WYOMING SCHOOL ACCOUNTABILITY

TECHNICAL DETAILS OF THE GRADE 3-8 EQUITY INDICATOR

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The policy purpose for including an equity indicator in the Wyoming school accountability model was to encourage a focus on the performance of the most at-risk students by measuring the progress of these students during a given year. To accomplish this measurement a consolidated subgroup was constructed. The consolidated subgroup includes all full academic year students with student growth percentiles (SGPs) with achievement that was *below proficient* on the prior year’s PAWS test in reading and/or math.

An adequate growth percentile (AGP) is used to produce a school score for equity. An AGP is the SGP that a student needs to be at the proficient cut score during the current year or some future year. This is described more precisely below. For the equity indicator, however, the intent is to encourage schools to get as many students as possible on track to become proficient within three years or by grade eight, whichever comes first. This was measured as the percentage of students in the consolidated subgroup who had current year SGPs that equaled or exceeded their AGPs.

For more detailed information about the calculation of student growth percentiles (SGPs) see Betebenner[[1]](#footnote-1). Quantile regression produces numerous coefficient matrices that can be used as look up tables to identify a student’s SGP in relation to all other students in their same grade in school with given prior test scores. The scale score cut point for proficient represents a current and future achievement target for each student. The coefficient matrices produced by the SGP quantile regression can further be used to *project* the SGP a student needs in the current year in order to become (i.e., for students who were not proficient in the prior year) proficient during the current year or some future year. Likewise the coefficient matrices can be used to *project* the SGP a student needs in order to remain (i.e., in the case of a student who was proficient in the prior year) proficient in the current year or some future year.

For each student one of more projections are provided by the coefficient matrices which indicate the SGP a student needs each year to reach or maintain performance at the proficient cut point within the time frame associated with the projection. For a fourth grade student in Wyoming there are four projections that are of interest.

* Projection 1, the SGP needed in the current year to be at the proficient cut point in the current year
* Projection 2, the SGP needed in the current year and the next year to be at the proficient cut point one year after the current year
* Projection 3, the SGP needed in the current year and the next two years to be at the proficient cut point two years from the current year
* Projection 4, the SGP needed in the current year and the next three years to be at the proficient cut point three years from the current year.

These same four projections are of interest for a student in grade 5. It is not possible to project beyond grade 8 in Wyoming since the PAWS is administered in grades 3 through 8 only. Grade 8 is the terminal year of PAWS administration. Because of this projections 1 through 3 are of interest for students in grade 6 since grade 6 students will be in grade 8 within two years so it is not possible to project three years out. Likewise, for students in grade 7 it is only projections 1 and 2 that are of interest and in grade 8 it is just projection 1 that is of interest.

These projections were used to produce adequate growth percentile (AGP) using a procedure described in Marion and Domaleski (2012)[[2]](#footnote-2). For students in grade 8 the AGP was projection 1 for all students. For students in the other grades, the production of the AGP was different for students who were not proficient in the prior year versus students who were proficient in the prior year. When students were not proficient in the prior year, the AGP was the lowest of the multiple projections appropriate for the student’s current grade in school. When students were proficient in the prior year, the AGP was the highest of the multiple projections appropriate for the student’s current grade.

It seems intuitive that students with AGPs that were produced using more projections might have AGPs that result in more favorable equity scores for a school. If this were true then the equity indicator might be biased in favor of schools with particular grade configurations. The analyses that follow show the impact of adding additional projections to the computation of AGPs.

Method and Results

This study used all of the student level data that was used for the Wyoming 2012-13 pilot school accountability model. The students included in the analyses were all in the consolidated subgroup meaning they were below proficient on the prior year’s (i.e., 2011-12) PAWS test in reading and/or math. The students were also full academic year students only meaning that they were continuously enrolled in a school from October 1st to the midpoint of the test window for the 2012-13 school year.

Each of the projections 1 through 4, as described above, were computed for all students with SGPs. These projections were used to compute AGPs for each student using the method described by Marion and Domaleski (2012). As such, these AGPs were computed using a different number of the four projections based upon a student’s grade in school.

For grade 8 students, therefore, their AGP was projection 1 (i.e., the SGP needed to be at the proficient cut score on their grade 8 PAWS test) since it is not possible to project beyond the terminal grade for the PAWS test which is grade 8. Projection 1 is essentially a projection from the prior year’s test to the current year’s test. Because the grade 8 AGP is based upon just projection 1, it seems reasonable to speculate that this AGP methodology places grade 8 at a disadvantage relative to the other grades. To test this speculation, pseudo AGPs were computed for students in grades 4 through 7 using the same methodology used for grade 8 students. Specifically, AGPs based upon just projection 1 were computed for all students regardless of their grade in school. Equity scores for each grade were then computed using the grade 8 AGP and the pseudo AGPs for the other grades by computing the percent of full academic year students in the consolidated subgroup in each grade who had SGPs that equaled or exceeded these pseudo AGPs. The findings are presented in Table 1.



The grade specific equity scores based upon the pseudo AGP computed with grade 8 AGP computation rules are found in the column with the heading *Projection 1 Only.* Around 45% of consolidated subgroup students in grades 4 and 6 had SGPs meeting or exceeding this pseudo AGP target. The percentages in grades 5, 7 and 8 were in the low 30s.

Next, the grade 7 AGP computation rule was applied to grades 4, 5 and 6 also. The findings for the grade 7 AGP and the pseudo AGPs for the other grades based upon the grades 7 computation rule are presented in the column with the heading *Projections 1 & 2 Only.* The next column to the right used the grade 6 AGP and pseudo AGPs based upon the grade 6 computation rule. The final column used the AGP computation rule for grades 4 and 5. The actual AGP is presented in the second column of the table. The findings in Table 1 are presented in chart form in Figure 1.

Grades 4 and 5 were the only grades where all possible AGP computation rules were applied. The grade 4 equity score tended to be in the mid 40s regardless of the rule applied. Grade 4 also ranked as the highest grade regardless of the rule applied.

For grade 5, in contrast, the equity score was much lower when just 1 projection was used than when 2, 3 or 4 projections were used. Grade 5 was clearly disadvantaged when their equity score was based upon the pseudo AGP computed using grade 8 rules. The other two pseudo AGPs that were applied to grade five yielded quite consistent equity scores that were very similar to the equity score based upon the actual grade 5 AGP. The grade 5 anomaly in the *Projection 1 Only* condition was essentially the only anomaly in the Table 1.

Grades 7 and 8 had the lowest equity scores when the actual AGPs were used in computing the equity scores. The equity scores based upon using projection 1 only was the only one where the scores for all five grades were computed using the same method. The grades 7 and 8 equity scores were in the low 30s using this method and much lower than the mid 40s scores for grades 4 and 6.

Grades 4 and 6 had quite consistent equity scores regardless of the rules used for computing pseudo AGPs and the pseudo AGPs were essentially consistent with their actual AGPs. The grade 7 pseudo AGP based upon grade 8 rules was essentially the same as the actual grade 7 AGP. Finally, the grade 8 equity score was similar to the grade 7 equity score under both grade 7 conditions and well below the grades 4 and 6 equity scores when identical rules were used to compute pseudo AGPs for them.



In conclusion, the findings in grade 5 were mixed and suggest that grade 5 was at a disadvantage when grade 8 rules were applied but not when grade 7 or grade 6 rules were applied. In contrast, grades 7 and 8 had lowest equity scores when computations included the use of actual AGPs and grades 4 and 6 had the highest equity scores when computations were based upon the use of actual AGPs. These results were essentially the same when pseudo AGPs were computed for grades 4 and 6 using the rules from grades 7 and 8. These findings provide some support for concluding that differences in equity scores across grades were due to actual differences in equity rather than to differences in computation procedures. Specifically educators serving students in grades 7 and 8 were less effective than educators serving students in grades 4 and 6 when it came to improving the growth of low performing students in reading and math.

1. Betebenner, D. W. (2011). *A technical overview of the student growth percentile methodology: Student growth percentiles and percentile growth projections/trajectories.* Downloaded November 6, 2013 from <http://www.nj.gov/education/njsmart/performance/SGP_Technical_Overview.pdf>. [↑](#footnote-ref-1)
2. Marion, S. & Domaleski, C. (2012). *The Wyoming comprehensive accountability framework: Phase I.* Produced for the Wyoming Select Committee on Statewide Education Accountability. [↑](#footnote-ref-2)