, they arise in a workforce which is nevertheless expanding, while its clientele is shrinking. Lastly, there is no evidence that these vacancies have deleterious effects on student outcomes. Therefore, they cannot be regarded as a matter of present concern.

A. Attrition

Attrition rates have unambiguously increased over the past several years, to nearly 11% ("Employee Compensation", table 10, pg. 32), or more than 700 teachers. Some of this increase, from .8% to 1.4% of workforce between 1994 and 1999, consists of inter-district moves. These moves do not constitute a threat to the Wyoming public school system as a whole.¹⁴

¹³ "Employee Compensation" (pg. 25), reports that approximately 3% of all teaching positions in 2001 were "not filled with qualified applicants". This document does not define "qualified applicant". It seems likely that these positions were largely filled by personnel with temporary certification, as discussed below, rather than actually vacant.

¹⁴ Section VI addresses the implications for individual districts.

However, the rate of "state quits", individuals who either leave teaching or leave the State to teach elsewhere, has increased from 6.3% to 9.4% of workforce over the same period. The magnitude of this increase warrants further investigation. It would be a matter of concern were it to be attributable to more attractive teaching opportunities elsewhere.¹⁵

The available evidence suggests that this is not the case. Moves to teaching positions out-of-state appear to be a relatively small fraction of state quits. "Employee Compensation" (pg. 34) reports that no more than 37 Wyoming teachers made such moves to Colorado, South Dakota and Utah during any of the years beginning in 1993 and ending in 1999.

This number represents roughly 5% of state quits, and less than one-half of one percent of all teachers in Wyoming. Moreover, there is no evidence that they are attributable to more attractive teaching opportunities elsewhere. Average salaries for these teachers at their destinations are substantially less than the average of their last Wyoming salaries. Furthermore, teacher immigration from these states into Wyoming appears to balance emigration to them ("Employee Compensation", pg. 35).

Of course, this evidence does not account for any teacher flows between Wyoming and other states. Therefore, gross flows in both directions are almost surely larger. "Call to Action" (first page of "Executive Summary", and pg. 32) estimates that, in total, 143 teachers in 1999 and 190 teachers in 2000 left Wyoming districts to teach in other states. The latter flow would represent roughly 2.5% of all teachers in Wyoming, and slightly more than a quarter of all state quits.

Flows of this magnitude might give greater cause for concern. However, "Call to Action" does not estimate the gross inflow of teachers from all other states. The gross outflow, by

¹⁵ The most likely explanation, however, is in the distinctive macroeconomic conditions during this period: high rates of economic growth and low rates of unemployment. If these are responsible for the increase in state quits, these quits should have become less frequent in the past two years. Recent increases in relative Wyoming teacher compensation would also have the effect of reducing these quits. To the extent that these increases, rather than those in unemployment rates, are responsible for any decrease in state quits, there might still be reason to be concerned about the relative competitiveness of teaching jobs in Wyoming.

itself, says little about the relative attractiveness of Wyoming teaching positions.¹⁶ Moreover, nothing is apparently known regarding the effects of these flows on student outcomes.

The remaining state quits must be attributable to retirements from teaching. The teacher workforce in Wyoming has aged somewhat over the past decade ("Supply and Demand", figure 3, pg. 8). It has also moved closer, on average, to retirement eligibility ("Demand and Supply", table 4, pg. 9). At the same time, the record contains no direct measures of retirement rates, or of the relationships between these rates and teacher ages or retirement eligibility.

However, indirect evidence suggests that relatively few teachers continue beyond retirement. "Demand and Supply" (pg. 52) reports that, while 488 teachers in 1999 were aged between 56 and 60, only 109 were aged greater than 60, the age at which all teachers become eligible for retirement ("Demand and Supply", pg. 9). Moreover (pg. 62), the quit rate among the former was 19.3%, while among the latter it was 36.7%.

It therefore seems reasonable to conclude, tentatively, that retirement rates will increase. Nevertheless, the consequences of this increase cannot be predicted with confidence. Nothing in the record allows reasonable estimates of its magnitude.

Overall, the increases in attrition rates and retirement eligibility command further attention. However, "Demand and Supply" (table 30, pg. 39) predicts that the Wyoming public schools will experience relatively stable attrition rates in the years through 2007. These predictions are unchallenged. Matched with predictions of declining enrollments, they suggest that attrition rates will not interfere with the continuing decline in average student-teacher ratios.

B. Accession

Along with attrition, accession rates determine vacancies. The record contains anecdotal evidence to suggest that hiring has become more difficult for Wyoming public schools, but

¹⁶ "Call to Action" does not identify the source of its estimates or the methodology from which they are derived. If the issue of teacher migration is to be pursued further, the first task should probably be to reconcile these estimates with those in "Employee Compensation".

no evidence that is systematic.

According to "Employee Compensation" (pg. 26) "Wyoming administrators were less likely to agree that starting and experienced pay was competitive, and they were more likely to agree that it was more difficult to hire teachers than five years ago. [in comparison to answers from administrators in 'comparison states'] In all these cases, the differences were statistically significant."

As "Employee Compensation" (pg. 27) notes, these responses were elicited by the Wyoming Superintendent of Public Schools. The identification of the Superintendent as the intended audience may have encouraged respondents to dramatize their circumstances. In any event, there is little supportive accompanying evidence.

In terms of recruiting, "Call to Action" (pg. 29) reports that, on average, fewer than half of the 48 Wyoming school districts have attended the Interview Days for graduating teacher candidates at the University of Wyoming in the years 1997 through 2001. In 2000-1, 19 Wyoming districts did not attend any recruiting fairs. "Blueprint" (pg. 11) asserts that those Wyoming school districts that have attended the University of Wyoming Interview Days have been less well-prepared than attending districts from other states.

This behavior on the part of Wyoming school districts supports the inference that recruiting is not an urgent priority for them. Any lack of urgency may be plausibly explained as the consequence of the declining enrollments, increasing teacher numbers and declining student-teacher ratios discussed in section II.

In terms of actual hiring, "Employee Compensation" (pg. 25) reports that the proportion of Wyoming teacher vacancies filled by "qualified applicants" is slightly smaller than that in comparison states. However, the difference is not statistically significant.¹⁷

This evidence is relatively meager. Nonetheless, it is all that the record contains. It suggests that Wyoming school districts have not been especially aggressive in the recruitment of new faculty. The success rates of such recruitment efforts as they have put forth have not been noticeably low.

¹⁷ To the extent that this difference might be meaningful, it might be attributable to less attractive employment offers in Wyoming. However, it would also be again consistent with the inference that hiring is a lower priority for Wyoming school districts.

These suggestions imply that more effort on the part of Wyoming public schools would probably result in more new hires and higher rates of filled vacancies. However, "Demand and Supply" (table 31, pg. 39) predicts that the Wyoming public schools will actually demand fewer teachers in the years through 2006 than in 1999 and 2000. As these predictions are unchallenged, additional recruitment efforts may be unnecessary.

These conclusions contradict assertions in "Call to Action" (pg. 6, "The competition for educators is becoming fiercer each year.") and in the "WEA Response" (pg. 4, "To win the recruiting wars, Wyoming districts must compete with the highest paying states in the region and with national competitors."). The only evidence offered in support of these assertions consists of counts of the numbers of school districts from other states attending the University of Wyoming Interview Days ("Call to Action", pgs. 29-31), salary schedules from these districts ("Call to Action", pgs. 26-28), and counts of school districts attending the University of Northern Colorado Interview Days ("Call to Action", pg. 29).

These counts and schedules do not directly address the relevant points. Direct support for the assertion that Wyoming public schools are at a competitive disadvantage would consist of evidence that large numbers of University Wyoming graduates take teaching positions in other states, and that many of them reject offers from Wyoming school districts in order to do so. In fact, the number of University of Wyoming graduates who actually take teaching jobs in other states appears to be small ("Employee Compensation", pg. 28).¹⁸ Of those that do, nothing is known regarding the number of those that rejected offers from Wyoming schools in order to do so.

The specific implication that Wyoming school districts find it increasingly difficult to hire the graduates of these Universities, and the general implication that these school districts must compete with other districts nationwide, must therefore be regarded as unsupported. Similarly, counts of school districts from other states attending the University of Wyoming Interview Days cannot be regarded as compelling justification for increases in average salaries ("Advisory Group Report", pg. 8) or for cost-of-living adjustments based on multi-state wage indices ("Advisory Group Report", pg. 2).

¹⁸ "Employee Compensation" (footnote 3, pg. 5) asserts that, in general, most teachers find jobs where they are trained. This assertion is unchallenged in the record.

C. Temporary certifications

While the quantity of accessions to teaching positions in Wyoming public schools does not appear to be cause for concern, the quality of new hires is also a relevant issue. As referenced in section II, the "WEA Response" suggests that quality has been inadequate in the recent past. Once again, however, the record contains little evidence that bears on this suggestion.

However, one potential aspect of this issue is relatively well-documented. Teachers without full certification are becoming relatively more common in Wyoming public schools ("Employee Compensation", pgs. 16-23).

The implications of this trend are uncertain.¹⁹ The record is silent with regard to its components. If it represents a growing population of teachers who remain uncertified for extended periods of time, it may indicate a growing tendency to circumvent certification requirements. In this case, it would be a matter of substantial concern.

However, this trend might instead represent a growing tendency for teachers and other professionals to move into subject areas and grade levels where teachers are in relatively short supply, taking advantage of flexibility in the certification requirements to do so. In this case, it would be evidence that the system, so to speak, is working.

What little evidence exists in the record is consistent with this latter explanation. Most of the growth in teaching staff without full certification is in the "transitional" category ("Employee Compensation", chart 7, pg. 20). This provisional certification "allows certified teachers to teach outside of their subject area(s) for which they have endorsement" ("Blueprint", pg. 37). Many of the teachers in this category appear to be employed in areas where teachers are in

¹⁹ However, the assertion of the "WEA Response" (pg. 8) that "(t)he need to employ those individuals [who do not have permanent certification] illustrates the fact that the district [sic] is unable to compete for qualified teachers" is not supported. "Employee Compensation" (pg. 16) reports that the proportion of teachers without permanent certification in Wyoming is substantially lower than the national average. This implies that Wyoming has been more successful than many other states in recruiting fully credentialed teachers.

relatively shorter supply ("Employee Compensation", pg. 18).²⁰

There appears to be considerable uncertainty regarding whether full certification is a prerequisite for acceptable student outcomes ("Employee Compensation", pg. 16, "Supply and Demand", pgs. 9 and 15, "Blueprint", pg. 36), in addition to the uncertainty regarding the nature of the increase in Wyoming temporary certifications. In this context, it is premature to conclude that this increase is a negative trend. It would, however, be appropriate to pursue further investigation.

D. Superintendents, principals and assistants

The market for superintendents, principals and assistants differs in important ways from that for teachers. It draws almost exclusively on professionals who have often extensive labor market experience prior to joining this occupation. Correspondingly, these individuals are often older and closer to retirement age ("Laying the Groundwork", table 3, pg. 7 and table 6, pg. 9). Lastly, they appear to be more likely to come to Wyoming school districts from other states or industries ("Laying the Groundwork", pg. 16). For these reasons, this market warrants some individual attention.

Vacancy rates among administrators do not differ substantially from those of teachers. However, turnover rates seem markedly higher. The attrition rate for principals reached 16% in 1999 ("Laying the Groundwork", table 11, pg. 13).

This implies that the typical term in office is only about six years. Attrition rates may be elevated, and tenure curtailed, relative to those of teachers, by higher retirement rates associated with this older workforce. However, the attrition rate far exceeds that which could be explained by retirement, alone.

For example, in 1999, 21% of principals were eligible to retire within the next five years. This suggests annual retirement rates of approximately 4% to 5%. However, 16% of principals actually chose not to return to principal positions in the Wyoming public schools in that year alone. (All data from "Laying the Groundwork", table 11, pg. 13).

²⁰ In addition, portfolio certification is evidently leading to increasing, though small, numbers of permanent certifications (letter from the Professional Teaching Standards Board, reproduced in "Call to Action", pg. 34).

The statistics regarding superintendents are even more dramatic ("Laying the Groundwork", table 24, pg. 23). Their attrition rates peaked at 31% in 1995. The average attrition rate between the years 1993 and 1999 was approximately 18.6%, implying average terms in office of less than six years. This is consistent with the record of 60 new superintendents in the 48 Wyoming school districts during the seven years from 1994 to 2000 ("Laying the Groundwork", pg. 26).

In the years for which retirement eligibility has been measured, approximately 40% of superintendents have been so eligible. Ordinarily, this would imply annual retirement rates of approximately 8%. As with principals, actual attrition rates among superintendents far exceed those implied by retirement eligibility.

Once again, the implications of this activity are unclear. The record offers no explanation, nor any link between it and student outcomes. Both would be in order.²¹

IV. Should Wyoming spend more?

The ultimate issue in the current discussion is whether Wyoming public schools should be in a position to increase personnel expenditures beyond current trends. The presumption that emerges from section II is again negative. The argument to increase expenditures is certainly weakened by the observation that teachers are not in short supply.

It could be strengthened, perhaps dramatically, if it could be shown that increased expenditures would improve student outcomes. The record contains no direct evidence to this effect. While some unsatisfactory indirect evidence can be extracted, a more constructive record would address this issue explicitly.

Instead, the available discussion seems to have "gone off the rails". For example, a natural way for the State to encourage favorable student outcomes would be to reward districts that produce them. Correspondingly, a natural way for districts to frame a compelling argument in favor of increased expenditures would be to demonstrate that such increases would

²¹ "Call to Action" (pg. 10) suggests that the market for principals is nationwide. While no supporting evidence is offered, this suggestion could be consistent with the elevated attrition rates among administrators.

improve student outcomes.

In contrast, extant recommendations repeatedly advocate reimbursements to districts based on what they spend, rather than for what they produce. For example, the "Advisory Group Report" (pgs. 11-12) recommends that the State fund what school districts actually pay in compensation, irrespective of performance. If adopted, this policy would relieve districts of any consequences, should they raise teacher compensation. This would surely encourage districts to do so, regardless of the educational implications.

Similarly, the "Advisory Group Report" (pg. 10) recommends that the State fund all salary steps in district contracts. It declares that the failure to do so imposes "an arbitrary ceiling". However, there is no evidence in the record that the compensation increases associated with the highest steps yield commensurate improvements in student outcomes. If they do not, then it is the practice of increasing compensation without such improvements that must appear arbitrary.

Table 3

Test scores and teacher salaries

| <u>School year</u> | <u>Grade 8 mathematics</u> | <u>Grade 4 reading</u> | <u>Grade 8 science</u> | <u>Average salaries</u> | <u>Rank among states:</u> | |
|--------------------|----------------------------|------------------------|------------------------|-------------------------|---------------------------|---|
| | | | | | <u>Average salaries</u> | <u>Ratio of average teacher salaries to per capita income</u> |
| 1989 | | | | | 28 | 3 |
| 1990 | 272 | | | | | |
| 1992 | 275 | 223 | | | | |
| 1994 | | 221 | | \$32,136 | | |
| 1996 | 275 | | 158 | \$32,663 | | |
| 1998 | | 219 | | \$34,578 | 42 | 33 |
| 1999 | | | | \$35,325 | 42 | 44 |
| 2000 | 277 | | 158 | \$35,979 | 42 | |

Sources: Grade 8 mathematics NAEP average score from Smith, page 10, table 5. Grade 4 reading NAEP average score from Smith, page 10, table 6. Grade 8 science NAEP average score from Smith, page 11, table 7. Student-teacher ratio from Wolkoff and Podgursky, 15, table 4 for 1994-1999, imputation from Reichardt, page 4 and Reichardt, page 6, table 1 for 2000. Average teacher salaries from Reichardt, page 21, table 16. Rank among states for average teacher salaries from "A Call to Action" page 44 for 1989, page 53 for 1998-2000. Rank among states for ratio of average teacher salaries to State per capita personal income from "A Call to Action", page 44.

What little information is available does not demonstrate any relationship between teacher salaries and student outcomes. The first three columns of table 3 reproduce the average test scores in table 2. The fourth column presents average salaries for teachers in the Wyoming public schools. The last two columns present Wyoming's rank among all states with regard to average teacher salaries and the ratio of average teacher salaries to State per capita income.

As observed with respect to table 2, average test scores have been essentially stagnant over the past decade. In contrast, average salaries have increased. This comparison certainly would not support a claim that student outcomes will improve if salaries are increased further.²²

Conversely, average test scores have not suffered while Wyoming's average salaries have fallen dramatically, relative to those of other states. This comparison would not support the claim that Wyoming's failure to maintain higher ranks has had negative effects on student outcomes.

Of course, both of these claims could be valid, even so. The points here are that, first, there has been no effort in the record to sustain them. Second, the fragmentary and unsatisfactory evidence that can be culled from that record is not, on its own, supportive. The existing record is therefore a very fragile and untrustworthy vehicle in which to embark on substantial deviations from existing funding trends.

²² This claim also appears to be unsupported in the research literature ("Demand and Supply", pg. 21).

Only the final two columns of table 3 receive any attention in the existing record ("Call to Action", pgs. 42-48, "WEA Response", pgs. 6-7). In isolation, they contribute little to the discussion. First, section II demonstrates that there is no evidence of substantial inter-state competition for teachers, especially outside the region. Therefore, national comparisons of teachers salaries are of limited relevance.²³

Second, if these comparisons are to figure in the discussion, they should be made responsibly. The rankings of average and median teacher salaries in "Call to Action" (pgs. 42-48) do not appear to adjust for differences across states in the cost of living, the tenure and educational composition of the teacher workforces, state-specific tax burdens or other components of teacher compensation packages.²⁴

In the absence of these adjustments, comparisons across states are difficult to interpret. Adjustments for differences in costs of living would almost surely reduce the disparities between states. The effects of adjustments for state tax liabilities would probably be in the same direction. However, the consequences of adjustments for differences in teacher tenure and education are impossible to anticipate.

Third, interstate comparisons of average salaries omit other components of teacher

²³ For the record, "Employee Compensation" (pgs. 4-15) and "Proposed Revisions" (table 20, pg. 25) demonstrate that, within the region, average salaries for Wyoming teachers are comparable to those elsewhere. "Employee Compensation" (pgs. 27-30) demonstrates that, among 1997 graduates of the University of Wyoming, those who teach in Wyoming receive similar average salaries to those who teach in surrounding states. Their average salaries are higher than those in surrounding states, relative to those of 1997 University of Wyoming graduates in the same state employed outside of teaching.

²⁴ "WEA Response" (pg. 10), correctly notes that state income tax payments are deductible from income for federal income tax purposes. The effect of this is to shift some of the burden from state residents to the country as a whole. This reduces the impact of state income taxes on those subject to them. However, this reduction is only partial. At best, it leaves those with state income tax liabilities at a reduced disadvantage with respect to those without. The only apparent qualification to this might arise if the absence of state income tax liabilities actually increases the federal income tax liabilities of the latter by preventing them from itemizing their deductions. While interesting, this point is almost surely of secondary importance.

compensation packages. Fringe benefits are often substantial. They can therefore have an important effect on the value of teacher compensation. They also vary markedly across employers. Accordingly, they can cause the rankings of total compensation packages to differ from those of salary, alone.

For example, evidence in "Employee Compensation" (chart 4, pg. 12 and table 3, pg. 14) demonstrates that, although Colorado has the highest average teacher salaries of the seven states represented there, it has the lowest value of fringe benefits. In consequence, both Utah and Nebraska have higher average total compensation levels. The gap between average total teacher compensation in Colorado and in Wyoming is slightly less than half the gap between average teacher salaries in the two states.

Lastly, if interstate comparisons of teacher salaries are relevant, than interstate comparisons of expenditures per student should be, as well. "Proposed Revisions" (pg. 3) asserts that

"In 1996-97 Wyoming was spending \$5,971 per pupil, which was less than \$50 above the national average. In 2000-01 spending had increased to \$7,928 per pupil or about \$850 greater than the national average. The Legislative Service Office forecasts that revenue per pupil will grow to over \$8,200 per pupil in 2001-02. Spending at this level would rank Wyoming among ten or fifteen highest spending states."

This assertion is unchallenged. It raises an obvious puzzle: If Wyoming's rank, in terms of expenditures per pupil, has increased, why has its rank, in terms of salary per teacher, fallen?

The record does not address this puzzle directly. However, it suggests a plausible explanation. As described in section II, the ratio of students to teachers in Wyoming public schools has declined in recent years to the point where it is among the lowest in the country. It would appear that Wyoming school districts have chosen to devote rapid increases in expenditures per student to reductions in this ratio rather than to increases in teacher salaries.

This choice might have been motivated by expectations of two possible benefits. First, it might have been expected to improve student outcomes. Second, it might have been expected to reduce teacher workloads, and thereby improve teacher welfare. As discussed in section II, the former has not been demonstrated. The record is silent on the latter issue.

To the extent that these expectations have not been realized, Wyoming school districts might consider alternatives. The obvious alternative would be to raise teacher salaries at the expense of reduced student-teacher ratios. With little evidence that reduced student-teacher ratios have improved student performance, policies that attempt to accomplish this through linking performance with teacher pay may deserve examination.

V. Should Wyoming spend more on some people?

The previous section demonstrates that arguments in favor of general increases above current funding trends are weak. That does not necessarily imply that arguments in favor of increases for specific teachers, subjects or districts would be similarly unpersuasive. This section examines them.

A. New teachers

Salary levels for new teachers in Wyoming are slightly lower, relative to those in surrounding states, than are salaries for experienced teachers ("Employee Compensation", chart 4, pg. 12). Salary increases for these teachers have also been lower, relative to surrounding states ("Employee Compensation", table 2a, pg. 8). These comparisons might suggest that new teachers in Wyoming have a relatively strong claim to increased funding.

However, as discussed in section III, there is little evidence that Wyoming public schools are experiencing difficulty in hiring new teachers. This may be consistent with the salary comparisons in the previous paragraph. If this difficulty arose, districts would ordinarily respond to it by offering more competitive entry-level salaries. The fact that they have, apparently, chosen not to, suggests that they believe their needs to be greater elsewhere.²⁵

²⁵ This argument suggests that some of the recommendations for higher entry-level pay in "Blueprint" (pg. 6) are not supported. For example, loan forgiveness programs are simply compensation increases, in a particular form. They are no more nor less justified than any other income increase. However, scholarships are somewhat different. Individuals with little savings or income may have difficulty financing teacher training, because loans are difficult to secure against future income. This might curtail the supply of future teachers. Scholarships, by circumventing this "capital constraint", might restore supply to the levels that would obtain if financing were not restricted in this way.

B. Continuing teachers

Section III also finds no compelling evidence that Wyoming public schools are experiencing great or increasing difficulty in retaining continuing teachers. Nevertheless, their retention might be an issue of concern if their contributions to Wyoming public education were especially important.²⁶

This claim is not well-supported in the record. "Employee Compensation" (pgs. 38-39) and "Demand and Supply" (pg. 9) conclude that, according to existing research nationwide, teacher effectiveness may improve over the first few years of teaching experience. However, it does not appear to improve subsequently.

"Employee Compensation" (Appendix B, pgs. 50-52) attempts to examine this issue in the specific context of the Wyoming public schools. As it recognizes, the data upon which this analysis is based are not satisfactory. However, they reveal no relationship between average teacher experience in Wyoming schools and average test scores.

Despite its shortcomings, this analysis is consistent with the accumulated research results. Together, they place the burden of proof on advocates of the position that experience has greater positive effects on teacher performance. Extant requests that the State incorporate all experience-based salary steps in its funding algorithms ("Call to Action" (pg. 7) and "WEA Response" (pg. 13)) do not meet this burden.

C. Retirement-eligible teachers

As discussed in section III, the record suggests that the retirement rate among retirement-eligible teachers in Wyoming is quite high. However, effective retention efforts would probably be very expensive. These teachers leave Wyoming public schools with guaranteed pensions, and the options to engage in traditional retirement activities or in employment elsewhere ("WEA Response", pg. 11).

This latter option represents the potential for dramatic income increases. Effective retention

²⁶ As the "WEA Response" (pg. 13) puts it, "While there is something to be said for the enthusiasm of the beginner, the idea that knowledge and experience gained over years is not valuable lacks common sense."

offers would have to offer conditions that were superior.²⁷

The record discussed in the previous subsection does not demonstrate that teachers nearing retirement are measurably more effective than teachers near the beginnings of their careers, any more than it does so for continuing teachers who are not retirement eligible. If they are substantially more expensive to retain, then efforts at retention should probably be directed towards teachers who are at earlier stages in their careers.

D. Positions experiencing excess demand

As suggested in section III, teachers in some fields and at some levels appear to be harder to find than in others. In addition, turnover rates among administrators are sufficiently high as to be suggestive of retention difficulties. Increases in compensation for these positions would ordinarily elicit greater supply. They would therefore be the natural solution.²⁸

It is likely that differential compensation increases, or their equivalents, are already being awarded to personnel in positions where hiring or retention is difficult. Even where salary schedules nominally prohibit such differentiation, employers can manipulate other elements of the compensation package, or of working conditions, in order to provide more attractive opportunities to workers for whom they experience greater needs.

²⁷ This does not necessarily imply that effective retention offers would have to match the combined value of pension payments and salaries elsewhere. Preferences for the teaching profession and communities of residence might also encourage retirement-eligible teachers to remain at their jobs, even if total income itself could be increased through retirement.

²⁸ The "WEA Response" (pgs. 11-12) objects to differential pay for positions where qualified personnel are scarce, on the grounds that this policy would damage the morale of teachers in other positions. However, increases in compensation for all positions would require much greater expenditures in order to elicit sufficient supply to those that currently experience shortages. Moreover, positions that are currently more attractive would maintain their relative appeal and experience surpluses. The loss of morale among teachers who would not benefit from differential pay must be weighed against the loss of morale among those who would be unemployed as a consequence of general pay increases, as well as the cost of those increases, themselves.

If administrators or teachers in particular categories are more difficult to attract, Wyoming school districts are probably making greater efforts to attract them. The record is silent as to whether these efforts occur. It would be useful to establish the extent to which they do. They would be the most credible evidence that shortages were actually present.

E. Compensation and teacher quality

A reasonable objective for Wyoming public school funding policies would be to sustain and improve the quality of Wyoming public school teachers. This objective may, in fact, be mandated. For example, the "WEA Response" (pg. 4) asserts that "(t)he constitutional requirement is that salary provisions provide sufficient money to attract and retain **high quality** teachers for **all** of Wyoming schools." (emphasis in original).²⁹

This objective could be achieved by hiring better teachers, encouraging incumbent teachers to improve, and encouraging inadequate teachers to leave. Policies to do so effectively would almost surely include appropriate compensation incentives.³⁰

Incumbent teachers almost surely vary in their quality.³¹ However, salary schedules in the record reward only increased education and increased experience.³² As discussed in

²⁹ The record contains no information regarding the quality of teachers in the Wyoming public schools, apart from education and experience. It does not contain any attempts to use this information to assess whether the Wyoming public schools are in compliance with this mandate.

³⁰ The "WEA Response" (pg. 3) criticizes existing salary discussions for failure to support this objective: "Neither MAP, nor any other salary analysis has focused on the need to provide funding which allows the hiring and retention of high quality teachers in every school."

³¹ For example, as quoted in section III, the "WEA Response" (pg. 9) suggests that recent hires are of consistently lower quality.

³² For example, see "Call to Action", pgs. 22-25. "Employee Compensation" (pg. 38) asserts that "(t)he Court has accepted the State's approach for funding teachers based on establishing a competitive starting salary, and adjusting for teacher experience and education".

Appendix B of "Employee Compensation" (pgs. 50-52) and subsection B of this section, there is little evidence that education and experience are closely related to teacher quality.

Consequently, there is no assurance that these salary schedules offer higher rewards to higher-quality teachers. Among teachers with the same education and experience, those that are less effective receive the same salaries as those that are more effective. The latter, therefore, have no incentive to continue to perform at high levels. The former have no incentive to improve.

This implies that the absence of explicit salary distinctions between higher- and lower-quality teachers is inconsistent with the objective of ensuring a high-quality teacher workforce. In terms of teacher development, it encourages all teachers to avoid the efforts necessary to become more effective. In terms of teacher turnover, it ensures that the least effective teachers at each level of education and experience will be the easiest to attract and retain.³³

In contrast, explicit rewards for better performance would encourage individual teachers to improve. They would encourage higher-quality individuals to join and remain in the Wyoming teacher workforce.³⁴ They would appear to be a prerequisite for achieving what appears to be the constitutional goal of ensuring that Wyoming public schools teachers of the requisite quality.

The record contains two explicit objections to performance-based pay schemes. First, the "WEA Response" (pg. 9) asserts that "a salary schedule based on educational qualifications (usually academic degrees and advanced course work) and experience (measured in years of service) is virtually the universal norm for school districts across the country." This does not

³³ Analogously, general increases in salaries that are not related to performance may help to retain high-quality faculty, who will be less likely to look for more attractive opportunities elsewhere. However, they will certainly help to retain low-quality faculty, who would presumably not have such opportunities.

³⁴ The "WEA Response" (pgs. 9-10) expresses concern that performance-based compensation would discourage teacher applicants. Lazaer (1986), Brown (1990) and Prendergast (1999) demonstrate that this effect would apply only to those of low quality. In general, more able workers are attracted to jobs in which they can expect to receive compensation commensurate with their performance.

address the conflict between these schedules and the objective of sustaining a high-quality teacher workforce. The persistence of ineffective policies elsewhere is not a compelling justification for the preservation of these same policies in Wyoming.³⁵

Second, the "WEA Response" (pg. 10) asserts that "(i)ssues of favoritism or outright discrimination will increase." Compensation schemes that allow for individual pay distinctions certainly create the potential for these abuses.³⁶ Moreover, to the extent that abuses were to occur, they would impede progress towards the objective of improving teacher quality.

Therefore, compensation strategies consistent with this objective would have to reward better performance, and do so consistently. This would require responsible teacher evaluations based on accepted standards and measurements.

There is no evidence in the record, as it currently stands, that such evaluations take place in the Wyoming public schools. If the "WEA Response" (pgs. 3-4) correctly represents the mandates of the Wyoming Constitution, they would appear to be necessary, both to monitor compliance with these mandates and to support compensation schemes that would promote compliance.

³⁵ The "WEA Response" (pgs. 10 and 12) raises issues of morale with respect to differential pay for positions experiencing short supply that might also be raised with respect to performance pay: Teachers who do not benefit from performance pay may experience lower morale. The essential question, however, would be whether student outcomes are more likely to improve if lower-quality teachers are made accountable for their performance, or protected from any consequences.

³⁶ However, it is uncertain whether "discrimination" would increase with compensation for performance. As discussed above, compensation based only on levels of education and experience systematically "discriminates" against the best teachers and in favor of the worst at each level.

VI. Should Wyoming spend more in some places?

The record suggests that workforce conditions vary across Wyoming school districts. This raises the question of whether funding should vary as well. This section examines the distinctive characteristics of rural and western districts.

A. Rural districts

Rural Wyoming school districts have lower student-teacher ratios than do urban districts ("Demand and Supply", figure 8, pg. 29). However, Master's degrees are less common among their teachers ("Demand and Supply", table 6, pg. 11) and temporary certifications are moreso ("Demand and Supply", table 12, pg. 18). These school districts also experience slightly higher vacancy rates ("Demand and Supply", table 14, pg. 20), and small net outflows of teachers and administrators to urban districts ("Demand and Supply", table 26, pg. 33 and "Laying the Groundwork", table 13, pg. 14).

The record does not address whether student outcomes in rural school districts differ from those elsewhere. Consequently, there is no evidence as to whether students in these districts suffer as a consequence of the contrasts in the preceding paragraph. According to the cited research, none are unambiguously associated with differences in outcomes.

Therefore, these contrasts do not present a forceful case for differential funding. If, however, student outcomes could be shown to suffer, that case would be substantially strengthened.

B. Western districts

The differences between western and nonwestern school districts are similar to, but less marked than those between rural and urban districts. Teachers with temporary certifications occur more frequently in western than in other districts ("Demand and Supply", table 12, pg. 18), as do vacancies ("Demand and Supply", table 14, pg. 20). Attrition rates are slightly higher ("Demand and Supply", table 21, pg. 27) and these districts experience a very small staff outflow ("Demand and Supply", table 25, pg. 32).

Again, there is no evidence in the record that these contrasts result in poorer outcomes for students of western school districts. Evidence to this effect might support claims for greater resources. Districts in the southwest, where student-teacher ratios are especially high by

State standards ("Demand and Supply", figure 9, pg. 29) may be particularly likely to yield such evidence.

VII. What might we like to know?

Clearly, Wyoming State policy towards its public schools could be much better informed. The most immediate issue is that of quality. The quality of student outcomes and of teacher contributions are at the heart of all discussions. Nevertheless, there are no reliable measures of either. Until these exist, policy discussions will unavoidably lack focus.

Responsible measures of student outcomes will have to include measures of student preparation. The public schools should not be held responsible for changes in student background and motivation over which they have no control.

Responsible measures of teacher quality will have to go beyond experience and education. If these characteristics were sufficient measures of teacher quality, research would have revealed their efficacy long ago. The absence of such revelations indicates that other characteristics must be important, and must be considered.

With these basic measures in hand, the most important policy issue to examine would be the relationship between changes in teacher numbers, compensation and student outcomes. Presumably, this relationship is mediated by the responses of teachers to compensation incentives. Until these responses are understood, it will be difficult to identify the compensation policies that will achieve outcome goals most efficiently.

Additional policy issues that should be investigated include

- S** the extent to which temporary certifications are quasi-permanent, and whether these certifications have any deleterious effects on student outcomes,
- S** the true extent of interstate competition for teachers, including the frequency with which teaching graduates of the University of Wyoming take jobs in other states, and the frequency with which they do so in preference to jobs in Wyoming,
- S** accurate measures of the net flows of experienced teachers between Wyoming and other states,

- S retirement rates, their relationships with retirement eligibility and with compensation for retirement-eligible teachers, and
- S actual rates and reasons for principal and superintendent turnover.

The current dialogue between the State and its school districts promises to stimulate much greater understanding of the public schools in Wyoming. Though at times contentious, it will surely lead to policies that are more effective. These policies should ultimately be in everyone's interest. All participants are to be congratulated for their willingness to address these difficult and essential issues.

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