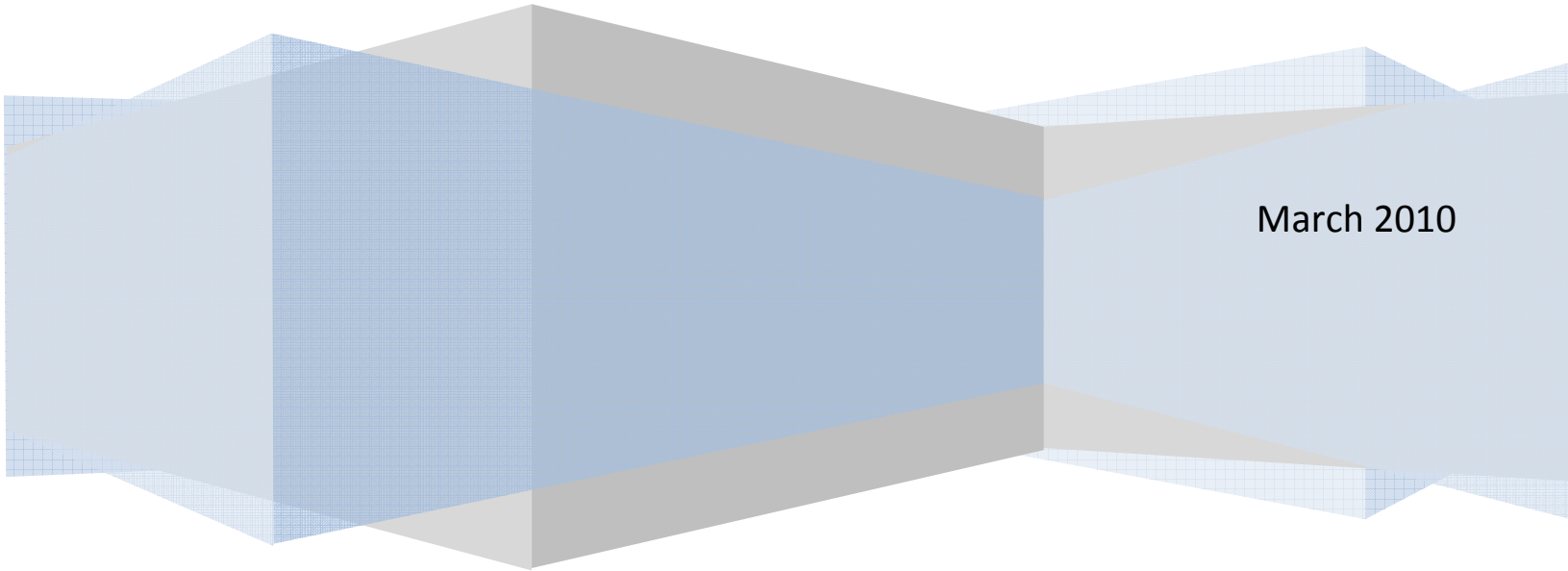
The Declining Enrollment Study

A Comprehensive Review of Funding for Colorado Public School Education

Prepared for

Colorado Department of Education



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Forward

The ultimate objective of the education system is to educate students, the next generation of workers. Hence, it is important to understand how the performance of students in declining enrollment districts compares to the performance of students in non-declining districts.

The declining enrollment study was tasked to consider the impacts to students in school districts with a long-term decline in pupil enrollment, school districts with a large short-term decline in pupil enrollments, and school districts in which an increasing number of pupils attend a charter school in the district.

The key issues are outlined in the Findings and the chapters following provide the requisite information regarding data and methodology, an overview of the Colorado public education system, evaluation of student performance as it relates to multiple aspects of declining and non-declining school district enrollments and the provision of education services through the Colorado Public School Finance Act of 1994 (CPSFA).

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Findings

This study provides a comprehensive analysis and review of the funding for Colorado Public School Education system and the impact of such funding on student performance given school district enrollment sizes and geographic settings as well as education choice opportunities and enrollment trends.

Student Performance

- A key result of the analysis is that student performance is not statistically significantly different between districts with declining and non-declining enrollments (irrespective of enrollment size or geographic setting) after accounting for other factors expected to impact performance. This result does not reflect whether or not school districts are meeting current or long-term expectations, just that there is no discernible impact from enrollment trends. As measured by CSAP, the percent of students at a proficient or advanced level in reading generally ranged between 60 to 80 percent while this range was between 40 to 60 percent for students in math performance.

- Another important result is that reading and math performances (as measured by CSAP) are both positively related to instructional expenditures per pupil, although the relationship is stronger for math than for reading.

- The percent of online students is negatively related to reading and math performance, and if modeling graduation rates as a performance measure there is also a negative correlation. That is, online students perform less well than others with similar student and school district attributes that are not in online programs.

- School choice when measured as the percent of students incoming and outgoing are both positively related to math performance, indicating school choice has had a positive impact on student performance. School choice, as measured by participation in charter schools, has not demonstrated any statistically significant differences in student performance.

- Although the number of non-CSAP course offerings is not found to have a statistically significant relationship with performance for any of the grade level regressions, it did prove to be an important and positive indicator of performance when using the graduation rate as the measure of performance.

School District Funding

- When comparing the total enrollment between academic years 2002-03 and 2007-08, 109 of the 177 school districts (without Vilas RE-5[1]) experience declining enrollments despite an increase over the six year period in the student population for the state of Colorado. The majority with declines are small enrollment school districts (less than 1,000 students per district) and/or in rural or small town environments. However, there are also a number of larger school districts in the urban and Denver Metro area experiencing decreases in student enrollment.

[1] After reviewing and analyzing the data as well as discussions with CDE, Vilas RE-5 was omitted from the analyses in this study. This is a small enrollment school district that operated the Hope Online Learning Academy for a couple of years during the time frame for this study. Including Vilas RE-5 skewed the results when viewed by size and setting category to the extent that relevant interpretations were not practical. In addition, the Hope Online program is now being operated by Douglas County and, therefore, this program no longer impacts Vilas RE-5 as it did during the study time frame. As such, the results where Vilas RE-5 was included no longer reflect the current school district environment.

- The allocation of the expenditures by major categories is extraordinarily similar for all school districts, irrespective of school district size and geographic setting or whether the school district is in a declining or non-declining enrollment environment.

- The percent change in per pupil expenditures over the six year period provides a somewhat different perspective, where the small enrollment and rural and town school districts in a non-declining enrollment environment are falling behind, on a percent basis, from their declining enrollment counterparts. Interestingly, the larger school districts and Denver Metro school districts with non-declining enrollments have been spending greater amounts relative to their similarly situated declining enrollment school district counterparts. (This may be due to voter approved overrides as discussed later in this report.)

- Although the instructional share of expenditures continues to indicate little or no budget allocation differences across school districts, the percent change in per pupil instructional expenditures suggests rural school districts with non-declining enrollments are not keeping up with inflationary increases.

- When evaluating administration expenditures per teacher FTE, school districts with non-declining enrollments across all size categories incurred greater expenditures (with the exception of the 2,300 to 4,000 size category) although more variation in this allocation was identified by geographic setting.

- Importantly, at risk, whether defined as free lunch and/or reduced lunch has increased over the six years considered in this analysis for school districts of all enrollment sizes and settings and also irrespective of enrollment trend. At risk students account for as much as 30 to 50 percent of school districts with declining enrollments while, generally, non-declining enrollment school districts have a lower percent of at risk students.

- From the data reviewed, districts receiving more limited state and federal support are non-declining school districts with mid-sized enrollments (500 to 2,300 students) and towns or cities.

- When evaluating average total program mill levy rates, generally declining school districts have somewhat greater rates than their non-declining counterparts, whether it is a district size or setting criteria. A similar trend is found when evaluating the average total mill levy rates.

- The override dollars, monies approved by voters for additional public school funding, indicates some variation across school district size and setting and enrollment trends. For example, substantially greater override monies have been approved for larger enrollment school districts and in the urban and Denver Metro areas, generally with greater provisions for the school districts with declining enrollments.

- School districts are particularly limited in their ability to adjust expenditures year to year for transportation and other support; however, they do have somewhat more flexibility in adjusting expenditures on other categories such as operations and maintenance, instructional salaries and benefits, food service, and administration. The most flexible category of adjustment for school districts has been shown to be other instructional expenditures.

- There is very little trend in per pupil expenditures over a wide range of district sizes, be it measured in square miles, enrollment, or building square feet. The implication is that the per pupil costs for these expenditure categories is relatively fixed with respect to district size. That is, these costs are, in general, proportional to the number of students in the school district.

- A few districts with medium land mass (500 to 1,500 square miles) have relatively high transportation expenditures and a few districts with very small

school facilities have relatively high operation and maintenance expenditures. Also, there is some increase in per pupil food service expenditures in districts with small enrollments (less and 400 students).

- In urban areas with relatively small (square miles) school districts it easier for students to take advantage of open enrollment and to attend a school district other than where they reside and it is easier for school teachers to move across school districts to acquire better salary opportunities, placing pressure on school districts in declining enrollments with more limited funding availability. Not surprisingly, school districts encompassing large geographic areas have more limited mobility for both students and teachers.

Funding Formula and Declining Enrollments

- Enrollment averaging provides important funding stability to districts facing declining enrollments, although school district superintendents express concern that the enrollment averaging is not adequate to offset the impacts of such decreases (because of the fixed nature of many of the school district costs).

Education Choice

- Charter schools can have an impact on funding for the traditional schools within the school district and also on the total costs to the state primarily because most of the per pupil funding follows the student to whatever type of school (traditional or charter) they attend and shifting the authorization of a school from the district to the Charter School Institute costs the state additional monies to educate the same students with no increase in choice options.

- Regardless of how monies are allocated between traditional and charter schools, an additional school facility will generally increase expenses including administration, instruction, etc. If a new school facility would have been required because of enrollment increases or changes in demographics, the extra costs associated with the opening of a new school may be mitigated.

- School choice results in traditional schools educating the more expensive students as the study finds the percent of students at risk or with special needs is higher in traditional schools than in charter schools. It is broadly acknowledged additional monies allocated to school districts for at risk and special needs students do not fully cover the expenses associated with these students. If this trend continues, the gap between the traditional school and charter school for the delivery of education services will continue to widen.

- If budgets do not increase at least an inflationary per pupil rate, increases in charter enrollment would be expected to negatively impact expenditure categories given the fixed costs identified in the delivery of education services. The budget categories likely to be most affected include other (non-teacher) instruction but more importantly, although to a lesser degree, administration, salaries and benefits, and food service expenditures.

Costs of Providing an "Adequate Education"

- Actual funding for Colorado public education in academic year 2004-05 was substantially below the base costs for all levels of school district enrollment using either the Professional Judgment (PJ) or Successful School District (SSD) approach with the exception of an average of 10,000 students. For this enrollment category (10,000 students), the actual expenditures fell between the cost estimates for the SSD and PJ approaches.

- Furthermore, the gap between the actual state average per pupil total program funding ($6,661 for academic year 2004-05) and the comparable cost estimate using PJ and SSD measures indicates the state does not provide the resources believed by professionals in education necessary to meet student performance expectations. Given state budget issues, this gap is likely to continue to increase.

- These adequacy cost measures do not yet incorporate the planned implementation of CAP4K, which is creating new standards, assessments, and accountability systems. The investment to sustain this educational commitment (anticipated to enable Colorado students to compete globally in the 21st century) is likely to increase adequacy costs.

Consolidation

- The literature reviewed and the empirical analysis outlined in this report do not identify obvious cost savings or increased academic opportunities from an across the board or formula driven consolidation of school districts. At best, on a case-by-case school district basis, the data reviewed identifies some very limited opportunities for cost savings or increased academic opportunities from the consolidation of school districts.

- There are alternatives to consolidation which include collaborations with other school districts. In Colorado, smaller school districts are afforded some of the benefits associated with size such as duplication of programs, risk management, price negotiation, etc. by collaborating through the Boards of Cooperative Educational Services (BOCES).

- At the school district level, benefits from consolidation may exist when school districts are geographically close and there is substantial student movement between the districts (i.e., incoming or outgoing), especially if one of the districts is experiencing declining enrollment. At the school level, it is important to note that the economic and civic impacts to a community of closing a school are often difficult to assess and may outweigh any potential gains from consolidation.

Statement of Work Location Finder

This report is not written in the sequential order of the statement of work as identified in the contract as it was determined that a more comprehensive analysis that flowed from one topic to the next would be easier to follow. As such, the deliverables are embedded throughout the report. For ease in locating the data and discussions relating to each of the deliverables, the statement of work location finder is included below. Of note, this finder provides the major sections of the report that are related to each statement of work; however, additional discussions and/or comments related to some of the deliverables may be found throughout the report.

Statement of Work	**Location (Chapters/Appendices)**
1. Data on all school districts experiencing declining pupil enrollment, including the size of the district and whether the district is in a rural or urban area.	*Student Performance and the Delivery of Education Services in a Declining Enrollment Environment and Appendix A - District Profiles*
2. The effect of the Public School Finance Act of 1994 (Article 54) on inconsistent declining pupil enrollment, where applicable.	*Funding Formula and Declining Enrollments*
3. A breakdown of what it costs to provide and maintain an average classroom necessary to provide pupils with a public education that meets the requirements of state and federal law.	*Costs of Providing an "Adequate Education"*
4. The fixed costs of providing transportation, special education, English Language Acquisition, career and technical education, and capital construction.	*Necessary Costs of Providing Education Services*
5. The cost of salaries and benefits for the teachers and staff employed by the district, including scheduled retirement benefit increases and health insurance.	*Necessary Costs of Providing Education Services and Appendix A - District Profiles*

6. The type of costs that a district may reduce to compensate for declining pupil enrollment and the types of costs that represent essential services that a district cannot reduce even when it is experiencing declining pupil enrollment.	*Necessary Costs of Providing Education Services*
7. For districts in urban areas, the effect that neighboring school districts have on declining enrollment district's ability to provide competitive salary increases and educational programs when the neighboring district is experiencing an increase in pupil enrollment.	*Necessary Costs of Providing Education Services*
8. The ways in which Public School Finance Act of 1994 (Article 54) may slow the effects of declining enrollment in a district but fails to address long-term financial solutions regarding how the declining enrollment district will cover fixed costs in the future.	*Funding Formula and Declining Enrollments*
9. The impact that school choice has on districts with declining pupil enrollment, including, but not limited to, the impact that charter school enrollment has on district pupil enrollment for purposes of funding under the "Public School Finance Act of 1994", the impact of the requirement that one hundred percent of pupils revenues be transferred to a charter school when only partial averaged revenues are provided to a district, and the effect of allowing a charter school to average enrollment in a similar manner as a district is allowed to average enrollment.	*Education Choice and Funding Formula and Declining Enrollments*
10. The barriers to and incentives for consolidation pursuant to the current consolidation laws, including but not limited to the impact of consolidation on declining enrollment districts, the impact on small attendance center aide, and the effect of absorbing the academic ratings of partnering districts.	*Consolidation Issues*

Chapter I
Background and Methodology

Literature Review

During the early stages of this research, Pacey Economics Group performed a literature review, detailed in Appendix B, on the following topics:

- Enrollment
- Colorado School Finance (including reports from Colorado School Finance Project and information and studies from CDE and Colorado Legislative Council staff)
- Student Performance
- Cost/Adequacy Studies
- Education Choice
- Consolidation

Data Collection

Following the literature review, Pacey Economics Group collected data from multiple public and private sources and merged them into one comprehensive dataset. The dataset includes data on the 178 Colorado school districts spanning the academic years 2002-03 through 2007-08 (the most recently available academic year for revenue and expenditure data).[2] Major categories and their sources are briefly outlined below

[2] Of note, throughout the report and appendices the academic year is often referred to by the calendar year in which the academic year commences. For example, academic year 2002-03 may be referred to as 2002.

while Appendix D contains more detailed explanations and the precise source for each variable.

- Data from CDE's website
    - Enrollment information by school district including total enrollment, funded pupil count, charter school enrollment, online enrollment, inter-district transfers, etc.
    - School district characterization by size using enrollment counts (size categories rounded per the size factor in the funding formula) and by setting such as urban, rural, town, etc. (as defined by CDE)
    - Teacher characteristics by school district including average salaries, average years of experience, percent with college and/or master's degree, pupil teacher ratio, etc.
    - Expenditure information by school district for instruction, administration, operations/ maintenance, transportation, food services, etc.[3]
    - Revenue information by school district including, state share, state categorical funding, local

[3] Of note, the expenditure data in the majority of this report reflects total school district expenditures as reported by the school districts. It is understood that most of the districts report their expenditures in the same categories consistently but not all of the charters have consistent reporting procedures. The analyses presented here are based on the best data presently available; however, analyses based on expenditure data could be impacted if school districts and/or charter schools did not report their expenditures in a uniform fashion.

property and specific ownership taxes, mill levy rates, net assessed valuation, federal revenues, etc.

  - Graduation and completion rates

- Other financial data provided by CDE's Public School Finance Unit including finance worksheets, categorical expenditure data, and National Public Education Financial Survey (NPEFS) data

- Data from CDE's Unit of Student Assessment
  - Colorado Student Assessment Program (CSAP) scores for reading and math for all test-takers for all grade levels (typically grades 3 through 10)
  - Student characteristics including gender, ethnicity/race, at-risk, Individual Education Program (IEP), language proficiency, etc. for CSAP test-takers

- Information on non-CSAP course offerings obtained through CDE's Data Services Unit

- Demographic data from U.S. Census Bureau including district population, population ages 5 to 17, and median county household income

- District square miles from U.S. Census Bureau map files

- District total square footage of facilities from CDE's Division of Capital Construction Assistance

- Cost of living information including the value of a 1,500 square foot home in each district from the Colorado Legislative Council's 2007 School District Cost of Living Study

- Salary schedules provided by school districts

A schematic of Colorado education finance illustrating the flow of enrollment, revenues, expenditures, and student performance is attached in Appendix E.

Interviews and Surveys

In addition to the literature review and data collection, we were very interested in obtaining the insights of school district professionals regarding enrollment and school finance in addition to any particularly unique circumstances within a school district. To this end, the following steps were taken.

- Preliminary discussions/interviews at the Colorado Association of School Executives (CASE) July 2009 convention were conducted. Pacey Economics Group purchased a vendor booth and two senior members of our staff were available for discussions with CASE attendees regarding the study. A letter from CDE was included in the attendees packet of information informing them of the study and our presence at the convention. In addition to discussions/interviews, input from the attendees was solicited via a short questionnaire.

- Shortly after the July CASE convention, the short questionnaire was distributed via an email from CDE to school professionals and school board members. This initial survey was designed to obtain knowledge about the

critical issues that school district professionals and board members face with respect to enrollment and public school financing.

- Based on the feedback we received at the CASE convention and the short questionnaire as well as the knowledge we gained through the literature review and the extensive data collection process, we developed a survey which was emailed in December 2009 to all school district superintendents indicating that others such as the district's chief financial officer and/or budget director were welcome to respond. This survey was designed to obtain information not available through our dataset and also opinions and perspectives regarding specific contract deliverables. We encouraged the school district professionals to contact us directly if they were interested in providing additional information or feedback.

- We contacted the Boards of Cooperative Educational Services (BOCES) and Denver Area School Superintendents' Council (DASSC) throughout the state to schedule interviews during their superintendents' advisory meeting. (Most, but not all, of the organizations responded to our request.) Through these small in-person group interviews, superintendents were provided the opportunity to discuss the topics that were important to their school districts with respect to enrollment and school finance. One-on-one in-person and telephone interviews with several superintendents were also conducted.[4]

[4] We gave all superintendents the opportunity for either small in-person discussions, telephone interviews or by survey questionnaire; however, not all responded to our request. We conducted interviews with approximately half of the school districts and received some survey questionnaire responses.

- An in-person interview was also conducted with Ms. Tracie Rainey, the executive director of the Colorado School Finance Project (CSFP), an organization that compiles and distributes information and data on topics related to school finance.

- An in-person interview was also conducted with Dr. John Augenblick and two of his colleagues, Mr. Justin Silverstein and Mr. Dale DeCesare of Augenblick, Palaich and Associates, Inc. (APA). APA has substantial experience and expertise analyzing public education systems and policies and has conducted numerous studies estimating the cost of providing an "adequate education" for Colorado as well as other states throughout the country.

Chapter II
Overview of Colorado Public Schools

The Constitution of the State of Colorado requires the General Assembly to provide for the establishment and maintenance of a thorough and uniform system of free public schools throughout the state. The School District Organization Act of 1992 was enacted:

- for the general improvement of the public schools in the state of Colorado;
- for the equalization of the benefits of education throughout the state;
- for the organization of public school districts in the state and the alteration of the boundaries of established school districts, in order to provide for the maintenance of a thorough and uniform system of free public schools throughout the state;
- and for a more responsible expenditure of public funds for the support of the public school system of the state.[5]

Subsequent to the School District Organization Act of 1992, Colorado passed the Public School Finance Act of 1994 establishing a "foundation formula" to determine the funding level for each student within a school district and the "share" of funding to be provided by the state of Colorado. This formula, having undergone some amendments since 1994, identifies a "base funding" per pupil which then incorporates adjustments

[5] *Manual of Procedures for School Organization Act of 1992 As Amended*. Colorado Department of Education, Office of Educational Services, October 2003.

for at-risk students, district size, and district cost of living and is generally referred to as Total Program. The state also contributes additional monies, referred to as categorical programs, to school districts for certain needs such as special education, English language learners (ELL), transportation, gifted and talented programs, etc. Other sources, although not substantial in terms of overall funding, of school district revenues are federal government grants (less than 7%), a few state grant programs or contingency projects, and the potential for limited override local revenue funds, if approved by local voters (and with a few other contingency limits).

The state allows flexibility in how local school districts spend these resources but establishes student performance expectations, measures how well schools and districts are operating, within the allocated resources, and holds the school districts accountable for meeting expectations.

School Districts and Enrollment

An overview of the Colorado public school system is necessary to evaluate the impacts on students in the school districts with declining enrollments.

- The State's 177 school districts (without Vilas RE-5[6]) with over 712,900 students attending public schools in Colorado in academic year 2002-03 and increasing to some 751,700 by academic year 2007-08.

- The number of students enrolled in each school district varies substantially across the state as is illustrated in the

[6] After reviewing and analyzing the data as well as discussions with CDE, Vilas RE-5 was omitted from the analyses in this study. This is a small enrollment school district that operated the Hope Online Learning Academy for a couple of years during the time frame for this study. Including Vilas RE-5 skewed the results when viewed by size and setting category to the extent that relevant interpretations were not practical. In addition, the Hope Online program is now being operated by Douglas County and, therefore, this program no longer impacts Vilas RE-5 as it did during the study time frame. As such, the results where Vilas RE-5 was included no longer reflect the current school district environment.

following charts and maps where the number of school districts, the student enrollment by school district, for categories of size (enrollment) and by geographic setting (rural, town, etc.) are identified. [7,8,9,10]

- Over the six year period, the number of school districts in the smallest (enrollment) size category (<300 students) increased from 53 to 59 while the number of school districts with enrollments of 500 to 1,000 decreased from 30 to 24. The number of school districts in size category of 1,000 to 2,300 increased slightly while the other three categories are mostly unchanged in terms of the number of school districts.

- Not surprisingly, the charts and associated maps confirm most school districts with smaller enrollments (<500) are located in rural areas and also the school districts with 500 to 1,000 students are generally in rural areas or small towns.

- On the other hand, the charts and associated maps confirm that the school districts with the largest

[7] The charts display data through academic year 2007-08, the most recent year of revenue and expenditure data available at the time of this study.

[8] The school district enrollment size categories used in this analysis track to the approximate (rounded) size adjustment factor in the Public School Finance Act funding formula while geographic settings are as identified on CDE's website.

[9] The Charter School Institute (CSI) was created through HB04-1362 with the first schools being authorized in Fiscal Year 2005-06. The CSI acts like a separate school district and will be discussed in more detail later in the report although is not included in the charts below; however, students attending charter schools through a district and not through CSI are included below.

[10] With the exception of Adams 12 Five Star, Cherry Creek, Denver Public Schools, Douglas County, and Jefferson County each with 35,000 plus students, the other school districts in the greater than 4,000 size category have enrollments ranging primarily from 4,000 to 25,000 students.

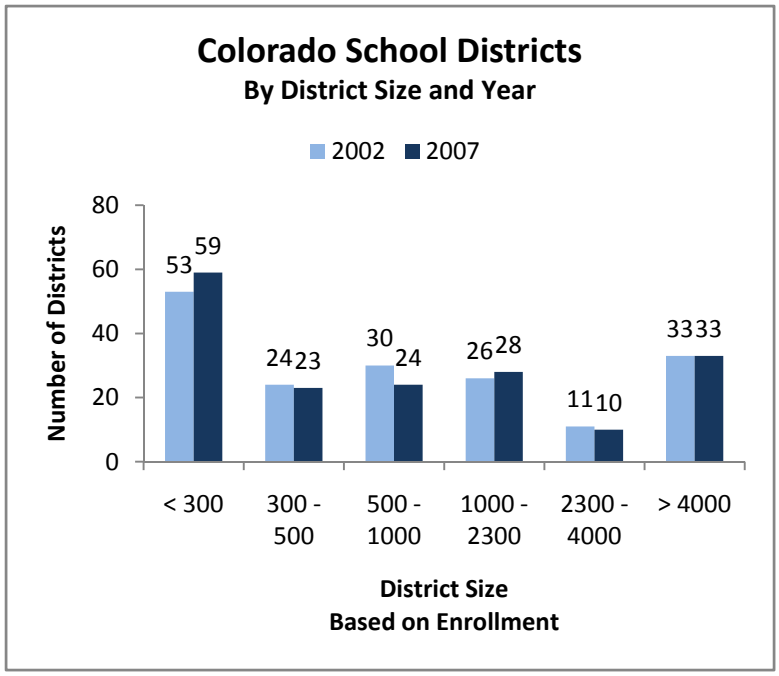
enrollments, i.e., those school districts with greater than 4,000 students, are in the urban and Denver metro settings. The maps identifying school districts by enrollment size show these larger school districts to be in the front range region of the state with additional detail on the following page.

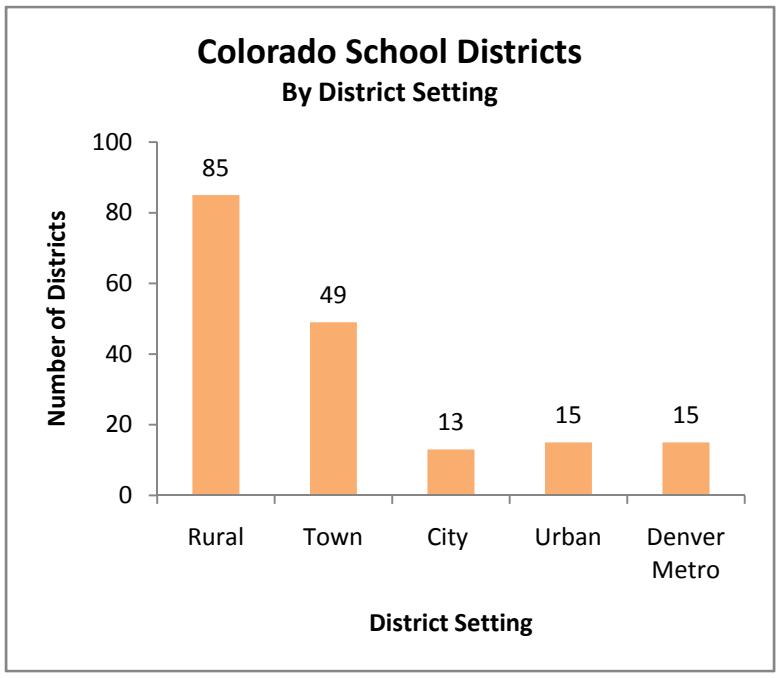
- The majority of the student population, some 644,000 or approximately 86% of the 751,700 attending public schools (with the exception of Vilas RE-5 as noted above) in academic year 2007-08, received educational services in school districts with greater than 4,000 students and nearly 420,000 (56%) were in the Denver Metro area. Small districts (less than 1,000 students) accounted for less than 5% of all students educated in the state.

- Other salient characteristics of the state include its topography, with mountainous regions and expansive plains and the dispersion of its citizens into densely and sparsely populated regions within the state. When measured in square miles by school district size (enrollment categories) or geographic setting, one can better appreciate the issues related to the education mission. Specifically, 43% of the state's land area is denoted as rural and is sparsely populated with 4% of the student enrollment (also a similar trend is noted with small sized school districts). While Denver Metro has 56% of student enrollment, it only has 3% of the state land area. When considering the enrollment of Denver Metro and the urban areas combined we find approximately 85% of student enrollment but only 10% of the state land area.

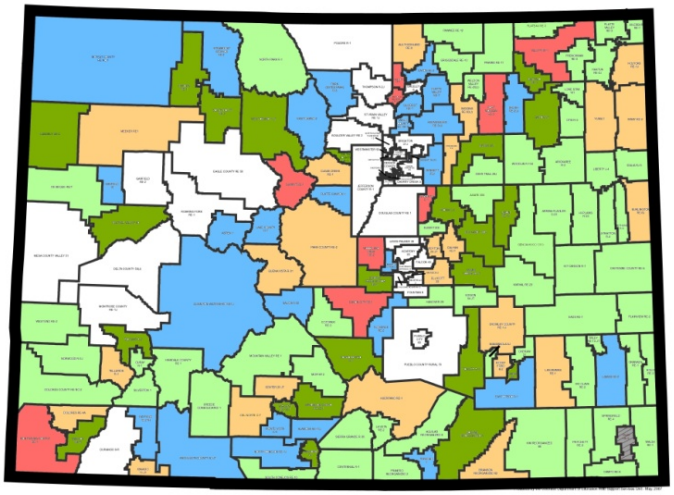
- Notably, three school districts (Denver Public School District, Jefferson County School District, and Douglas School District) account for nearly 200,000 with Adams 12 Five Star and Cherry Creek school districts adding another 86,000 for over two-thirds of the 420,000 Denver Metro enrollment in the 2007-08 academic year and over a third (38%) of the entire public school enrollment for the State of Colorado. For additional insight, subsequent sections of this study will isolate these exceptionally large school districts and provide comparative analyses to school districts with smaller enrollments.

- Interestingly, school districts of 1,000 to 2,300 students cover almost 20% of state lands with 41,900 student enrollment while school districts of 2,300 to 4,000 students represent less than 4% of land area and 30,000 student enrollment. These differences may account for some transportation issues discussed in a later chapter of this study.


Colorado School Districts
By District Size and Year
2002
2007
Number of Districts
80
60
40
20
0
53
59
24
23
30
24
26
28
11
10
3333
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on Enrollment

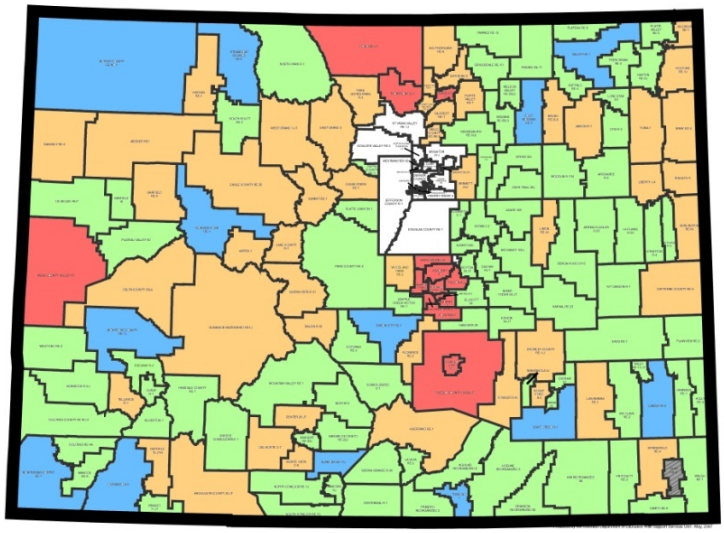

Colorado School Districts
By District Setting
Number of Districts
100
80
60
40
20
0
85
49
13
15
15
Rural
Town
City
Urban
Denver Metro
District Setting

Colorado School District Maps



By School District Enrollment Size

<300 300-500 500-1,000 1,000-2,300 2,300-4,000 >4,000

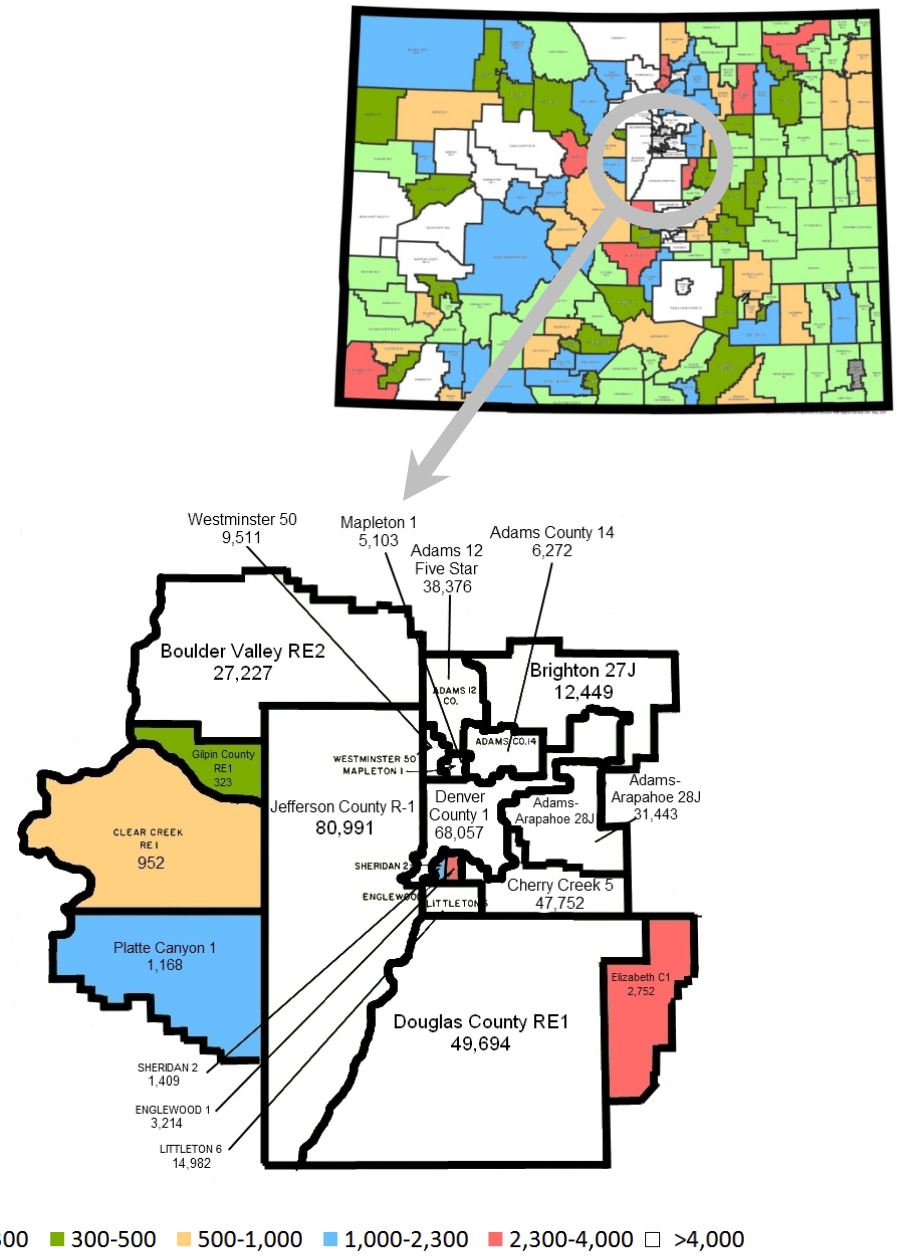


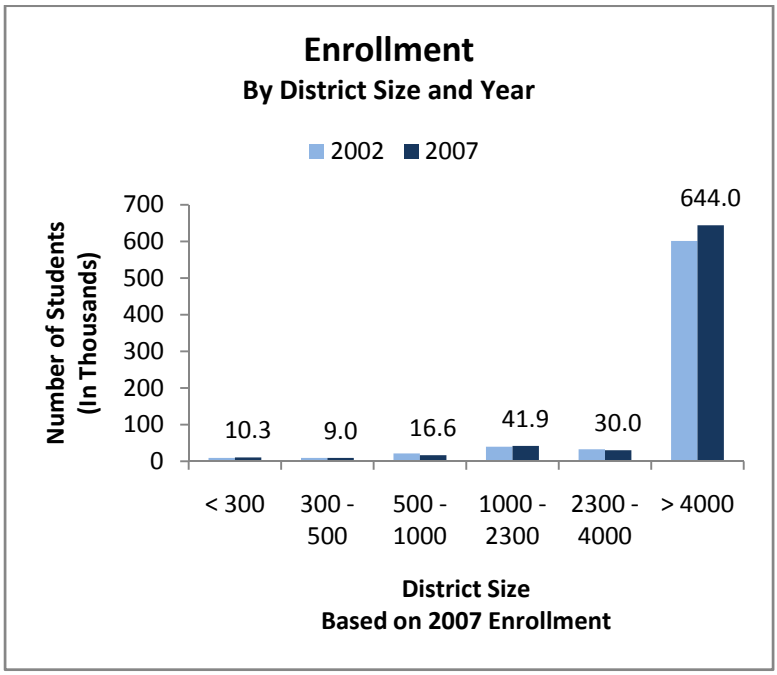
By School District Setting

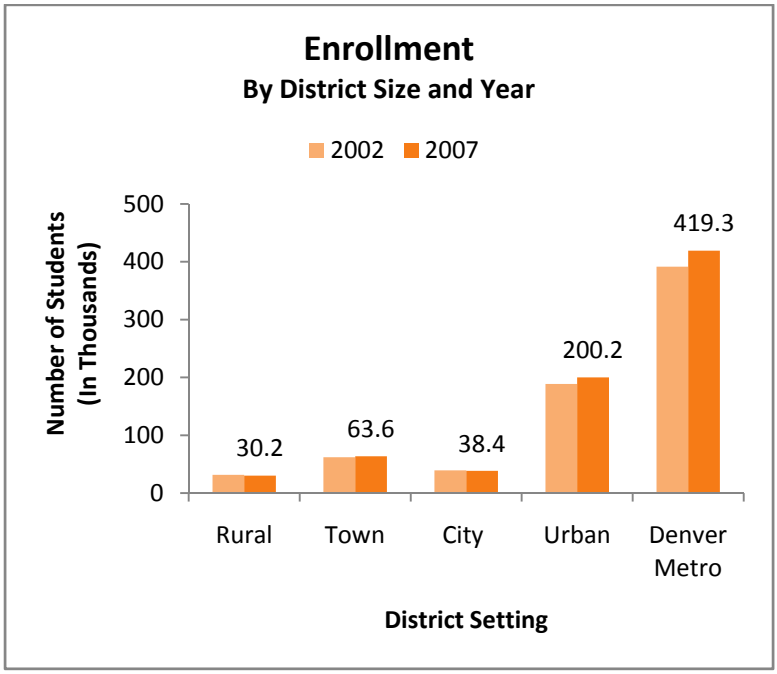
Rural Town City Urban Denver Metro

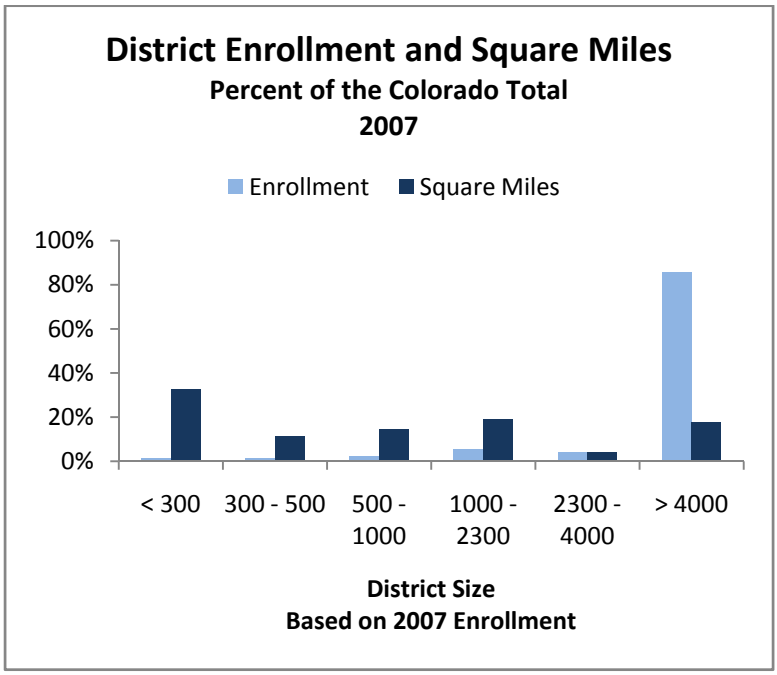
Colorado School District Map

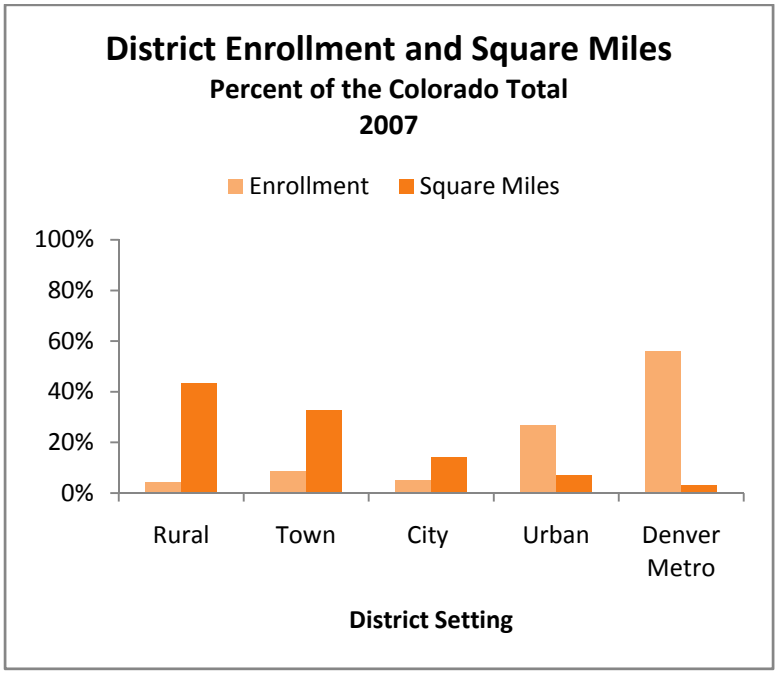
By Enrollment Size




Enrollment
By District Size and Year
2002
2007
Number of Students (In Thousands)
700
600
500
400
300
200
100
0
10.3
9.0
16.6
41.9
30.0
644.0
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


Enrollment
By District Size and Year
2002
2007
Number of Students (In Thousands)
500
400
300
200
100
0
30.2
63.6
38.4
200.2
419.3
Rural
Town
City
Urban
Denver Metro
District Setting


District Enrollment and Square Miles
Percent of the Colorado Total
2007
Enrollment
Square Miles
100%
80%
60%
40%
20%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment

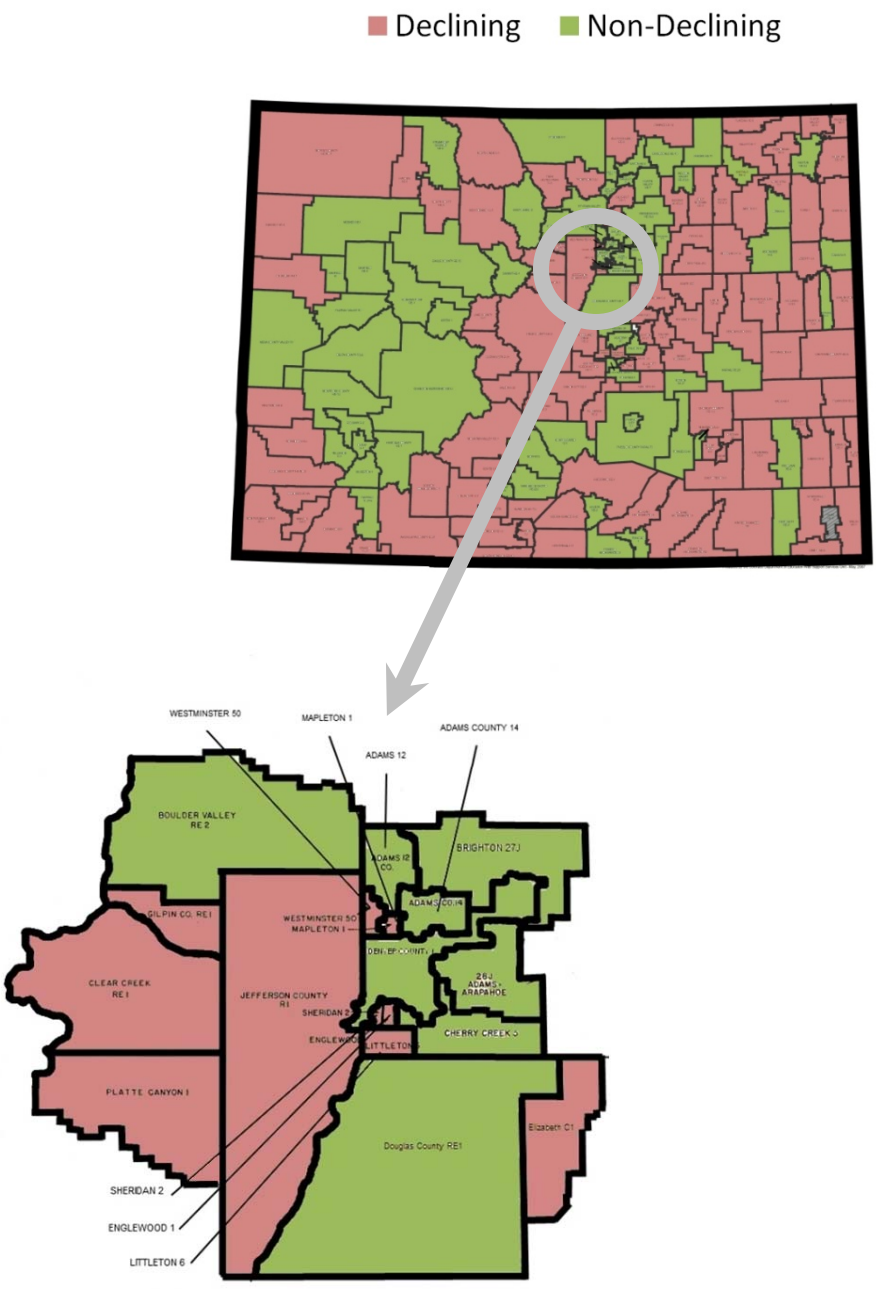

District Enrollment and Square Miles
Percent of the Colorado Total
2007
Enrollment
Square Miles
100%
80%
60%
40%
20%
0%
Rural
Town
City
Urban
Denver Metro
District Setting

Finally, the following map identifies school districts in the state with either declining or non-declining enrollment (declining enrollment is defined as a decrease in total funded enrollment between academic years 2002-03 and 2007-08). The school districts with declining enrollment are shaded in red while those school districts with non-declining enrollments are in green. Clearly, despite increases in the student population for the state over this six year period, the preponderance of school districts (67%) are experiencing declines in student enrollment.

These enrollment declines, be they because of changes in demographics or because of choice, may impact Colorado public school financing and student performance, the critical issue of this study. However, before detailing and evaluating the economic impacts associated with declining enrollment, the remainder of this chapter provides an overview of the Colorado public school system. In particular, an analysis of school district allocation of expenditures by school district size (enrollment) and geographic settings plus school district sources of revenue will be outlined and discussed. The following chapter of this study will then evaluate student performance and other impacts on students in the provision of education in a declining enrollment environment.

Colorado School Districts

By Declining or Non-Declining Enrollment



Expenditures

While the previous charts provide an overview of school district and enrollment characteristics, the following charts identify school district expenditures by major categories during the 2007-08 academic year. This report first identifies these major categories of expenditures as a percent of all current expenditures for school districts as measured by enrollment, and then also by geographic setting.[11]

- As the following charts illustrate, there are no major differences in the allocation of school districts budgets across major expenditure categories: instruction, administration, transportation, etc. by district size or setting.[12] Further, a review of academic year 2002-03 demonstrates a similar allocation across categories.[13]

- The percent change in per pupil expenditures from academic years 2002-03 to 2007-08 finds a somewhat lower increase for small school districts (less than 300 students) and to a lesser degree for school districts with 2,300 to 4,000 students and for those students in urban setting.[14] Alternatively, the Denver Metro School District was able to increase per pupil expenditures by nearly 30%. Further inspection of the Denver Metro School District, isolating the five large school districts (i.e., enrollment greater than 35,000) did not change this percent increase (30%) in any appreciable manner.[15]

[11] "Current" expenditures are designed to include "operating" costs and to exclude "capital" costs.
[12] Comparisons across school districts are performed using an average of school district data.
[13] Charts for academic year 2002-03 are not included in this report but are available upon request.
[14] Per pupil comparisons are performed using an overall average at the pupil level.
[15] The five large school districts include Adams 12 Five Star, Cherry Creek, Denver Public Schools, Douglas County, and Jefferson County RE-1.

- To simply maintain the per pupil expenditure levels provided in academic year 2002-03 requires a nearly 20% increase for inflation. All school districts, irrespective of size or setting, had monies to maintain academic year 2002-03 levels. The exception to this is the schools in the Denver Metro area with substantial increase in their per pupil expenditures.

- Simplifying and comparing school district expenditures into two major categories: instruction and support,[16] shows the budget allocation to be quite consistent across district size or setting. In addition, the 2002 chart (not included in this report) showed a similar allocation.

- Generally, if school districts are maintaining their academic year 2002-03 level of instructional commitments, the percent change to academic year 2007-08 for the per pupil instructional expenditures should meet or exceed this nearly 20% inflation adjustment.[17] With the exception of the very smallest school districts (less than 300 students), over this six year period, the per pupil expenditures on instruction have kept up with (or increased greater than in larger, Denver Metro districts) although are slightly lower than the percent change in total per pupil expenditures.

- Additionally, if instructional salaries and benefits are highly correlated to the number of students (i.e., if, on average,

[16] Instruction includes expenditures for instruction including those activities dealing directly with the interactions between students and staff, including paraprofessionals (aides) or classroom assistants who assist teachers in the instructional process while support includes administration, operations and maintenance, transportation, food services, etc.

[17] Exceptions could be explained by teacher turnovers, etc.

increases in students lead to increases in teachers) then school districts expenditures, irrespective of size and geographic setting, are likely to increase by both inflation and enrollment growth.

- A review of the per pupil instructional expenditures over the six year period from academic years 2002-03 to 2007-08 finds the majority of the school districts maintained only inflationary increases. An exception to this general finding includes:

    - School districts with greater than 4,000 enrollment and/or in the Denver Metro setting had substantially greater than inflationary increases for instructional expenditures even when isolating the five large enrollment school districts. These additional expenditures may be the result of low instructional personnel turnover, non-negotiable salary and benefit increases, and/or the availability of override funds for these school districts.

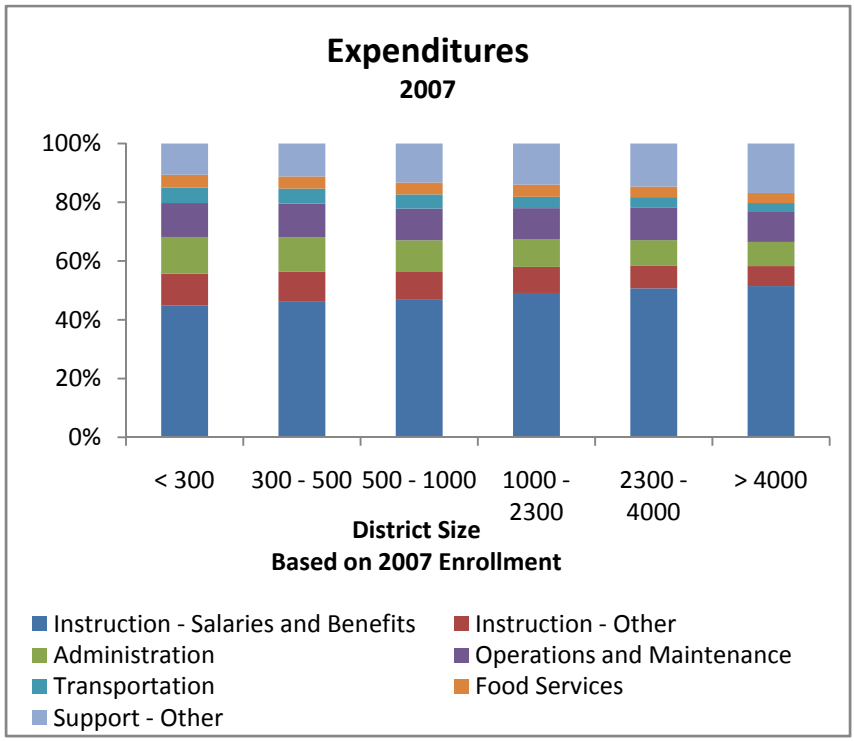
- Of equal interest when measuring the efficient operation of a school district would be an evaluation of administration expenses. It is important to note that administration expenses are not easily measured as responsibilities and job descriptions vary widely across school districts. For example, administration positions at large enrollment school districts will have demanding but narrowly defined job responsibilities while a superintendent in a small enrollment school district will

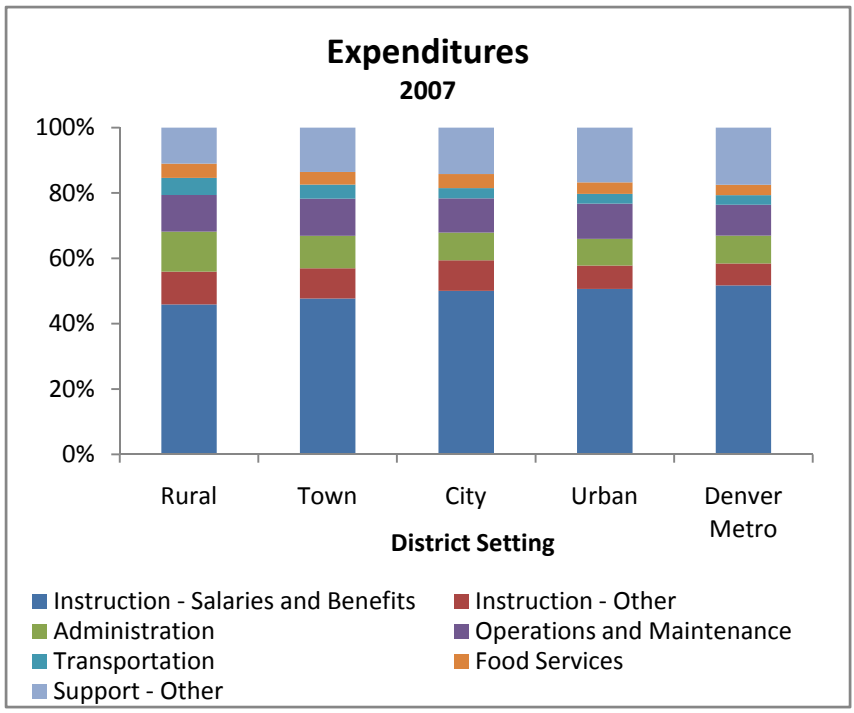
have an equally demanding position but is likely to have "multiple roles" ranging from superintendent, to principal, to academic counselor, etc.

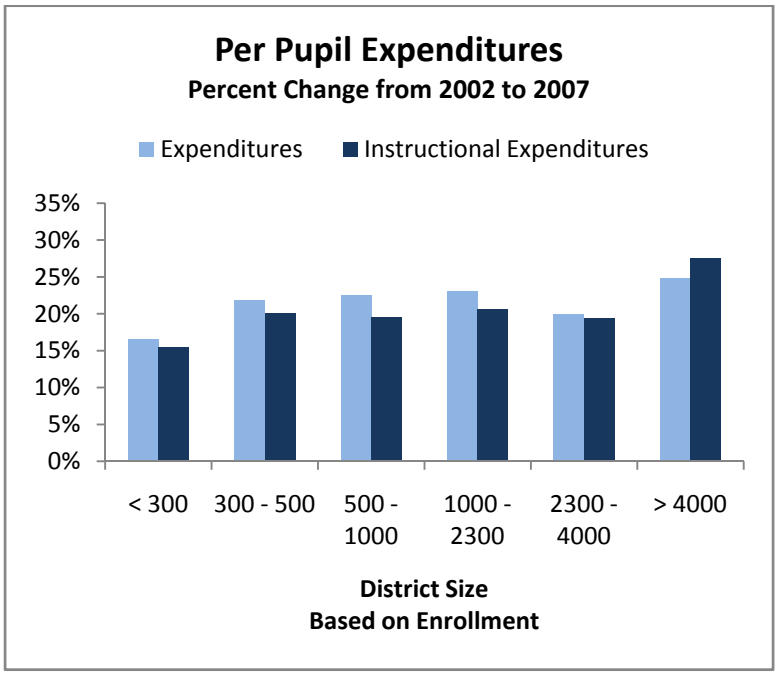
- In this analysis, administration expenditures include both general and school administrators (for reasons described above) and are first viewed as a percent of total expenditures indicating the small and rural school districts require a somewhat larger percent of overall expenditures for administration purposes, although the differential is fairly nominal across school district size and setting.

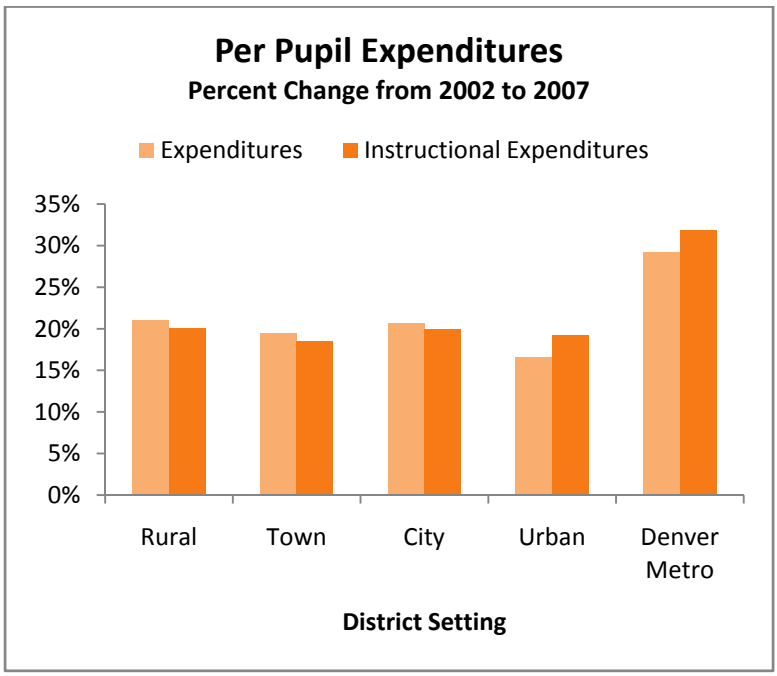
- However, administration expenditures relative to teacher full-time equivalents (FTEs), based on the expectation that administration expenses are related to the size of required personnel not students, provides a different perspective.[18] This analysis finds small enrollment school districts and/or school districts in rural, town and city settings have held administration costs below the inflationary increases over the six year study period. Notably, school districts with greater than 4,000 student enrollment and/or in the Denver Metro area have experienced substantial increases (above inflation) for administration expenses. Again, the findings are unchanged when isolating the five large school districts in the greater than 4,000 and Denver Metro categories.

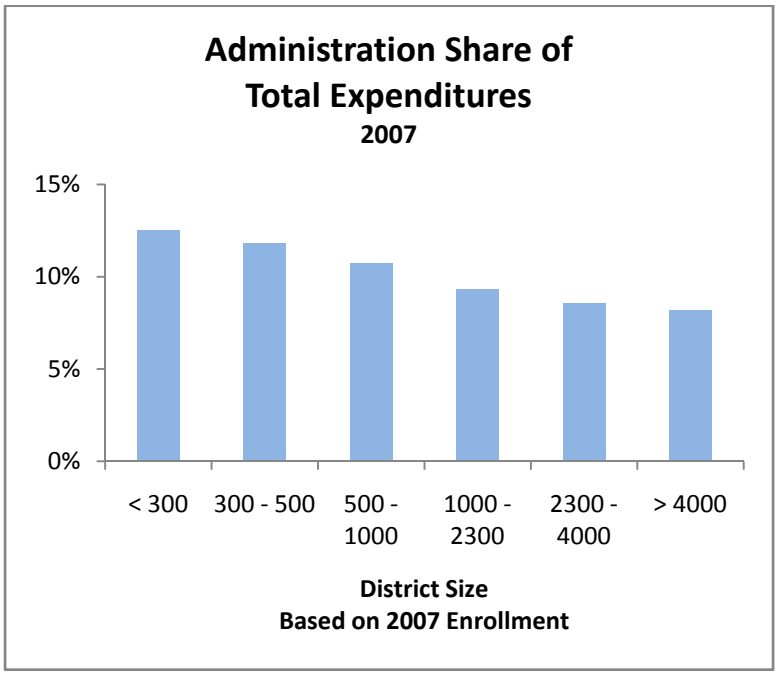
[18] Arguably, if administration expenses are more "fixed" than this measure would suggest, the conclusions drawn could be debated.

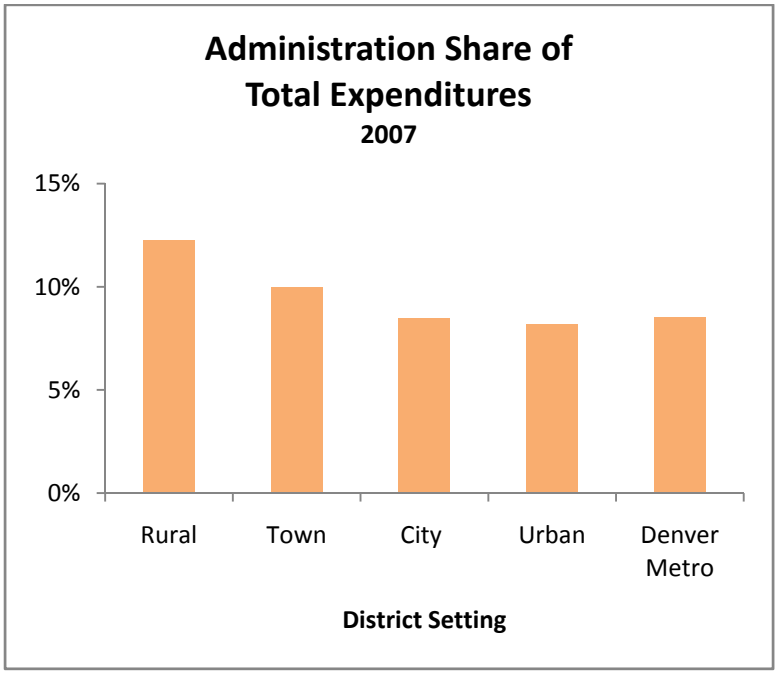

Expenditures
2007
100%
80%
60%
40%
20%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment
Instruction - Salaries and Benefits
Instruction - Other
Administration
Operations and Maintenance
Transportation
Food Services
Support - Other

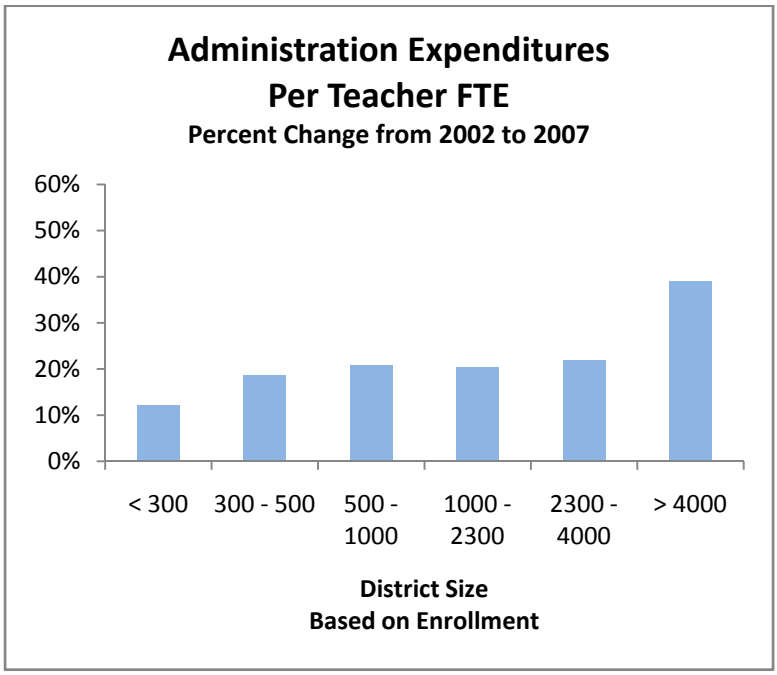

Expenditures
2007
100%
80%
60%
40%
20%
0%
Rural
Town
City
Urban
Denver Metro
District Setting
Instruction - Salaries and Benefits
Instruction - Other
Administration
Operations and Maintenance
Transportation
Food Services
Support - Other

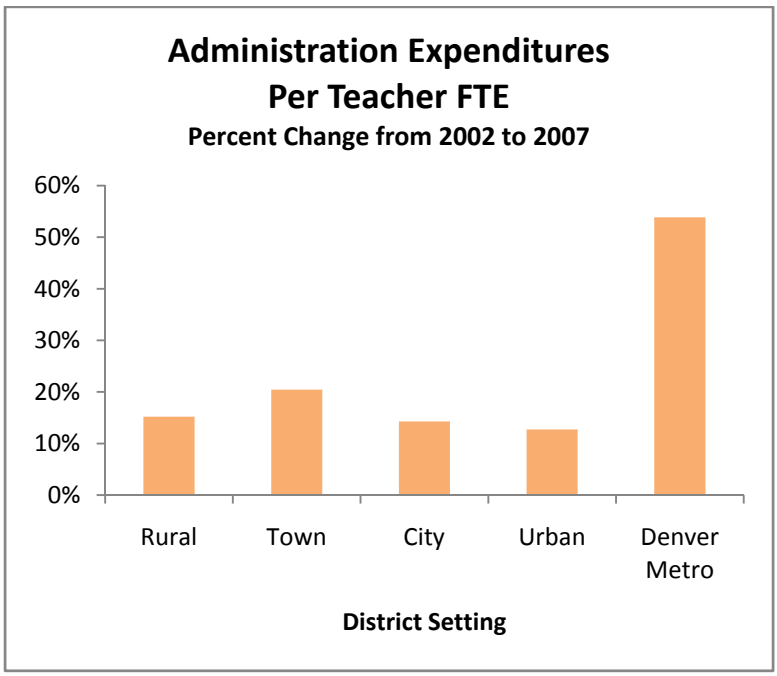

Per Pupil Expenditures
Percent Change from 2002 to 2007
Expenditures
Instructional Expenditures
35%
30%
25%
20%
15%
10%
5%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on Enrollment


Per Pupil Expenditures
Percent Change from 2002 to 2007
Expenditures
Instructional Expenditures
35%
30%
25%
20%
15%
10%
5%
0%
Rural
Town
City
Urban
Denver Metro
District Setting


Administration Share of
Total Expenditures
2007
15%
10%
5%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


Administration Share of
Total Expenditures
2007
15%
10%
5%
0%
Rural
Town
City
Urban
Denver Metro
District Setting


Administration Expenditures
Per Teacher FTE
Percent Change from 2002 to 2007
60%
50%
40%
30%
20%
10%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on Enrollment


Administration Expenditures
Per Teacher FTE
Percent Change from 2002 to 2007
60%
50%
40%
30%
20%
10%
0%
Rural
Town
City
Urban
Denver Metro
District Setting

Revenue Sources

Local, state and federal governments are the three major sources of financing for Colorado public elementary and secondary schools.[19]

Local governments provide funding for their school districts primarily through taxes on property (including personal and/or business property), but also a small percent of local funding is derived from specific ownership taxes, i.e., taxes paid on motor vehicles. The property tax rate, known as the mill levy, is calculated according to a formula in state law which is designed to comply with constitutional limits. The counties' collection of specific ownership taxes are distributed in proportion to the amount of property tax assessed to each relevant government entity in the county, such as school districts, cities, etc. Some districts collect more taxes than required per the funding formula as voters in those districts have approved additional property taxes. These monies are identified in the following charts under the local category (and later in this study under the total mill levy analysis).[20]

In the funding formula, the state provides the difference between the revenues local school districts generate and the total program cost. (Recall earlier the term total program is somewhat of an anomaly as it does not include additional contributions by the state for categorical programs nor does it include any additional state monies for contingency issues or capital construction.)

Finally, the federal government is the third major source for funding Colorado public school students. Typically, the federal government contribution for overall funding is relatively small (less than 7% in academic year 2007-08); however, with the recent financial downturn and national recession, the federal government stimulus package is providing substantial funding in the current and upcoming academic year.

[19] The Legislative Council Staff issued a publication entitled "School Finance in Colorado, January 2007" explaining, in detail, the funding formula and the other important provisions of revenue sources and criteria for the funding calculation.

[20] Of note, monies from voter approved property taxes are not included in the funding formula calculation.

- Predictably, non-categorical program contributions by the state are, by formula design, greater for the small enrollment school districts and rural school district areas than for the largest school district (>4,000 student enrollment) and/or the Denver Metro area school district.

- The local revenue contribution (identified on the following charts) include property and specific ownership tax in addition to special property tax assessments for school district funding requests "overrides" (all approved by the school district voters). Thus, in these charts, the funding by local sources includes not only the "funding formula" requirements but also any additional tax assessment the voters have provided for additional school funding – be it operational or capital improvements.

- With the exception of very small school districts (by enrollment), local funds account for more than half of the contribution to school district funding. The more limited local funding in small enrollment districts is not likely a function of "tax effort", if defined as mill levy rate. That is, the poorest school districts (in terms of assessed property value) tend to have the highest mill levy rate while the wealthiest school districts (as measured by assessed property value) generate more local funds with a much lower mill levy rate.[21]

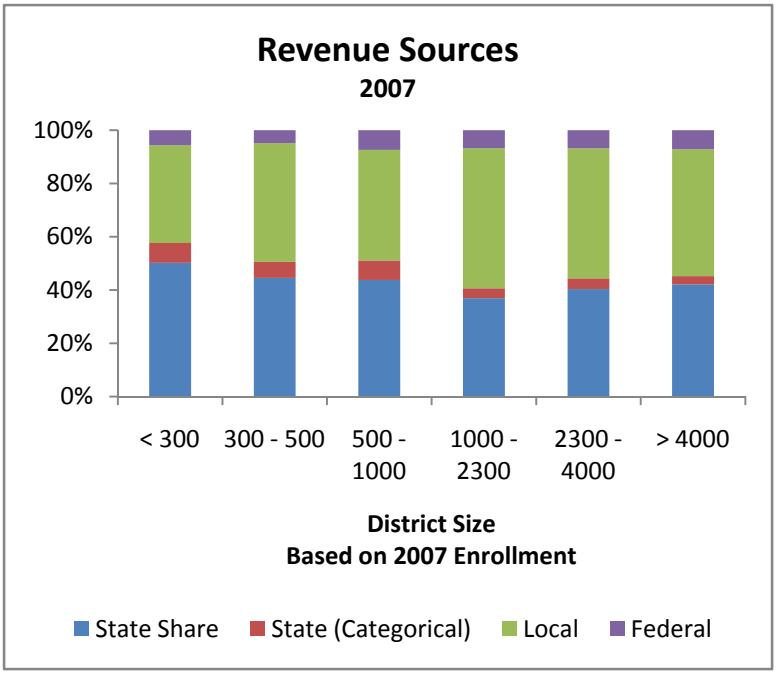
- The total program mill levy (i.e., mill levy incorporated into the funding formula) varies quite dramatically across all school district sizes and settings, with the least variation in the urban and Denver Metro areas. With the exception of school districts with enrollments between 2,300 and 4,000

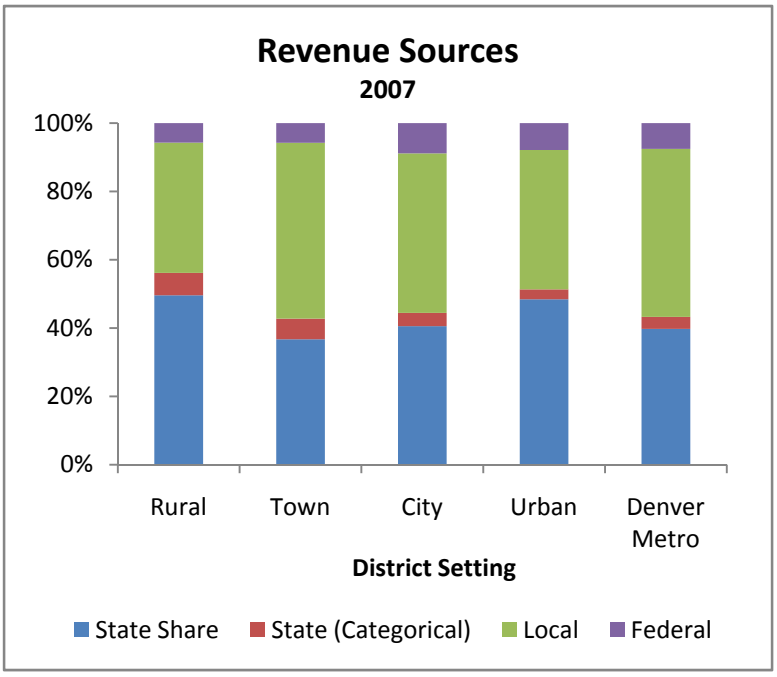
[21] This topic is described and analyzed in more detail in a later section of this report.

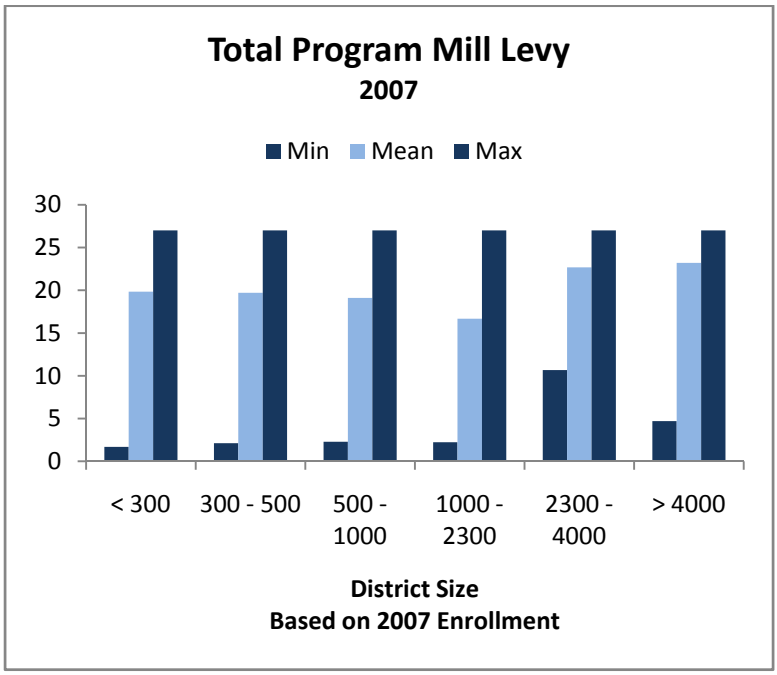
students, all school district sizes had some school districts with very nominal total program mill levies (less than 2 mills to 5 mills) but also many school districts with the maximum allowed total program mill levy of 27 mills.

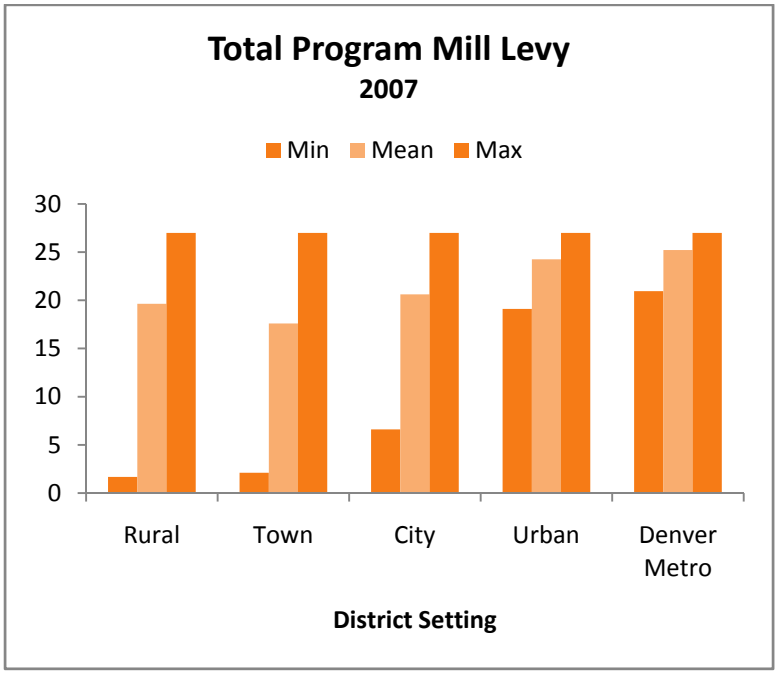
- This variation in tax effort, as measured by mill levy, was also reflected across school district size and setting for total mill levy commitments (not just total program mill levy). That is, a similar range exists between the minimum and maximum total mill levy commitment by voters to fund school needs (such as capital investments, etc.) beyond the total program mills required in the funding formula.

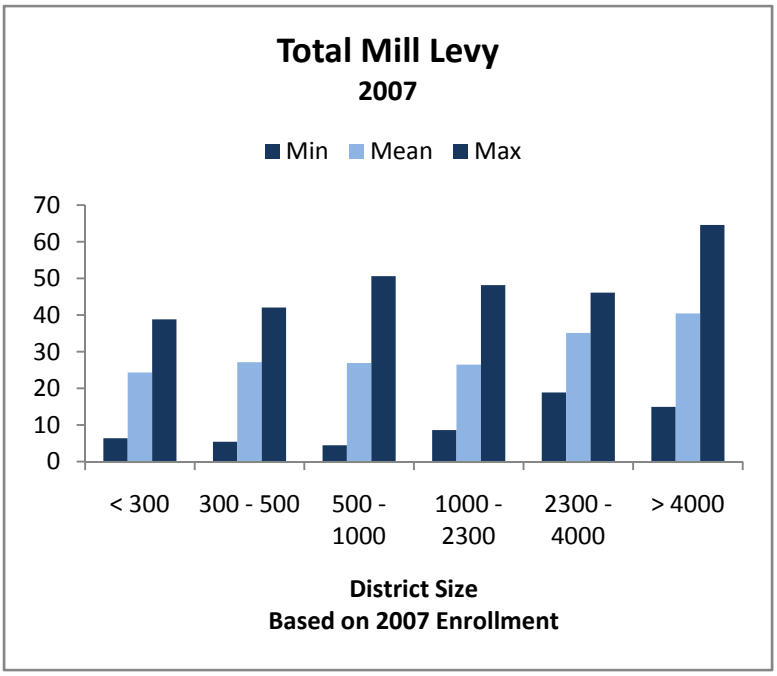
- The percent change in the total program mill levy over the six year period studied in this report finds school districts of all sizes and settings have enjoyed an average decrease in the mill levy rate Most, if not all, of this mill levy decrease is related to a reduction, by law in 2007 to the maximum allowable total program mill levy (of 27 mills down from a previous maximum of 40 mills). However, given increases in the assessed property values, the dollar amounts have generally increased over this same period by not always greater than inflationary increases.

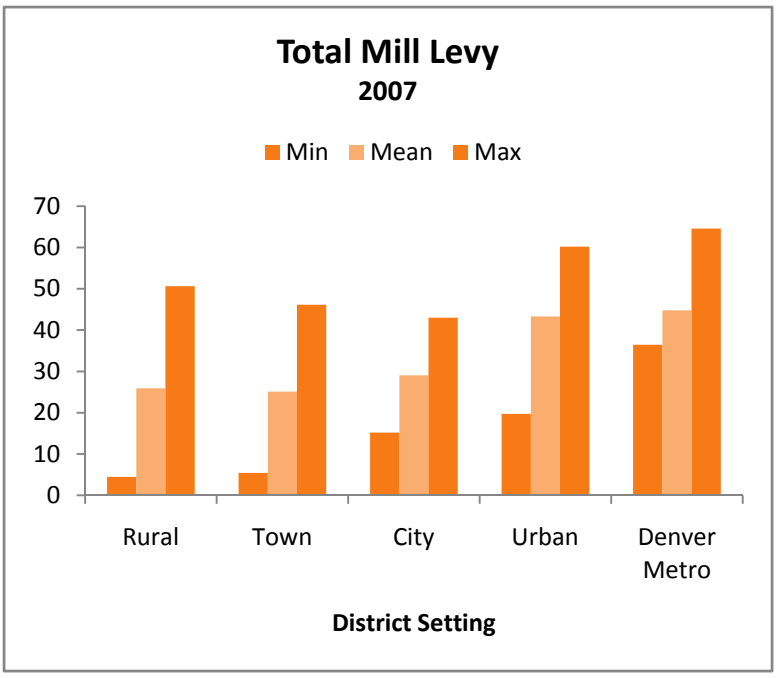

Revenue Sources
2007
100%
80%
60%
40%
20%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment
State Share
State (Categorical)
Local
Federal

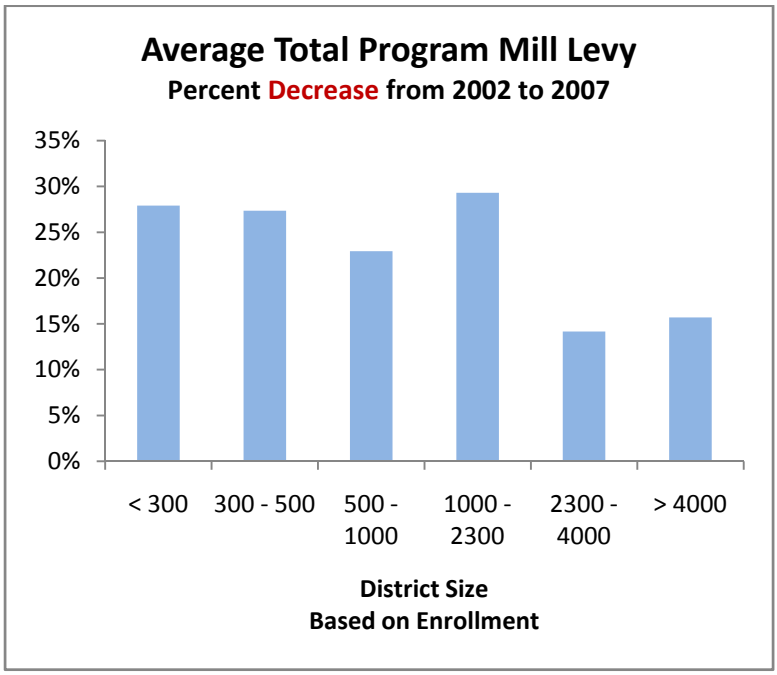

Revenue Sources
2007
100%
80%
60%
40%
20%
0%
Rural
Town
City
Urban
Denver Metro
District Setting
State Share
State (Categorical)
Local
Federal

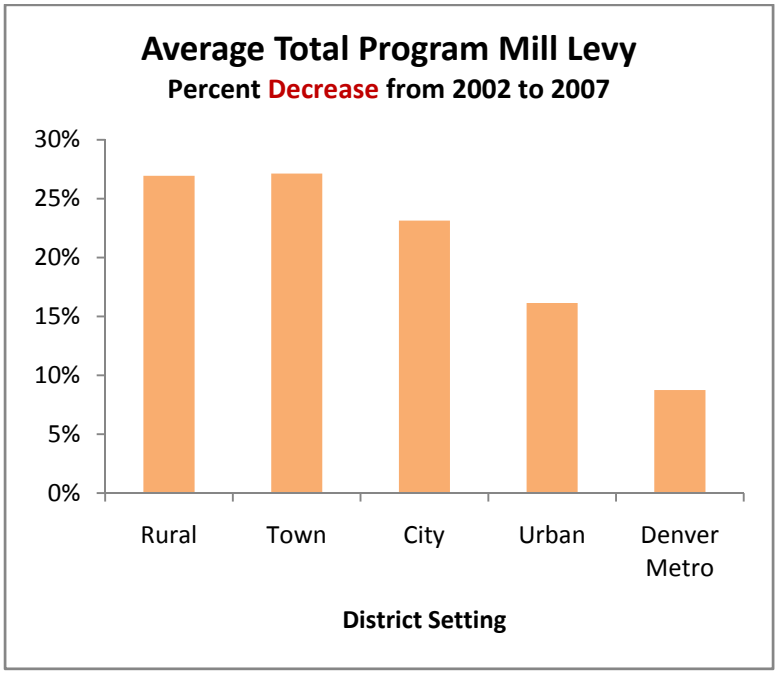

Total Program Mill Levy
2007
Min
Mean
Max
30
25
20
15
10
5
0
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


Total Program Mill Levy
2007
Min
Mean
Max
30
25
20
15
10
5
0
Rural
Town
City
Urban
Denver Metro
District Setting


Total Mill Levy
2007
Min
Mean
Max
70
60
50
40
30
20
10
0
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


Total Mill Levy
2007
Min
Mean
Max
70
60
50
40
30
20
10
0
Rural
Town
City
Urban
Denver Metro
District Setting


Average Total Program Mill Levy
Percent Decrease from 2002 to 2007
35%
30%
25%
20%
15%
10%
5%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on Enrollment


Average Total Program Mill Levy
Percent Decrease from 2002 to 2007
30%
25%
20%
15%
10%
5%
0%
Rural
Town
City
Urban
Denver Metro
District Setting

Education Choice

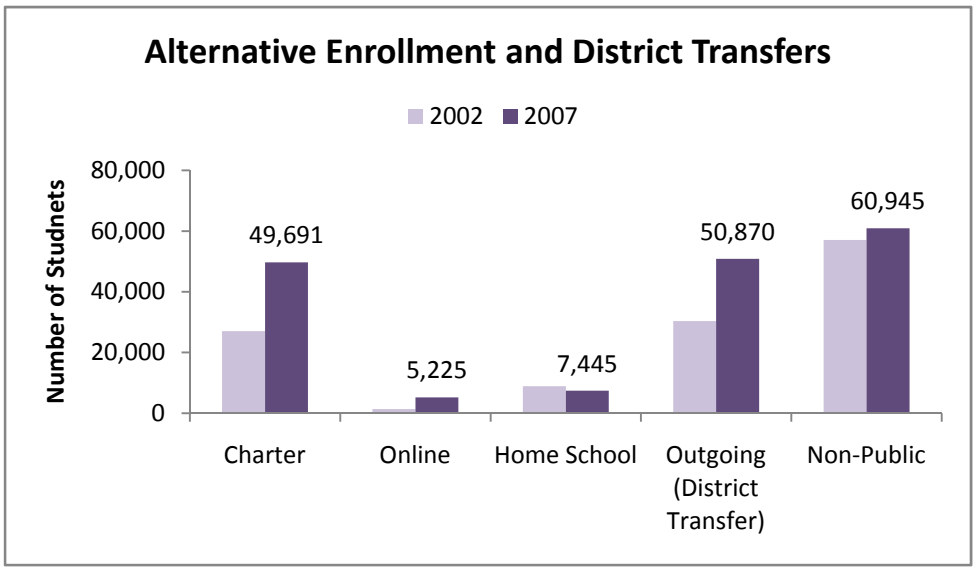
Another interesting aspect of the Colorado public school system is the increased opportunity for school choice over recent years. School choice now includes charter school options in addition to home schooling, online, and open enrollment (inter- and intra-district). The number of students who have availed themselves of these different opportunities are identified in the following charts.

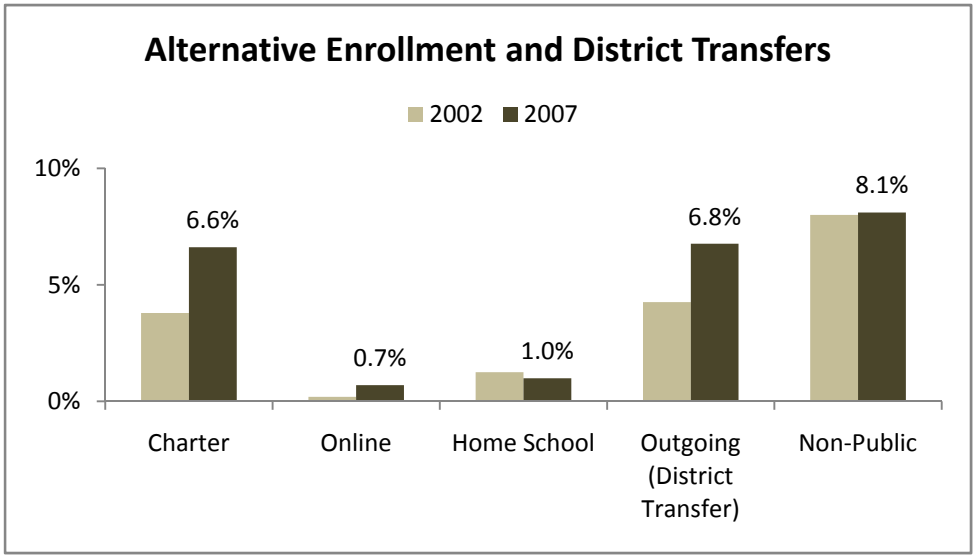
The interest and opportunities to enroll in charter schools has been at the forefront of the Colorado movement toward increased choice.

- Over the six years from academic year 2002-03 to 2007-08, charter school enrollment has increased from 27,000 to 49,700 students and now represents approximately 6.6% of the total funded enrollment in Colorado.[22]
- Non-public, i.e., private school, enrollment has remained relatively constant over the same time frame.
- Noteworthy but perhaps less recognized, is the increase in inter-district transfers which now reflects slightly less than 7% of students leaving their district to attend school in a different district (including charter schools in a different district as well as Charter School Institute schools). [23]
- Online enrollment, although a small percent of overall enrollment, has become more popular while home school has experienced a minor decline (more on these avenues of learning will be discussed in later sections of this report).

[22] Of note, if Vilas RE-5 is included, this figure increases to 7.0%.

[23] The numbers for inter-district incoming and outgoing can be misleading and must be used with caution. Students choosing a charter school outside their school district are identified in the incoming figure for the school district of that charter school (also Charter School Institute students are identified in the outgoing figures), i.e., charter and inter-district incoming and outgoing could be many of the same students.





Note: If Vilas RE-5 is included, online increases to 1.1%.

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Chapter III
Student Performance and the Delivery of Education Services in a Declining Enrollment Environment

One of the primary objectives of this study is to understand how the performance of students in declining enrollment districts compares to the performance of students in other districts. The analysis which follows evaluates the impact on student performance given the expanding array of school choices and the changing state demographics. In determining the impact school districts with declining enrollments may have on the efficiency and efficacy of the funding formula used by the state for the provision of public school elementary and secondary education services, this study will also identify the magnitude and relevance of student and school district characteristics, the expenditure levels by the school district, community demographics, among other factors expected to be related to student performance.

Econometric Model of Student Performance

The fundamental analysis used to examine the relationship between school performance and declining enrollment is a well-recognized and well-respected mathematical technique referred to as regression analysis.[24] Regression analysis provides an opportunity to explain the variations in student performance when "controlling for" or "accounting for" specific factors and characteristics known or believed to be related to performance outcomes.

- For instance, certain student attributes such as at-risk, special education or ELL needs may limit student

[24] Regression analysis is also often referred to as multiple regression or econometric modeling. These terms are used interchangeably in this report.

achievement (without special assistance) helping to explain some of the differences in student performance.

- Another factor that may explain some of the variation in student performance may be related to the non-core offerings of a school district such as advanced placement courses, music or fine arts or additional extracurricular activities in sports, band, etc. These offerings are believed to improve student motivation and interest and, hence, improve student performance.

- Still another factor expected to be important in the delivery of education services and student performance outcomes is that instruction (measured as instructional expenditures) matters.

All of these factors and many more are evaluated in the regression analysis discussed below.

In this analysis, the percent of test takers who score at the proficient or advanced levels for reading and for math on the Colorado Student Assessment Program (CSAP) is used to measure student performance. The measurement of student performance is a complex and difficult task and although the CSAP scores may be an imperfect measure, CSAP scores are utilized to form assessments and are also used to satisfy the accountability of the No Child Left Behind Act. This regression analysis is designed to explain the variation in student performance for reading and math combining all grades. As a cross check to this aggregation, the analysis also runs performance regression analysis for individual grades as well as graduation rates and completion rates. Of note, there are some nominal differences in the factors and/or the relevance

of the factors that explain the variation of student performance between the aggregate and the individual grade regressions.[25]

To explain the variation in student performance, the following student, school district, and community characteristics and attributes are ultimately considered in all variations of the regression analysis.

- The student attributes incorporated as explanatory variables in the models included a measure (using percent of funded enrollment) of students who are at- risk, (free lunch status only), who require an Individualized Education Program (IEP), who are ELL students identified as fluent, limited, or not English proficient, a percent of students in gifted programs, plus information regarding the percent of students who are Asian, African American, Hispanic, Native American, or female.

- As many professionals cite student performance outcomes depend on school district size, this analysis considers funded enrollment (as a proxy for school district size characteristics) as well as the percent of students in charter schools, on-line programs, and also the inter-district incoming and outgoing students within a district.

- School district characteristics included in the analysis were average teacher salary, average teacher experience, the percent of teachers with a master's degree or greater, the average teacher pupil ratio, and the number of non-CSAP offerings in each school in the district.

[25] The technical explanations for the regression models as well as the detailed results for the other seventeen individual grade models are not discussed in the text of this report but are available in Appendix C to this study.

- Although there is some debate in the educational arena regarding the necessary level of funding needed to effectuate positive student performance, there is little or no debate that funding is needed. As such, this analysis incorporates the instructional expenditures per pupil in expectation that this will be one of the key factors in explaining student performance.

- The demographics of the community in the school district such as population density (measured by funded enrollment per square mile of the school district), the percent of the residents in the school district with incomes greater than $75,000 as well as a the percent of school district residents with college educations are factors that may explain some of the variation in student performance and are hence included in this analysis.

- Finally, the geographic setting for the school district as defined by the Colorado Department of Education including rural, town, city, urban and Denver Metro are included as additional explanatory variables.

The key results are described below with the specifics of the econometric model and their parameters outlined in the table on the page following these findings. The results of the econometric model find:

- A key result of the analysis is that student performance is not statistically significantly different between districts with declining and non-declining enrollments. However, as measured by CSAP, the percent of students at a proficient or advanced level at a proficient or advanced

level in reading generally ranged between 60 to 80 percent while this range was between 40 to 60 percent for students in math performance.

- Another important result is that reading and math performances are both positively related to instructional expenditures per pupil, though the relationship is stronger for math than for reading.

- Total funded enrollment, a measure of school district size, and the percent of students in charter schools are not found to be related to performance.

- The percent of online students is negatively related to reading and math performance and if modeling graduation rates as a performance measure, this is also a negative correlation. That is, online students perform less well than others with similar student and school district attributes that are not in online programs.

- The percent of students incoming and outgoing both are positively related to math performance indicating school choice has had a positive impact on student performance.

- Student attributes have the expected relationship with student performance. That is, the percent of at-risk students is negatively related to reading and math performance indicating an increase in the percent of at-risk students in a district, all other things being the same, will decrease student performance for the district.

- The percent of students with an IEP has a strong and statistically significant relationship to both reading and math performance and the percent of students with limited or no English proficiency also has a strong and statistically significant negative relationship to reading performance and graduation rate.

- Ethnic background is found to be an important factor, with the percent of Asian students positively and significantly related to math performance and graduation rates indicating the increased percent of Asian students in the school district population, all other things equal, will result in greater student performance scores for the school district. Other ethnic backgrounds including African American, Hispanic and Native American students have both a negative and statistically significant impact when it comes to both reading and math performance.

- Interestingly, in the aggregate analysis females have a negative relationship with reading performance that is statistically significant although in the individual grade regressions this relationship is consistently positive for upper grade levels and statistically significant.

- Importantly, the teacher average salary for the school district is statistically significant and positively related to both reading and math performance where its impact on math performance is substantially greater than for reading. It is noteworthy that teacher experience measured as a percent of teacher with a master's degree or greater is not statistically significant on the impact of student performance in our analysis. It would appear that important teacher characteristics are being captured in

this salary measure which is appropriate if teachers are being properly compensated for their attributes.

- The pupil teacher ratio has a positive and statistically significant relationship with math performance when considering all grades in the aggregate although this is an unexpected result as one would anticipate smaller classes improving performance. When analyzing the impact of pupil teacher ratios in the individual grade regressions, with the exception of one grade level regression this parameter was not statistically significant in any of the other grade regressions.

- Although the number of non-CSAP course offerings is not found to have a statistically significant relationship with performance for any of the grade level regressions, it did prove to be an important and positive indicator of performance when using the graduation rate as the measure of performance.

- Finally, the impact of the geographic environment of students does appear to be a statistically significant factor as it relates to student performance in math. This analysis used the Denver Metro setting as a base for comparison (in part because it has the largest enrollment) and the regression analysis indicates that the math performance for all other geographic settings (urban, city, town and rural) is greater than the math performance in Denver although the reading performance is only greater than Denver Metro's in the urban setting.

Student Performance Regression Results

Explanatory Variable	Performance Measure		
	CSAP - Proficient or Advanced		
	Reading All Grades	Math All Grades	Graduation Rate
Declining Enrollment District	NS[1]	NS	NS
Instructional Expenditures Per Pupil	0.07**	0.29**	NS
Total Funded Enrollment	NS	NS	NS
Charter Enrollment (%)	NS	NS	NS
Online Enrollment (%)	-0.14*	-0.24**	-0.60**
Incoming Enrollment (%)	NS	0.10*	NS
Outgoing Enrollment (%)	NS	0.12**	NS
At Risk (%)	-0.20**	-0.07*	NS
IEP (%)	-0.44**	-0.52**	NS
Fluent English Proficiency (%)	NS	NS	NS
Limited English Proficiency (%)	-0.12*	NS	NS
Not English Proficient (%)	-0.42**	NS	-1.79**
Gifted (%, program)	NS	NS	NS
Asian (%)	NS	1.19**	1.91**
Black (%)	-0.34**	-0.59**	NS
Hispanic (%)	-0.21**	-0.20**	NS
Native American (%)	-0.40**	-0.41**	NS
Females (%)	-0.14**	NS	NS
Average Teacher Salary	0.18**	0.36**	NS
Teacher Experience	NS	NS	NS
Teachers with MA Degree or Higher (%)	NS	NS	NS
Pupil-Teacher Ratio	NS	0.11**	NS
Number of Non-CSAP Offerings	NS	NS	0.12**
Density	NS	NS	NS
Population with Income > $75,000 (%)	NS	NS	NS
Population with College Education (%)	0.07*	NS	NS
Urban Setting	0.08**	0.15**	NS
City Setting	NS	0.09**	NS
Town Setting	NS	0.11**	NS
Rural Setting	NS	0.09*	NS
Intercept	-1.45**	-6.09**	NS
Number of Observations	1052	1048	353
R-Square	0.66	0.52	0.53

[1]NS indicates not significant at the 0.05 level; * and ** indicate significance at the 0.05 and 0.01 levels, respectively.

Descriptive Analysis of Potential Factors Affecting Student Performance

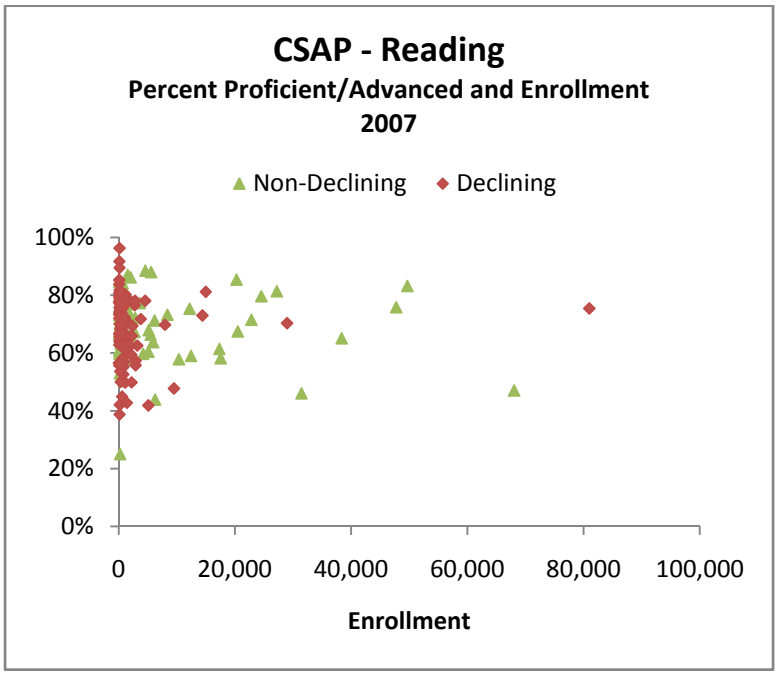
Regression analysis is a sophisticated statistical tool; however, the remainder of this chapter addresses the same issues and questions regarding student performance and financing but uses a descriptive statistic format. Although less precise, this format provides an alternative avenue to the understanding of the impact of declining enrollment and state financing on Colorado student performance.

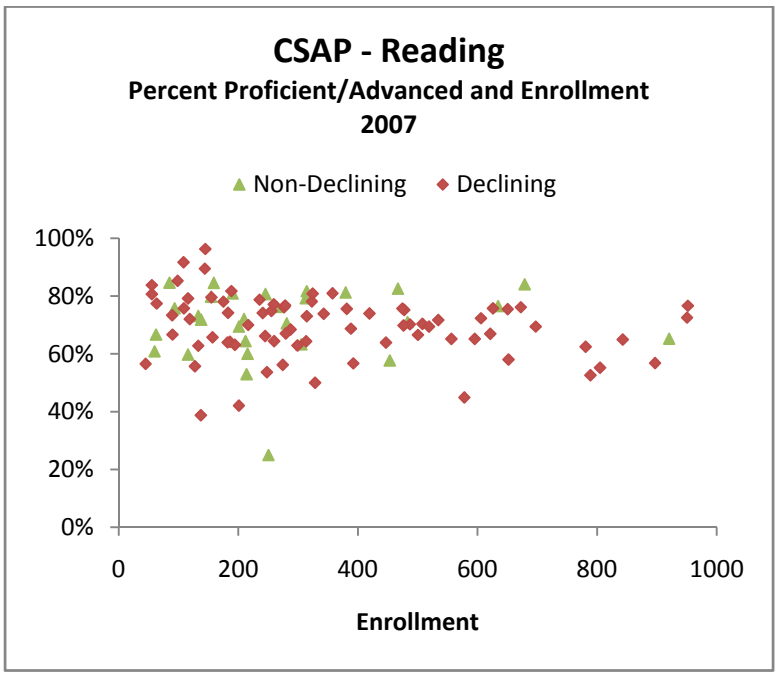
The graphs and charts on the following pages provide additional perspective on the relationship between student performance and enrollment.

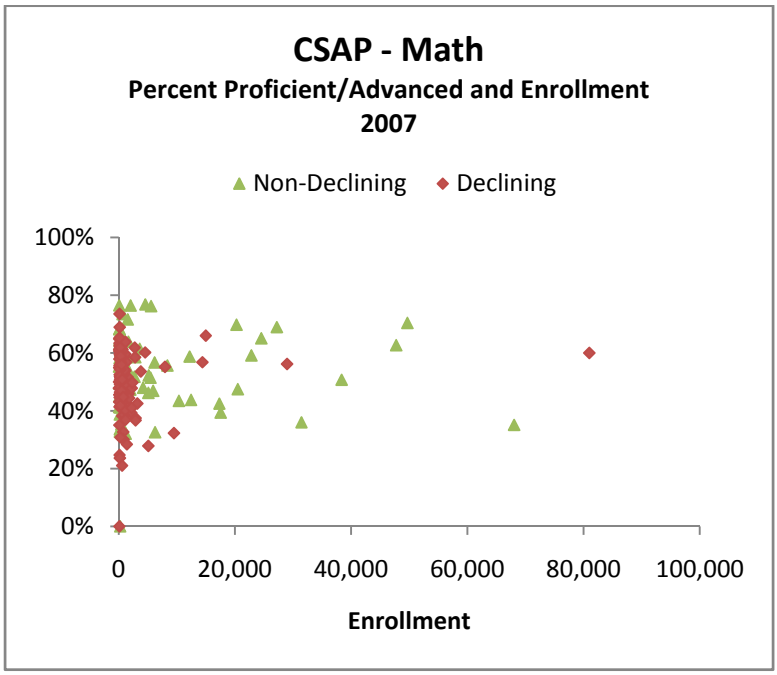
- The first scatterplots for both reading and math clusters all observations limiting any distinguishable information. The scatterplot below each of these focuses on enrollments up to 1,000 students which represents nearly two-thirds of the school districts in the state and provides more clear information regarding student performance for both declining and non-declining school districts. (Similar pattern for student performance exists for the larger enrollments but are not included on the following graphs.)

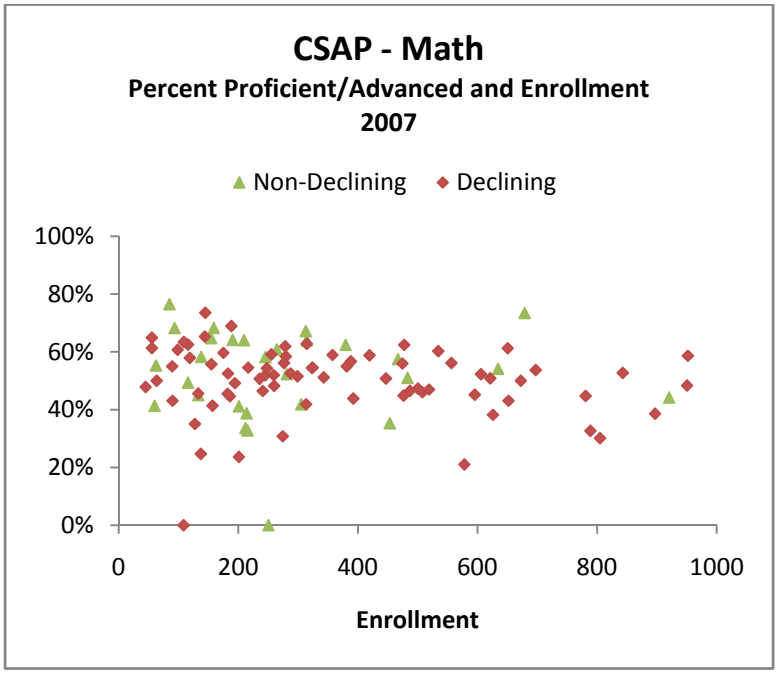
- The scatterplots demonstrate although there is some variation there is no trend in the student performance (CSAP scores) for reading or math across all enrollment levels irrespective of whether the school district is in a declining or non-declining enrollment environment.

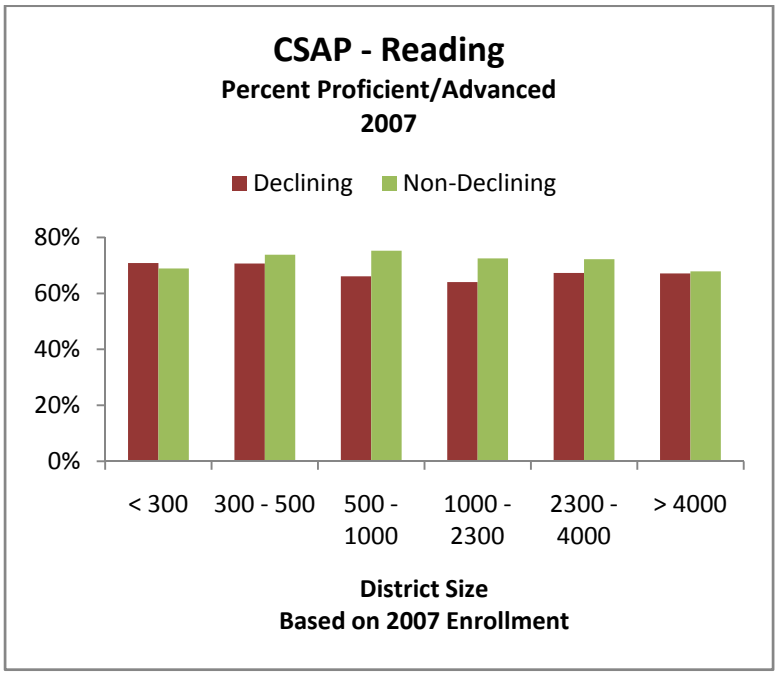
- The bar charts following the scatterplots suggest student performance across school district size or geographic setting is somewhat better for non-declining school districts; however, the regression analysis described earlier indicates this difference is not statistically significant when accounting for other factors.

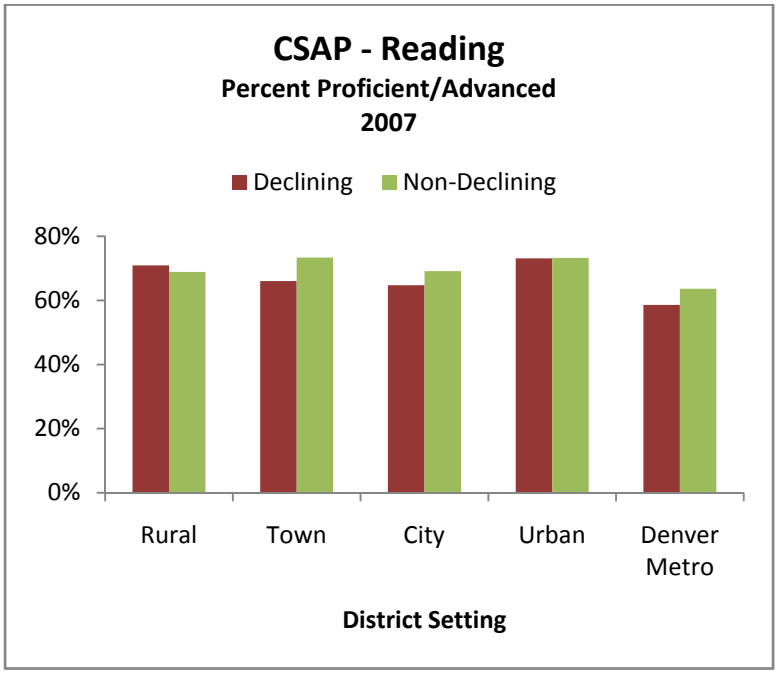

CSAP - Reading
Percent Proficient/Advanced and Enrollment
2007
Non-Declining
Declining
100%
80%
60%
40%
20%
0%
0
20,000
40,000
60,000
80,000
100,000
Enrollment

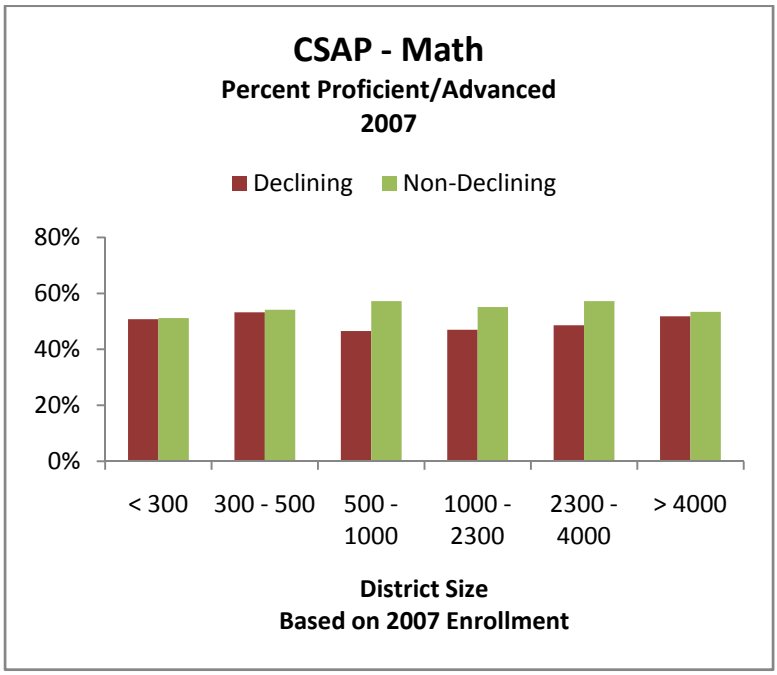

CSAP - Reading
Percent Proficient/Advanced and Enrollment
2007
Non-Declining
Declining
100%
80%
60%
40%
20%
0%
0
200
400
600
800
1000
Enrollment

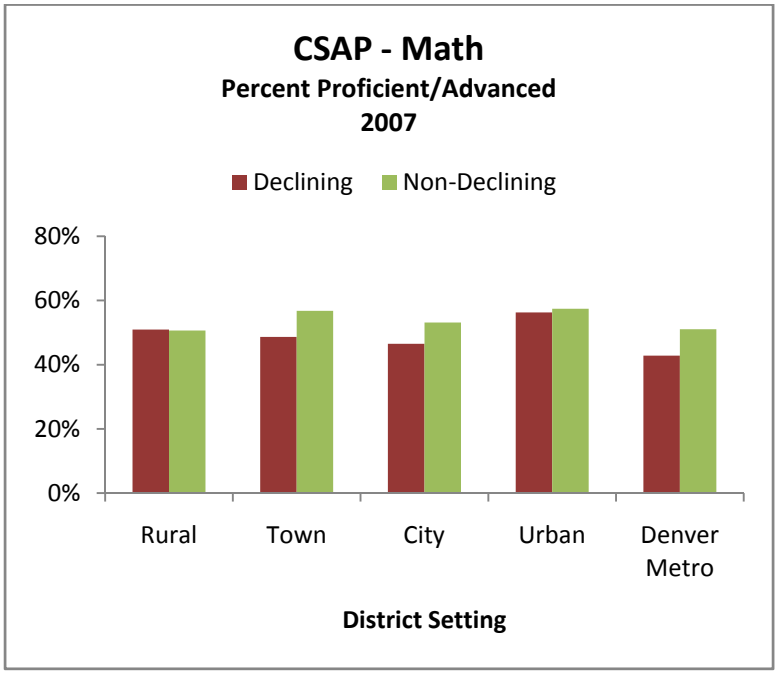

CSAP - Math
Percent Proficient/Advanced and Enrollment
2007
Non-Declining
Declining
100%
80%
60%
40%
20%
0%
0
20,000
40,000
60,000
80,000
100,000
Enrollment


CSAP - Math
Percent Proficient/Advanced and Enrollment
2007
Non-Declining
Declining
100%
80%
60%
40%
20%
0%
0
200
400
600
800
1000
Enrollment


CSAP - Reading
Percent Proficient/Advanced
2007
Declining
Non-Declining
80%
60%
40%
20%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


CSAP - Reading
Percent Proficient/Advanced
2007
Declining
Non-Declining
80%
60%
40%
20%
0%
Rural
Town
City
Urban
Denver Metro
District Setting


CSAP - Math
Percent Proficient/Advanced
2007
Declining
Non-Declining
80%
60%
40%
20%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


CSAP - Math
Percent Proficient/Advanced
2007
Declining
Non-Declining
80%
60%
40%
20%
0%
Rural
Town
City
Urban
Denver Metro
District Setting

School Districts and Enrollment

This section of the chapter provides an overview of three key identifying characteristics for declining and non-declining school districts across the state: the number of school districts, their enrollments, and the population densities. The following analysis evaluates expenditure patterns and revenue sources identifying any distinguishable differences for school districts with declining enrollment vis-à-vis school districts with non-declining enrollments, by size (enrollment) and geographic setting.[26]

While the first set of charts identify the number of school districts impacted by declining enrollments, the second set of charts offer information regarding the potential number of students affected by these enrollment declines. The third set of charts evaluate student population by square miles for school districts of different enrollment size and geographic setting to determine shifts in the number of students in declining enrollment environments. The following observations can be made regarding these school district characteristics.

- When comparing the total enrollment between academic years 2002-03 and 2007-08, 109 of the 177 school districts (again, without Vilas RE-5) experienced declining enrollments and the majority of school districts with declines are small enrollments (less than 1,000 students per district) and/or in rural or small town environments. There are also a number of larger school districts in the urban and Denver Metro area experiencing decreases in student enrollment.

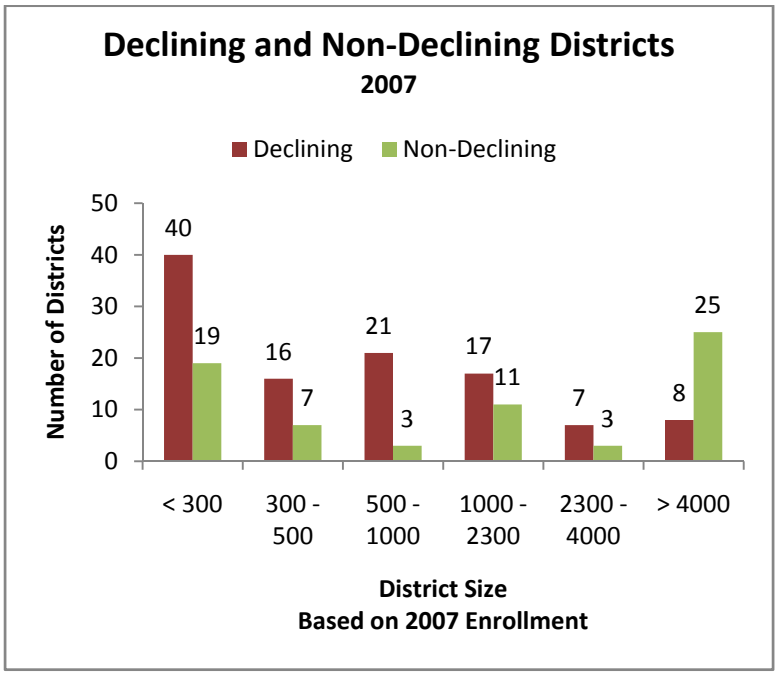
- Some 240,000 students in academic year 2007-08 are educated in declining enrollment districts and account for

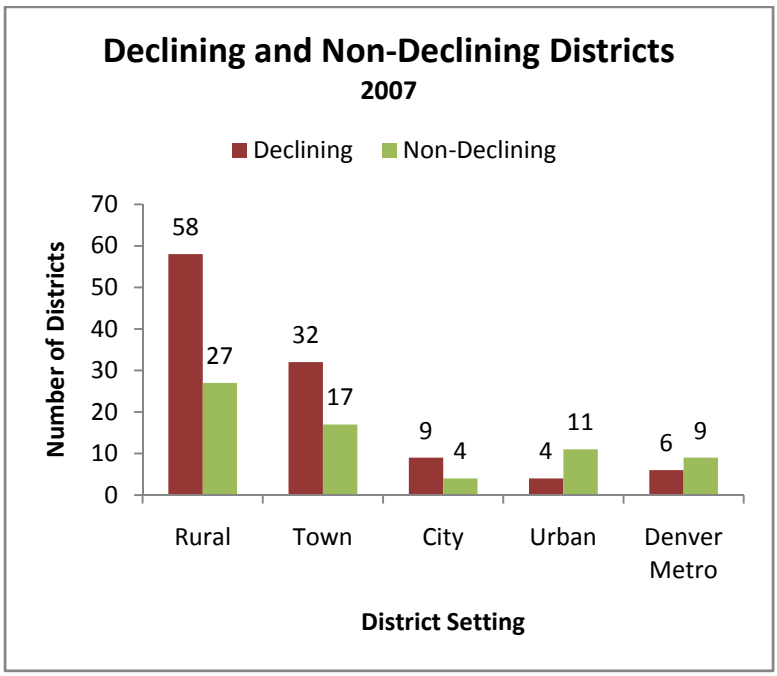
[26] School choice patterns across the different enrollment patterns will be noted in this section of the study but will be addressed in more detail in a later section of this report.

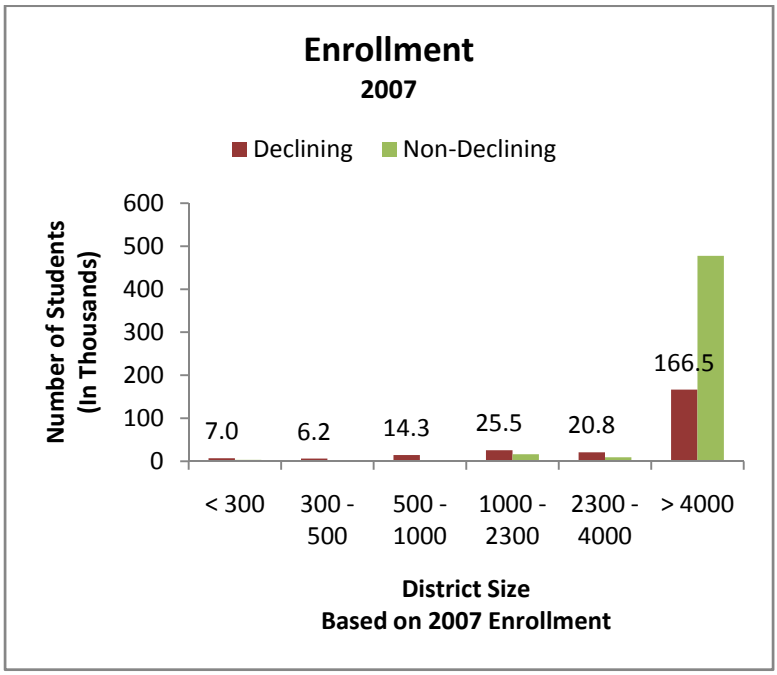
nearly a third of the overall state student population. Nearly 70% of the students in declining enrollment districts are in districts with more than 4,000 students. Approximately 30% percent of the students are in a similar declining enrollment environment in school districts of less than 4,000 students.

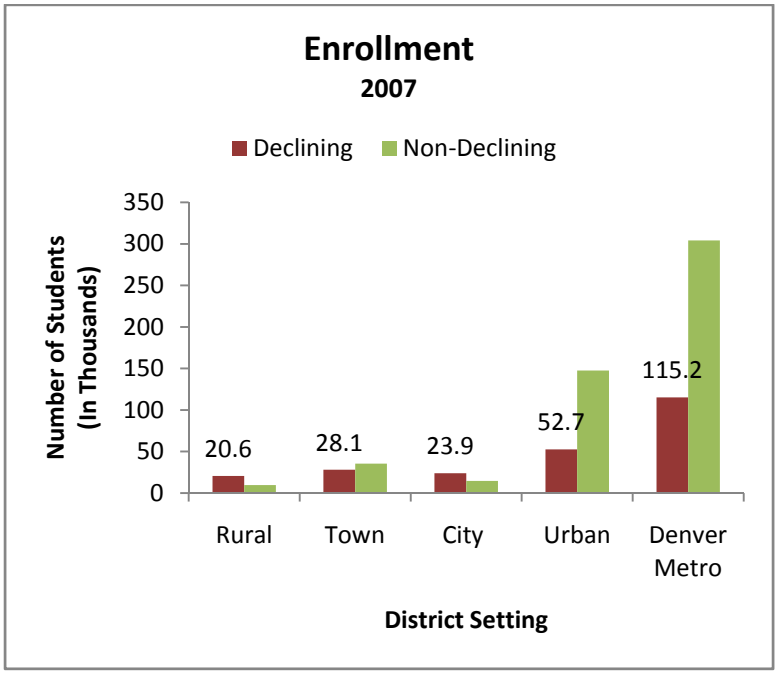
- In rural and less densely populated areas of the state a large number of the school districts are struggling with declining enrollment issues.

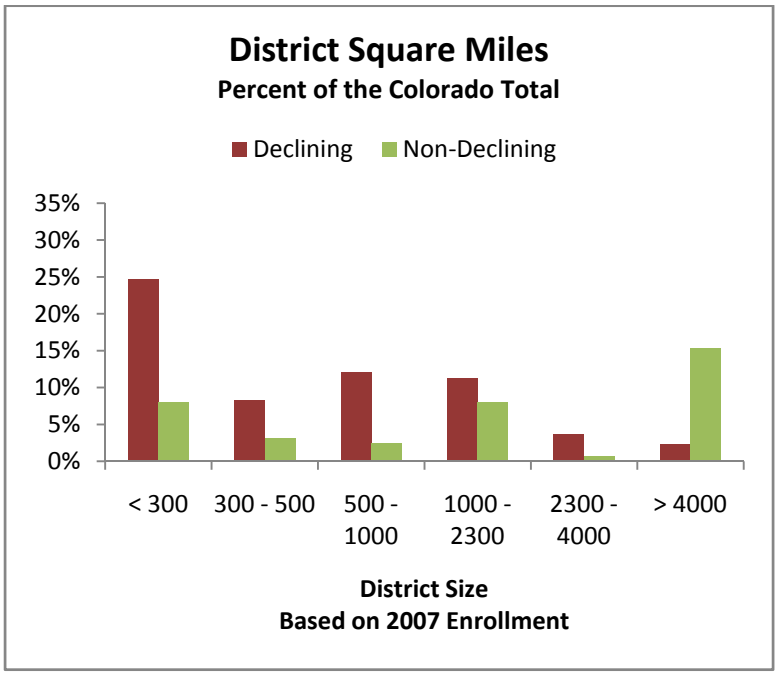
- Equally concerning is that there are approximately 167,000 students enrolled in urban and Denver Metro areas (and in school districts with more than 4,000 student enrollment) that are receiving educational services in districts with declining enrollment. While larger student bodies potentially offer greater flexibility to adjust, this large number of students may be impacted by declining enrollment issues in ways other than the student performance evaluated in this analysis.

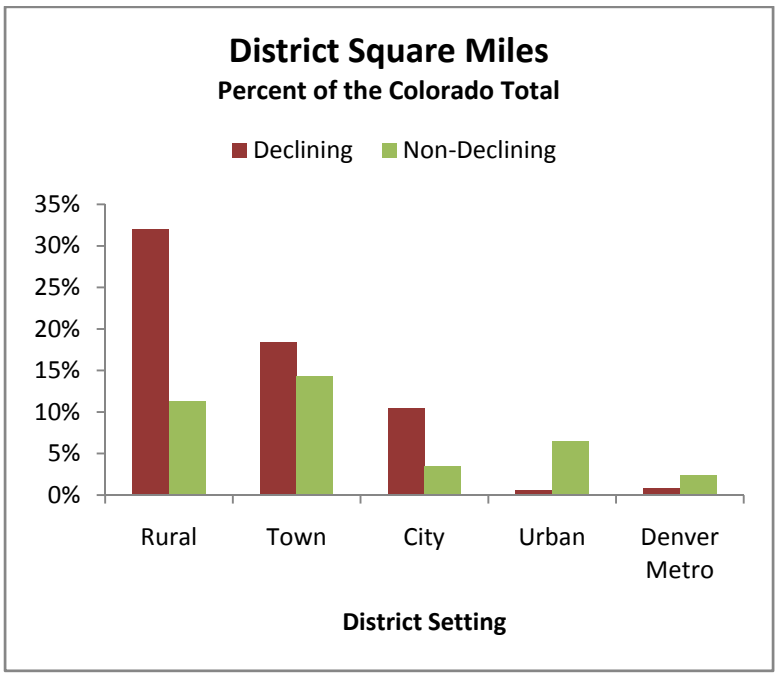

Declining and Non-Declining Districts
2007
Declining
Non-Declining
Number of Districts
50
40
30
20
10
0
40
19
16
7
21
3
17
11
7
3
8
25
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


Declining and Non-Declining Districts
2007
Declining
Non-Declining
Number of Districts
70
60
50
40
30
20
10
0
58
27
32
17
9
4
4
11
6
9
Rural
Town
City
Urban
Denver Metro
District Setting


Enrollment
2007
Declining
Non-Declining
Number of Students (In Thousands)
600
500
400
300
200
100
0
7.0
6.2
14.3
25.5
20.8
166.5
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


Enrollment
2007
Declining
Non-Declining
Number of Students (In Thousands)
350
300
250
200
150
100
50
0
20.6
28.1
23.9
52.7
115.2
Rural
Town
City
Urban
Denver Metro
District Setting


District Square Miles
Percent of the Colorado Total
Declining
Non-Declining
35%
30%
25%
20%
15%
10%
5%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


District Square Miles
Percent of the Colorado Total
Declining
Non-Declining
35%
30%
25%
20%
15%
10%
5%
0%
Rural
Town
City
Urban
Denver Metro
District Setting

Expenditures

The charts on the following pages identify the allocation by major expenditure categories for school districts with and without declining enrollments, initially by school district size followed by the geographic setting of the school district.

- The allocation of the expenditures by major categories is extraordinarily similar for all school districts, irrespective of school district size or setting or whether the school district is in a declining or non-declining enrollment environment.

- The academic year 2002-03 (charts not included) shows no discernable difference in the budget allocation, again irrespective of size or setting or whether the school district is in a declining or non-declining enrollment environment.

- The percent change in per pupil expenditures between academic years 2002-03 and 2007-08 provides a different perspective where the small enrollment and rural and town school districts in a non-declining enrollment are falling behind (on a percent basis) from their declining enrollment counterparts. Interestingly, the larger school districts and Denver Metro schools with non-declining enrollment have been spending greater amounts relative to their similarly situated declining enrollment school district.

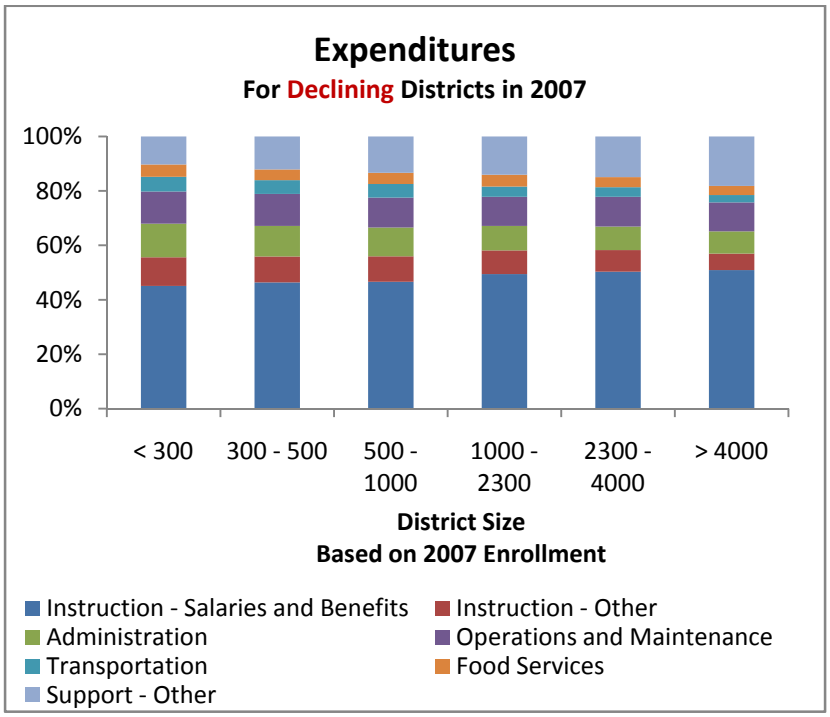
- Instructional share, the percent of the budget school districts spend for instructional purposes, continue to indicate little or no budget allocation differences across school districts.

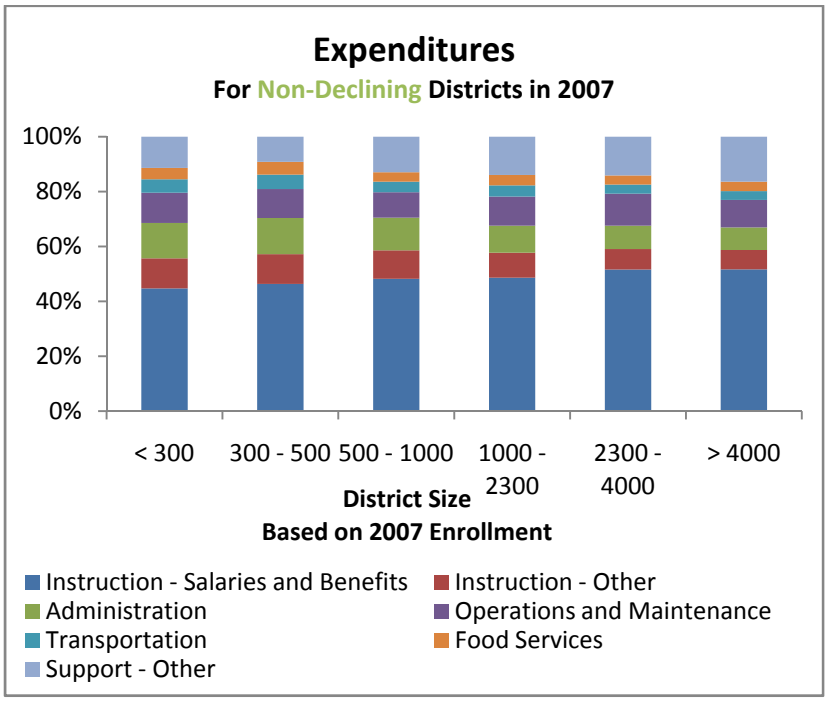
- However, the percent change in per pupil instructional expenditures tells a somewhat different story where small and rural school districts with non-declining enrollment are not keeping up with inflationary increases. [Of note, this reduction may be due to opportunities to increase the pupil teacher ratio, decrease salary and benefit due to turnover and/or lower funding restraints.] Non-declining large enrollment and Denver Metro school districts expend more relative to other school districts and substantially in excess of inflation.

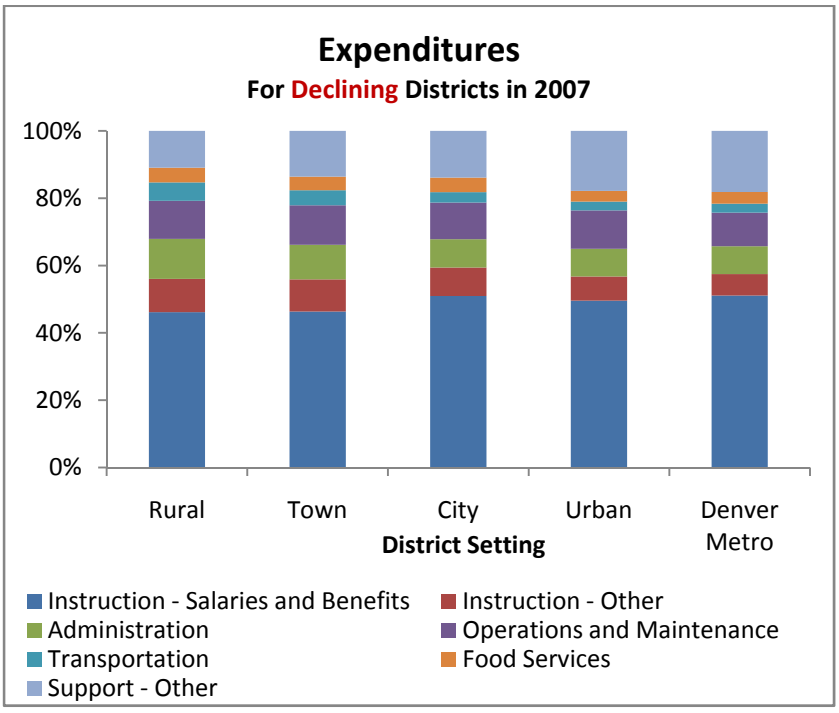
- The administration share of expenditures for school districts with declining enrollments tends to be a slightly smaller than their non-declining enrollment counterparts. The large enrollment and urban or Denver Metro school districts expend a somewhat smaller percent of the overall budget for administration purposes, but such a reduction does not necessarily imply more efficiency.

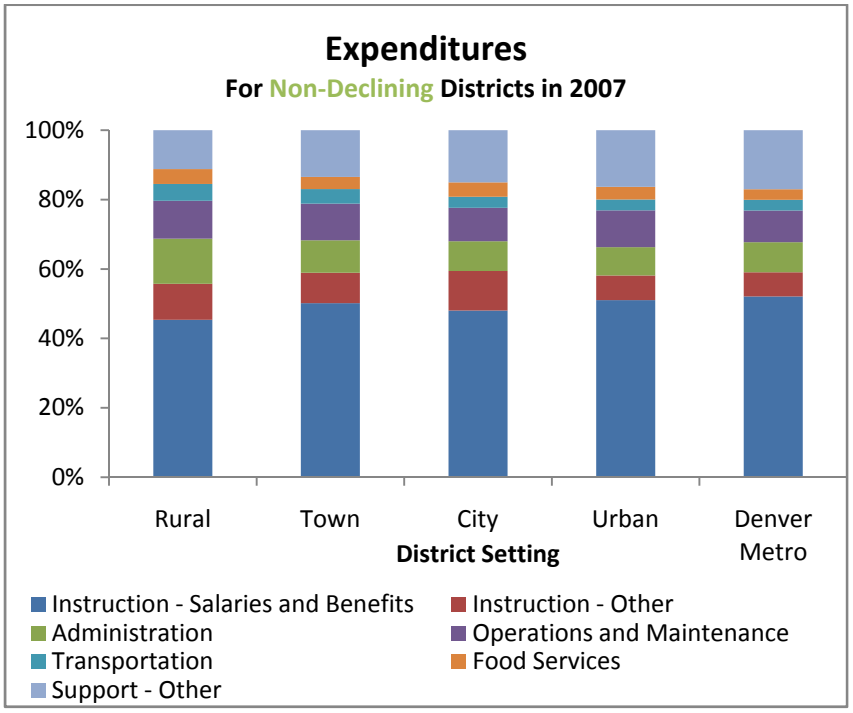
- For example, when evaluating administration expenditures per teacher FTE (for reasons discussed in the earlier chapter) finds school districts with non-declining enrollments across all size categories incurred greater expenditures (with the exception of the 2,300 to 4,000 size category). However, by geographic setting, where expenditure shares are relatively similar expenditures per teacher FTE show more variation.

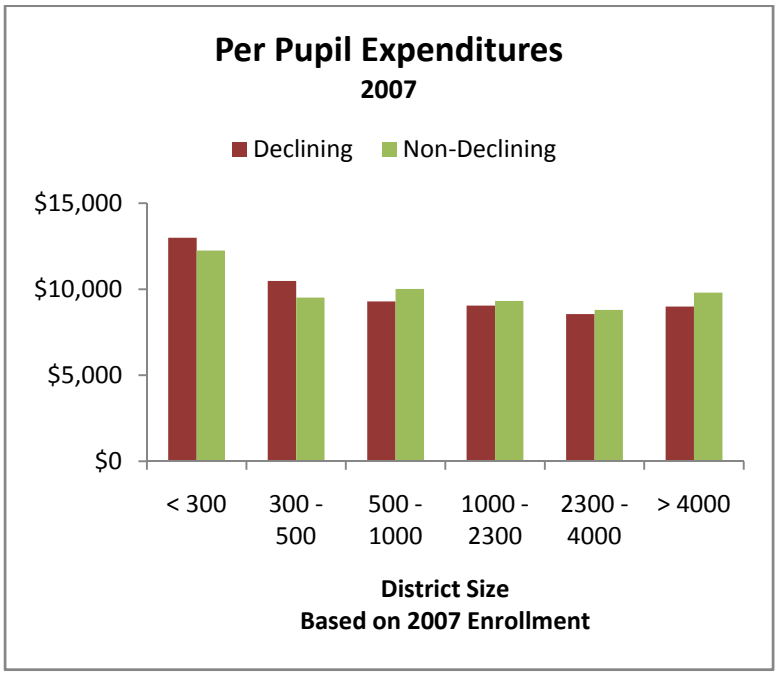
- Finally, the percent change in administration expenditures per teacher full-time equivalent (FTE) has no identifiable trend although non-declining school districts of 4,000 students or greater or the Denver Metro area have surprisingly large increases.

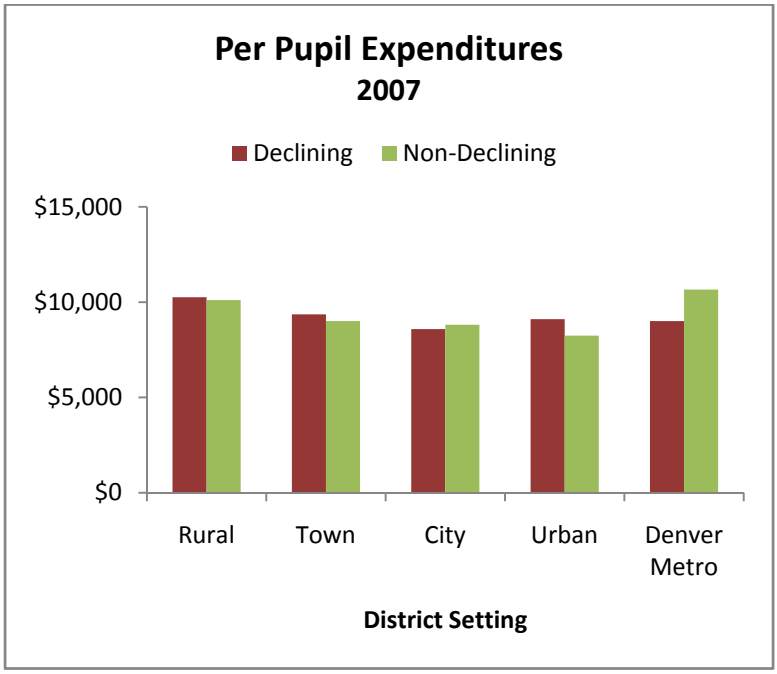

Expenditures
For Declining Districts in 2007
100%
80%
60%
40%
20%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment
Instruction - Salaries and Benefits
Instruction - Other
Administration
Operations and Maintenance
Transportation
Food Services
Support - Other

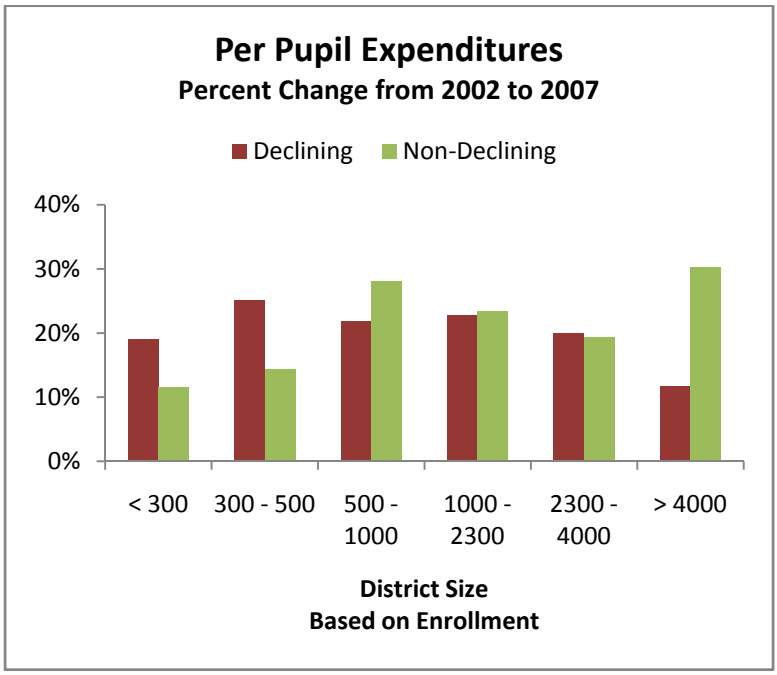

Expenditures
For Non-Declining Districts in 2007
100%
80%
60%
40%
20%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment
Instruction - Salaries and Benefits
Instruction - Other
Administration
Operations and Maintenance
Transportation
Food Services
Support - Other

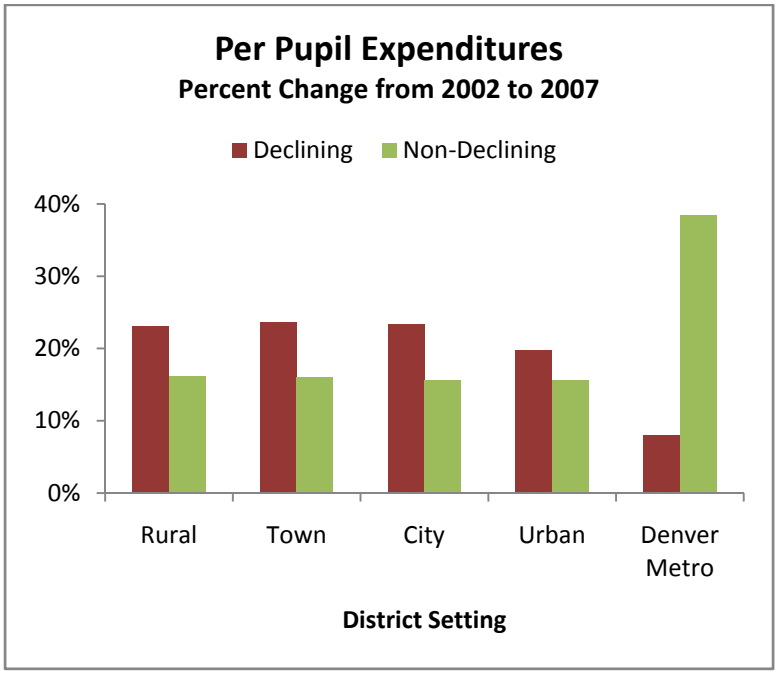

Expenditures
For Declining Districts in 2007
100%
80%
60%
40%
20%
0%
Rural
Town
City
Urban
Denver Metro
District Setting
Instruction - Salaries and Benefits
Instruction - Other
Administration
Operations and Maintenance
Transportation
Food Services
Support - Other

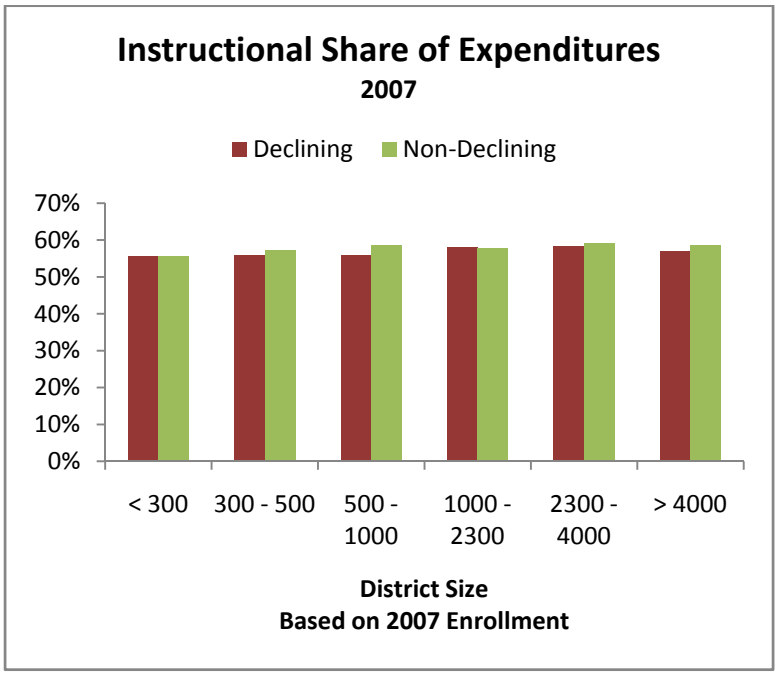

Expenditures
For Non-Declining Districts in 2007
100%
80%
60%
40%
20%
0%
Rural
Town
City
Urban
Denver Metro
District Setting
Instruction - Salaries and Benefits
Instruction - Other
Administration
Operations and Maintenance
Transportation
Food Services
Support - Other

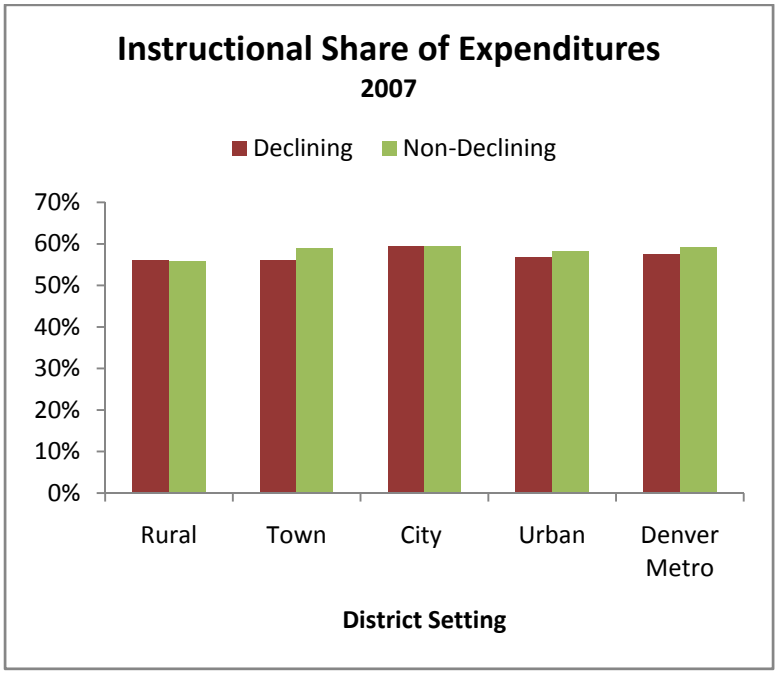

Per Pupil Expenditures
2007
Declining
Non-Declining
$15,000
$10,000
$5,000
$0
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment

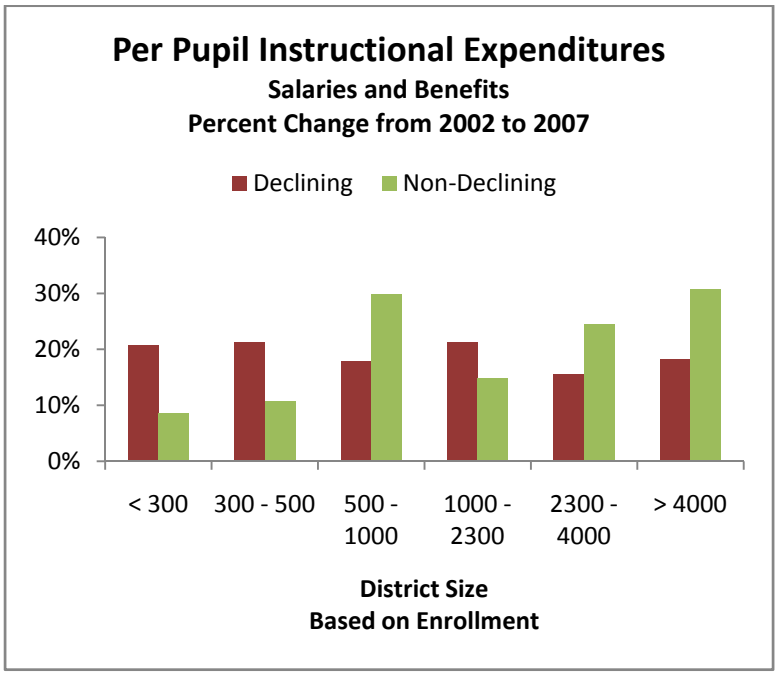

Per Pupil Expenditures
2007
Declining
Non-Declining
$15,000
$10,000
$5,000
$0
Rural
Town
City
Urban
Denver Metro
District Setting

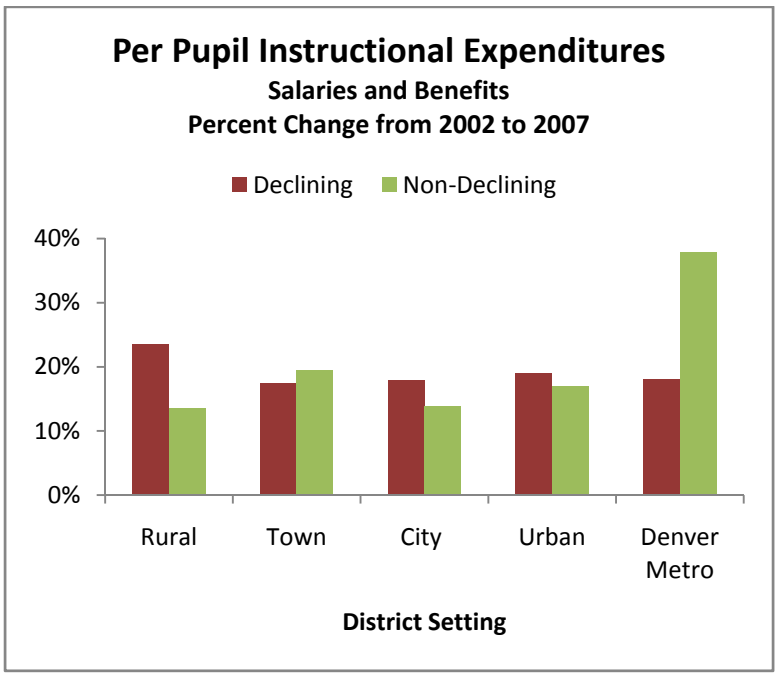

Per Pupil Expenditures
Percent Change from 2002 to 2007
Declining
Non-Declining
40%
30%
20%
10%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on Enrollment

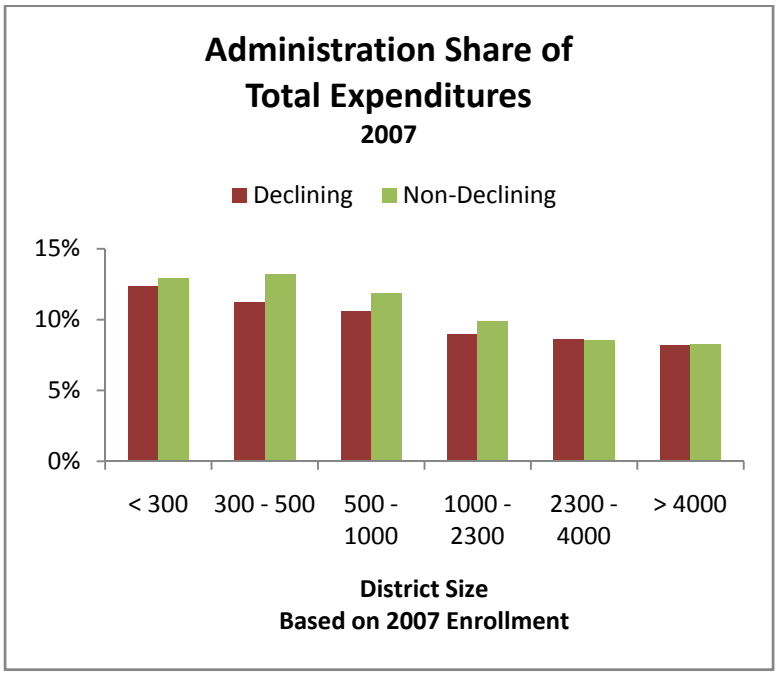

Per Pupil Expenditures
Percent Change from 2002 to 2007
Declining
Non-Declining
40%
30%
20%
10%
0%
Rural
Town
City
Urban
Denver Metro
District Setting

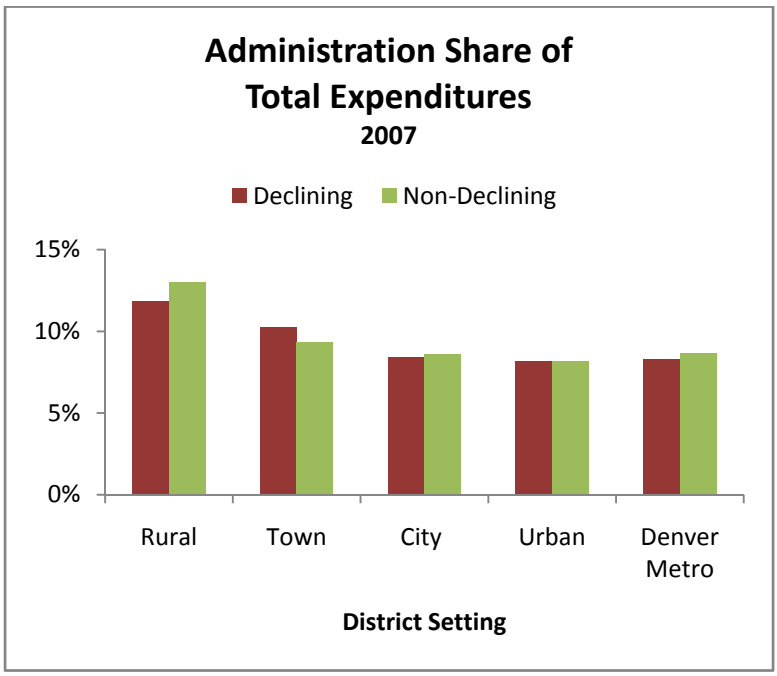

Instructional Share of Expenditures
2007
Declining
Non-Declining
70%
60%
50%
40%
30%
20%
10%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment

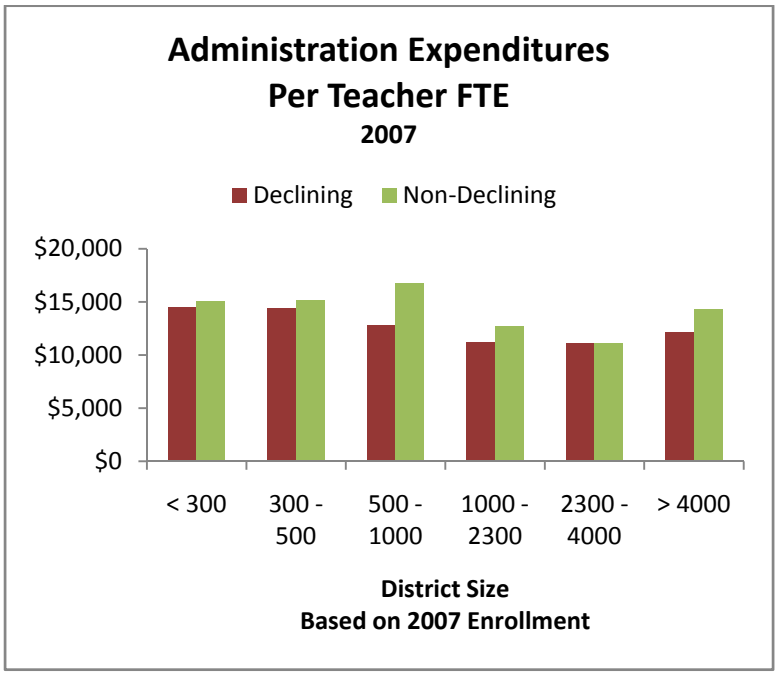

Instructional Share of Expenditures
2007
Declining
Non-Declining
70%
60%
50%
40%
30%
20%
10%
0%
Rural
Town
City
Urban
Denver Metro
District Setting

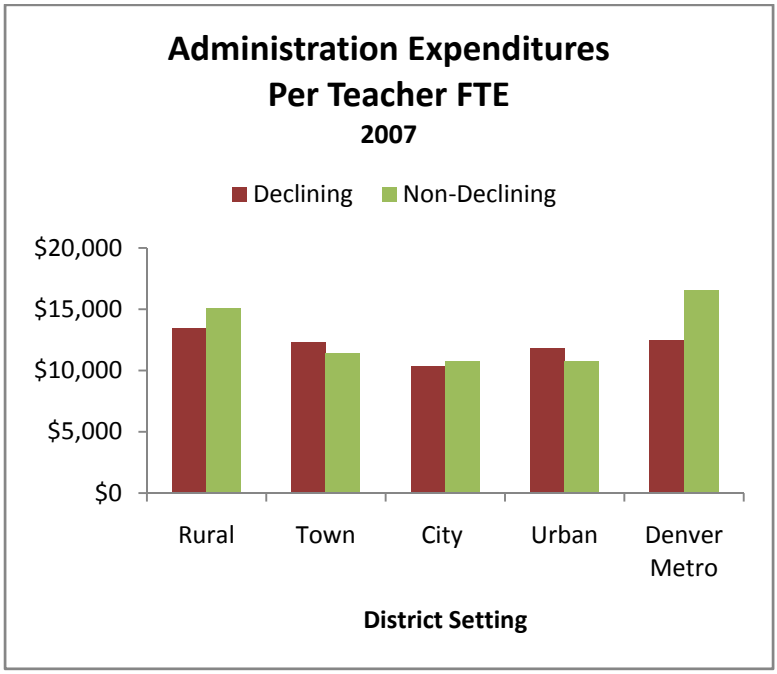

Per Pupil Instructional Expenditures
Salaries and Benefits
Percent Change from 2002 to 2007
Declining
Non-Declining
40%
30%
20%
10%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on Enrollment

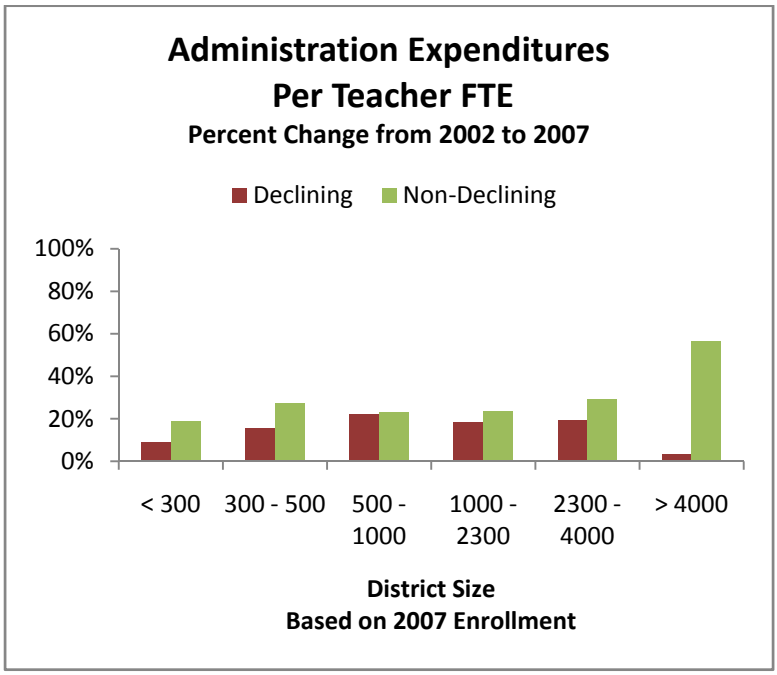

Per Pupil Instructional Expenditures
Salaries and Benefits
Percent Change from 2002 to 2007
Declining
Non-Declining
40%
30%
20%
10%
0%
Rural
Town
City
Urban
Denver Metro
District Setting

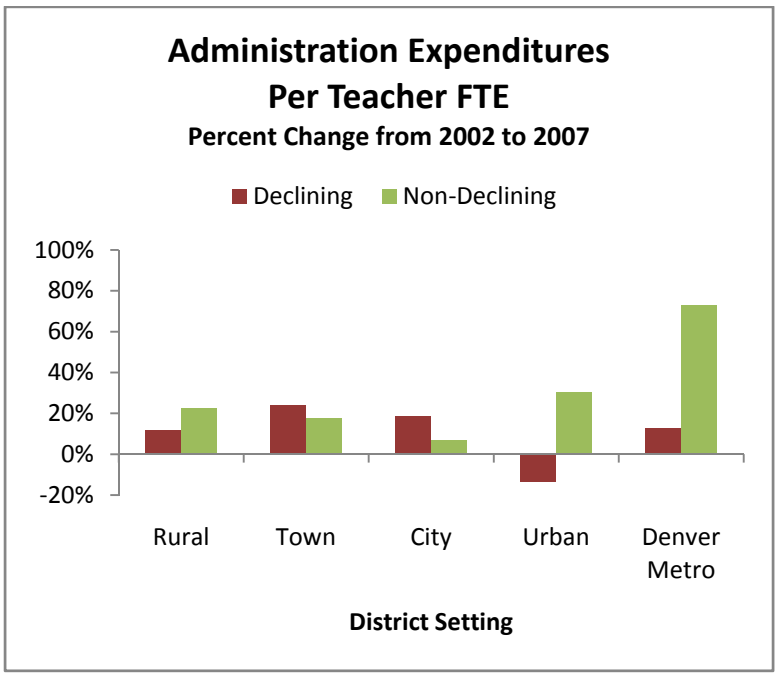

Administration Share of
Total Expenditures
2007
Declining
Non-Declining
15%
10%
5%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based based on 2007 Enrollment


Administration Share of
Total Expenditures
2007
Declining
Non-Declining
15%
10%
5%
0%
Rural
Town
City
Urban
Denver Metro
District Setting


Administration Expenditures
Per Teacher FTE
2007
Declining
Non-Declining
$20,000
$15,000
$10,000
$5,000
$0
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


Administration Expenditures
Per Teacher FTE
2007
Declining
Non-Declining
$20,000
$15,000
$10,000
$5,000
$0
Rural
Town
City
Urban
Denver Metro
District Setting


Administration Expenditures
Per Teacher FTE
Percent Change from 2002 to 2007
Declining
Non-Declining
100%
80%
60%
40%
20%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


Administration Expenditures
Per Teacher FTE
Percent Change from 2002 to 2007
Declining
Non-Declining
100%
80%
60%
40%
20%
0%
-20%
Rural
Town
City
Urban
Denver Metro
District Setting

Student Characteristics

In the mission of educating the student population, both school educators and school policymakers recognize certain demographic and socioeconomic characteristics can limit or impact student performance. At least one of these factors, the presence of at-risk students in the school district is incorporated into the funding formula to provide additional monies for program costs. Additional monies for school districts, referred to in the educational arena as state categoricals, are provided by the state primarily for students with limited English language skills (ELL), special education needs or special provisions for the gifted and talented.

The provision of these state monies is based on specific student need characteristics (not on full enrollment counts) and also is not fully funded (i.e., the distribution of extra monies by the state for these students does not fully fund the extra program needs for these students). There is an impact on school district budgets and ultimately a potential impact on student performance, although the regression analysis addressed earlier in this chapter should provide some comfort to officials and educators that the findings indicate declining enrollments *per se* has no statistically significant impact on student performance. However, the regression analysis did identify certain student attributes, specifically students at-risk, students with special needs, be they of learning limitations or gifted talents, do require additional attention. Importantly, the regression further established that the school district size or setting has no (statistically significant) impact on the student performance of students irrespective of attributes. The following charts provide some descriptive statistics in support of these findings.

These demographic and socioeconomic factors and their potential impact on school districts (with and without declining enrollments) are discussed below. The supporting charts identify students who are considered at-risk, English Language Learners (ELL), require special education needs, or are gifted and talented.

- The percent of at-risk students is higher in declining school districts relative to non-declining school districts for all size and nearly all setting categories. This is an interesting trend and, upon more detailed inspection (discussed later in this report), appears to be attributable to a number of factors, including school choice and/or in-migration.

- Importantly, at-risk, whether defined as only free lunch as calculated in the Colorado public school funding formula or also including reduced lunch (more consistent with the actual delivery of these services to the students), has increased over the six years considered in this analysis for school districts of all enrollment size and settings and also irrespective of declining and non-declining enrollment status (the academic year 2002-03 charts are not included).

- Interestingly, students at-risk (by free and reduced lunch counts) generally account for as much as 30% to 50% of the school districts with declining enrollment while, generally, non-declining enrollment school districts have a lower percent of at-risk students. The regression analysis indicates such attributes put increased pressure on teachers to meet student performance levels.

- Since academic year 2002-03, the enrollment of at-risk students (by free and reduced lunch counts) has increased for all school district sizes and settings by 2007-08. (The academic year 2002-03 charts are not included).

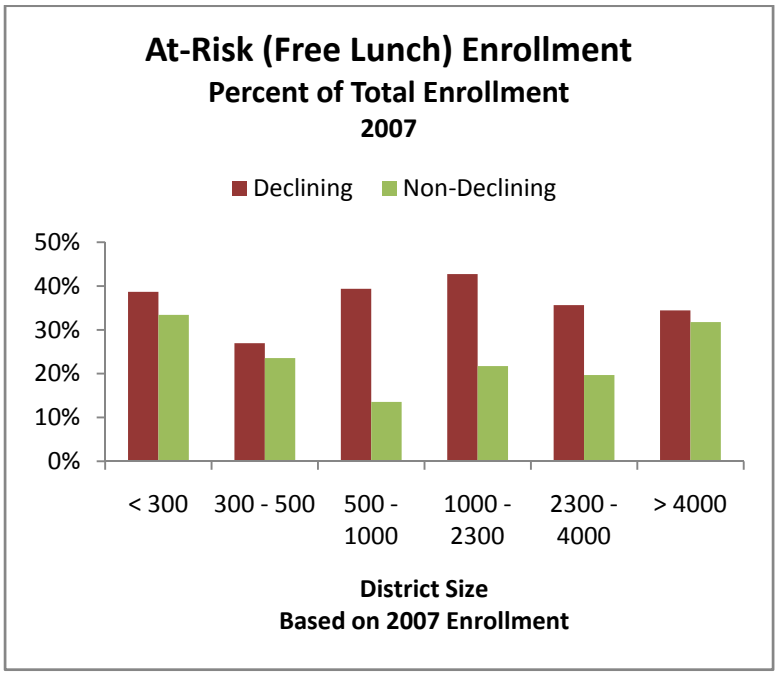
- Under the English Language Proficiency Act (ELPA), school districts are required to provide programs to improve the language skills of students who are determined to be

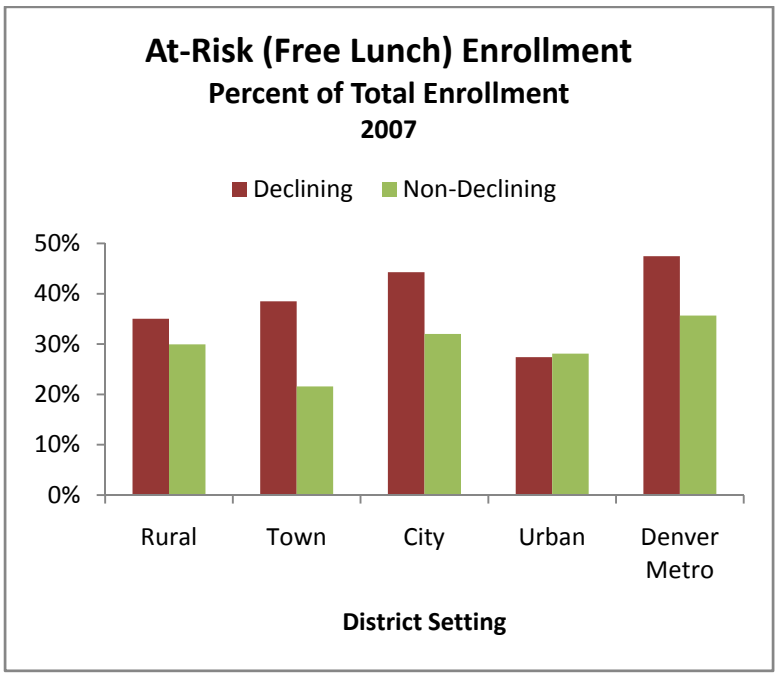
English Language Learners (ELL). The data indicate no trend associated with ELL between declining versus non-declining districts, although there is some nominal variation across academic years 2002-03 (chart not shown) and 2007-08.

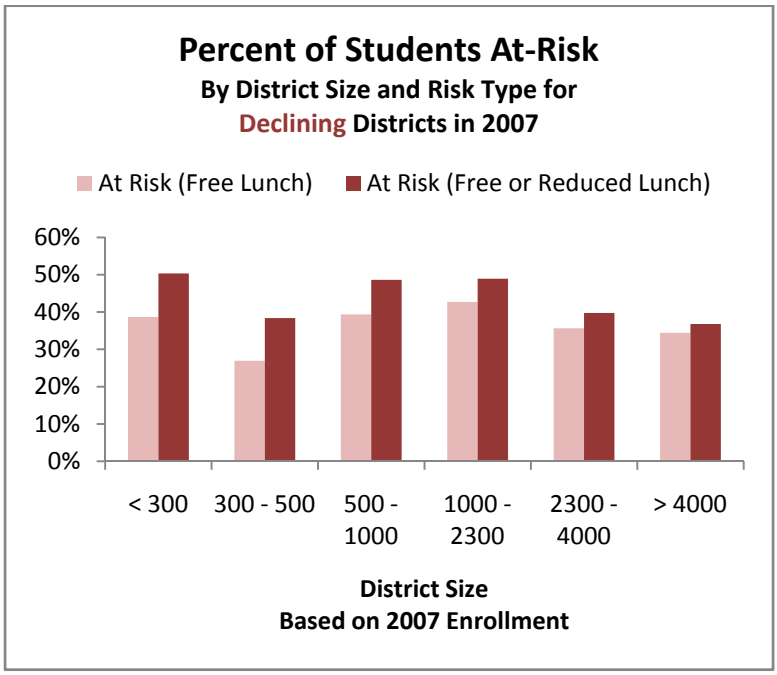
- School districts are also required to provide educational services to children who need and/or are eligible for special education. These include children for whom an individual education plan (IEP) has been created, recognizing these needs can range from minor needs to more severe learning issues.

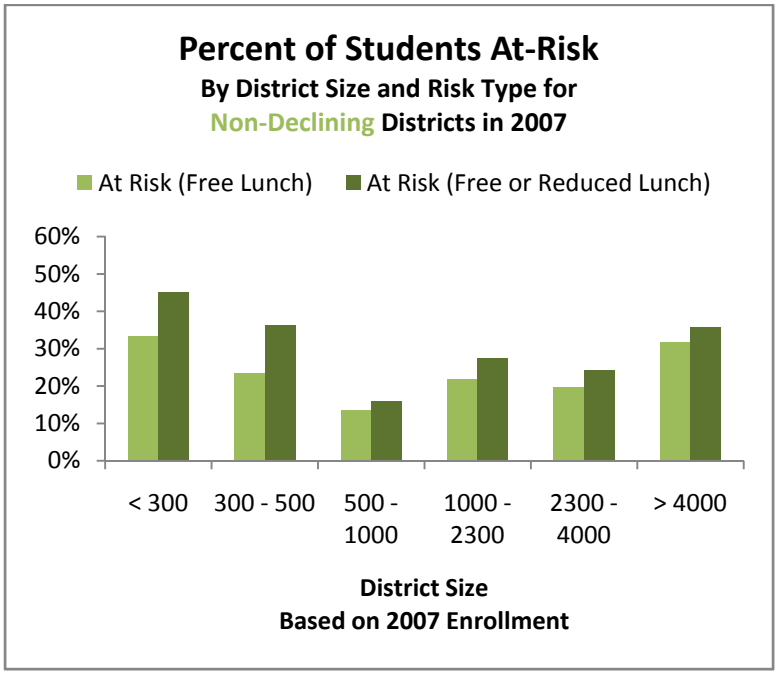
    - In nearly all of the school district size and setting categories, the percent of special education enrollment is greater in the districts with declining enrollments relative to the districts with non-declining enrollments.

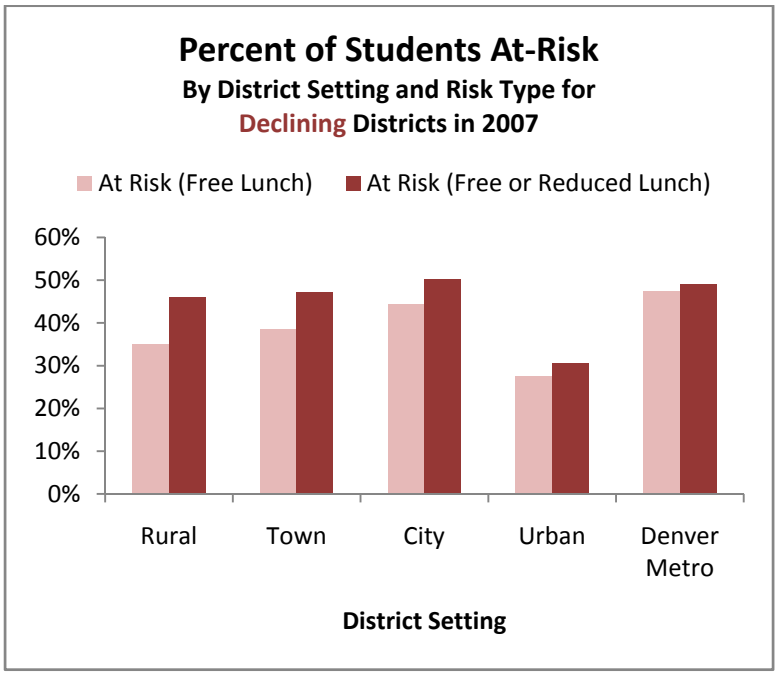
- No discernible pattern for gifted and talented exists by any school district characteristic (declining/non-declining and size or setting).

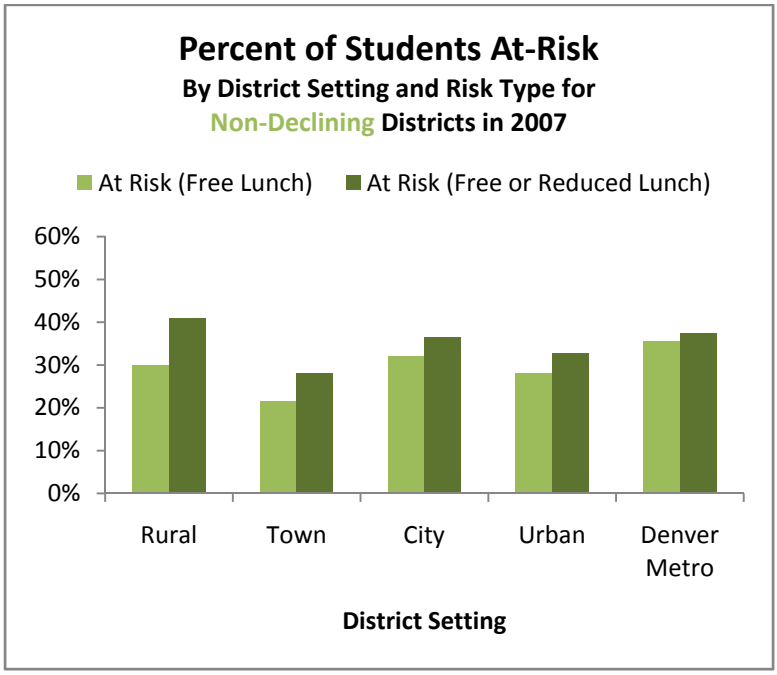

At-Risk (Free Lunch) Enrollment
Percent of Total Enrollment
2007
Declining
Non-Declining
50%
40%
30%
20%
10%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment

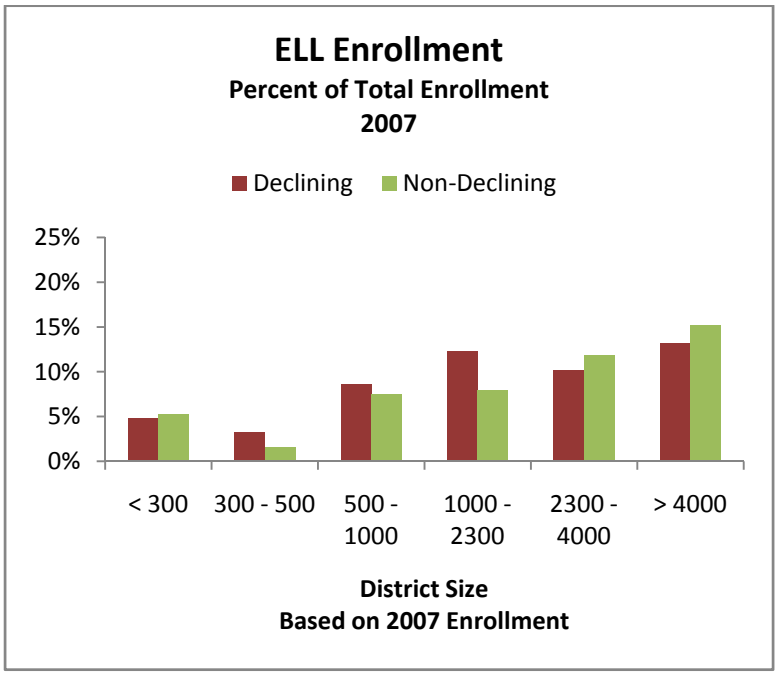

At-Risk (Free Lunch) Enrollment
Percent of Total Enrollment
2007
Declining
Non-Declining
50%
40%
30%
20%
10%
0%
Rural
Town
City
Urban
Denver Metro
District Setting

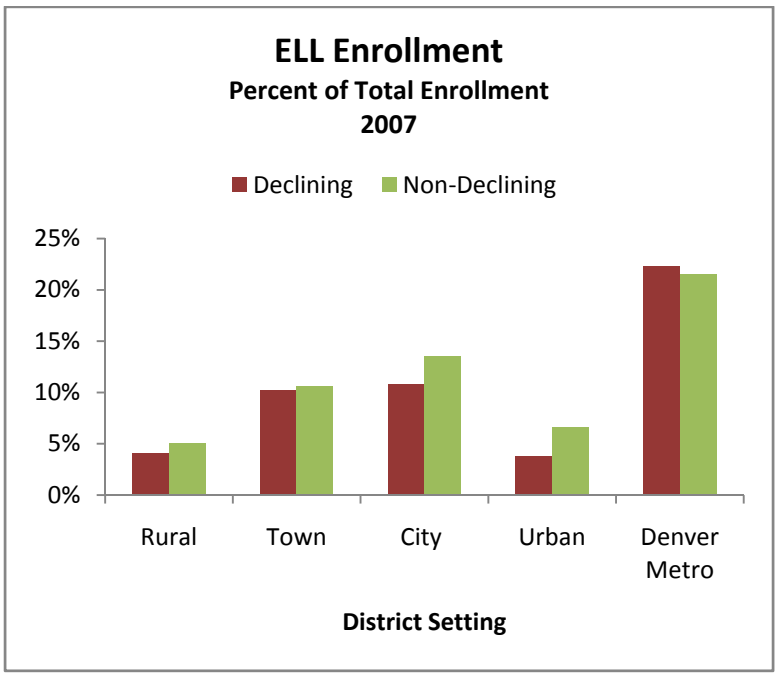

Percent of Students At-Risk
By District Size and Risk Type for
Declining Districts in 2007
At Risk (Free Lunch)
At Risk (Free or Reduced Lunch)
60%
50%
40%
30%
20%
10%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment

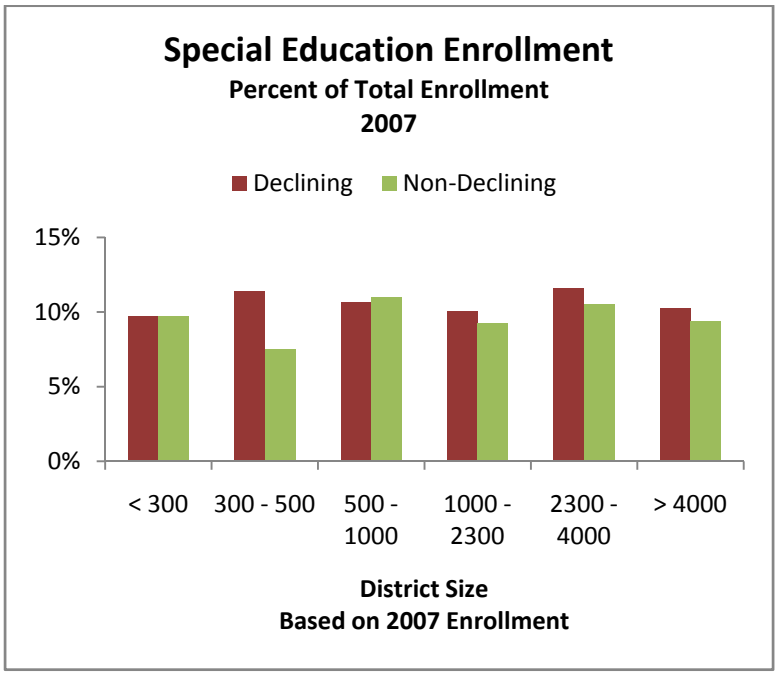

Percent of Students At-Risk
By District Size and Risk Type for
Non-Declining Districts in 2007
At Risk (Free Lunch)
At Risk (Free or Reduced Lunch)
60%
50%
40%
30%
20%
10%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment

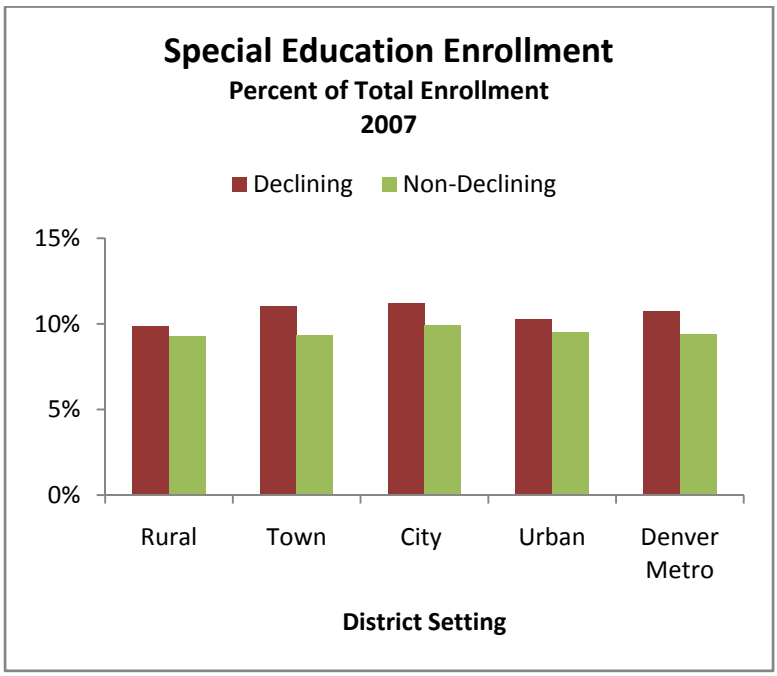

Percent of Students At-Risk
By District Setting and Risk Type for
Declining Districts in 2007
At Risk (Free Lunch)
At Risk (Free or Reduced Lunch)
60%
50%
40%
30%
20%
10%
0%
Rural
Town
City
Urban
Denver Metro
District Setting

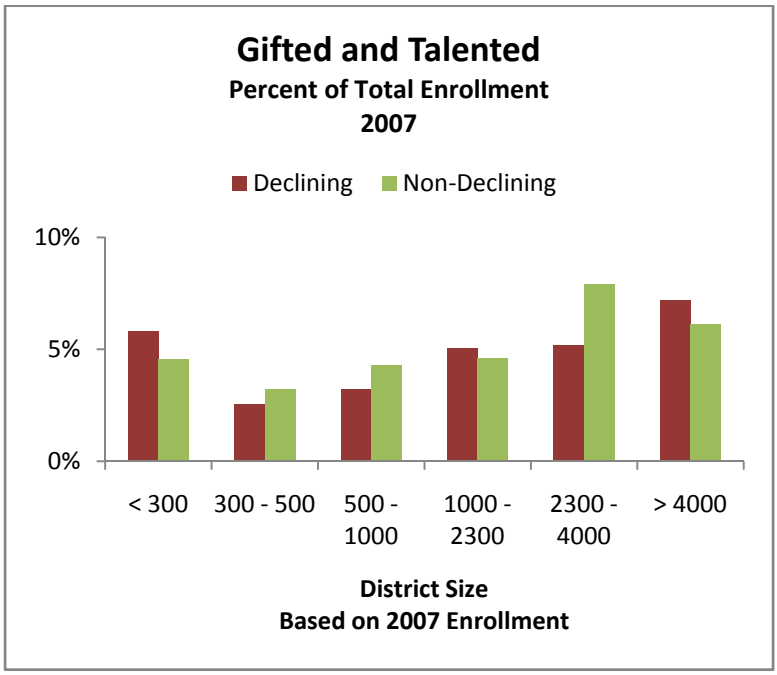

Percent of Students At-Risk
By District Setting and Risk Type for
Non-Declining Districts in 2007
At Risk (Free Lunch)
At Risk (Free or Reduced Lunch)
60%
50%
40%
30%
20%
10%
0%
Rural
Town
City
Urban
Denver Metro
District Setting

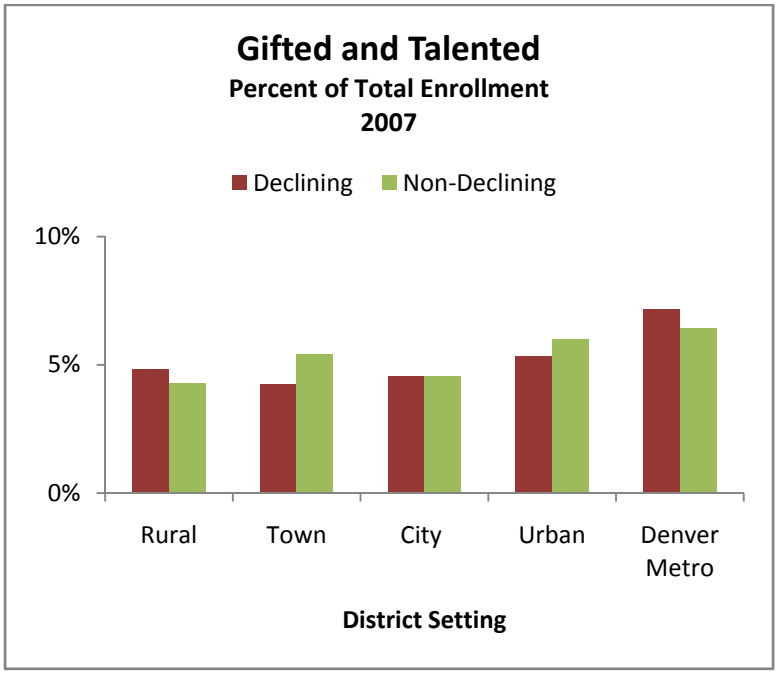

ELL Enrollment
Percent of Total Enrollment
2007
Declining
Non-Declining
25%
20%
15%
10%
5%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


ELL Enrollment
Percent of Total Enrollment
2007
Declining
Non-Declining
25%
20%
15%
10%
5%
0%
Rural
Town
City
Urban
Denver Metro
District Setting


Special Education Enrollment
Percent of Total Enrollment
2007
Declining
Non-Declining
15%
10%
5%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


Special Education Enrollment
Percent of Total Enrollment
2007
Declining
Non-Declining
15%
10%
5%
0%
Rural
Town
City
Urban
Denver Metro
District Setting


Gifted and Talented
Percent of Total Enrollment
2007
Declining
Non-Declining
10%
5%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


Gifted and Talented
Percent of Total Enrollment
2007
Declining
Non-Declining
10%
5%
0%
Rural
Town
City
Urban
Denver Metro
District Setting

Revenue Sources

As noted earlier, there are three major sources of financing for Colorado public elementary and secondary schools: local, state, and federal. The contributions by differing revenue sources are described below with the supporting charts provided on the pages following these findings.

- When evaluating the revenue sources for financing of Colorado public elementary and secondary schools by declining and non-declining school district enrollments, the mid-size (by enrollment) non-declining school districts have more local revenue support and relatively smaller provision of monies from state and federal government sources.

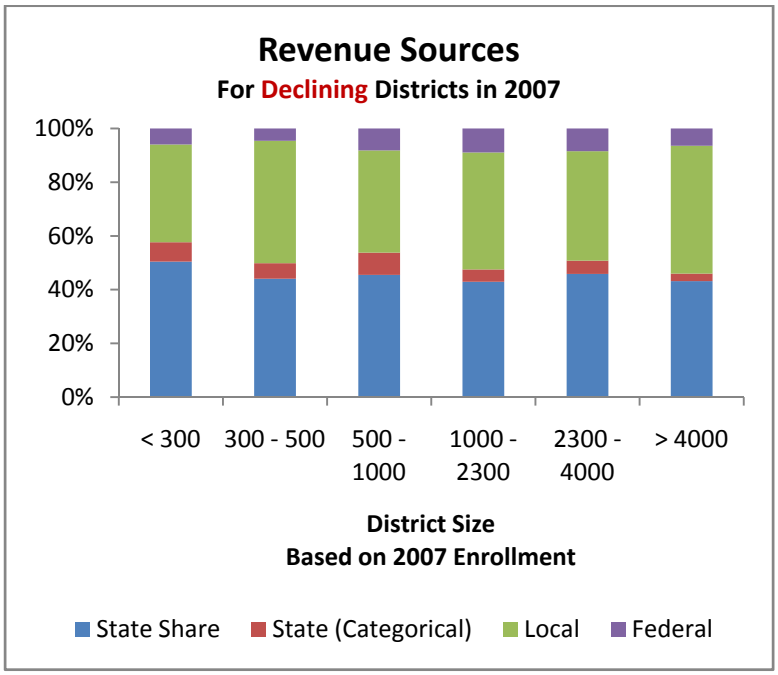
- Not surprisingly, school districts with less than 500 students and rural setting districts receive more state and federal support.

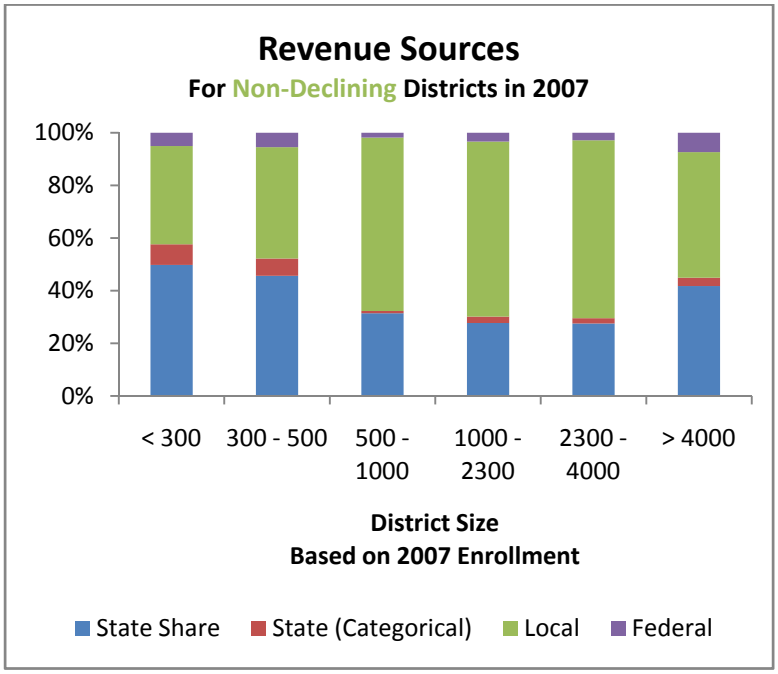
- From the data reviewed, districts receiving more limited state and federal support are non-declining school districts with mid-size enrollments (500 to 2,300 students) and towns or cities.

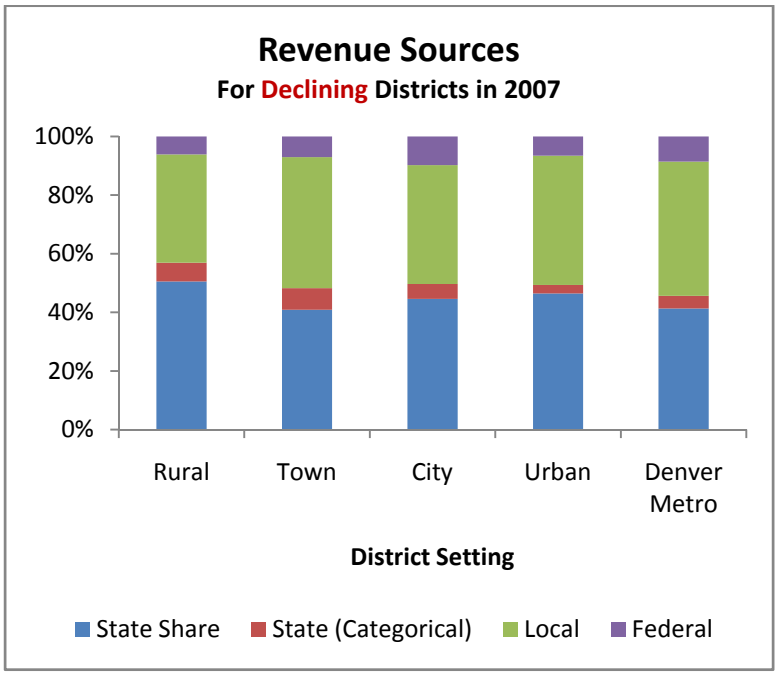
- When evaluating average total program mill levy rates, generally declining school districts have somewhat greater rates than their non-declining counterparts, whether it is a district size or setting criteria. A similar trend is found when evaluating the average total mill levy rates.

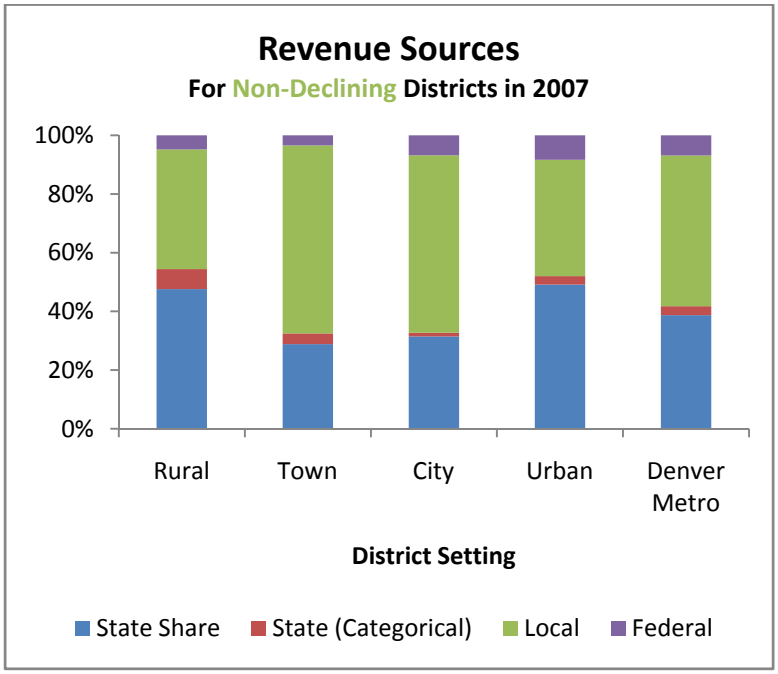
- The override dollars, monies approved by voters for additional public school funding, indicate the variation is mixed across school district size, setting, or enrollment

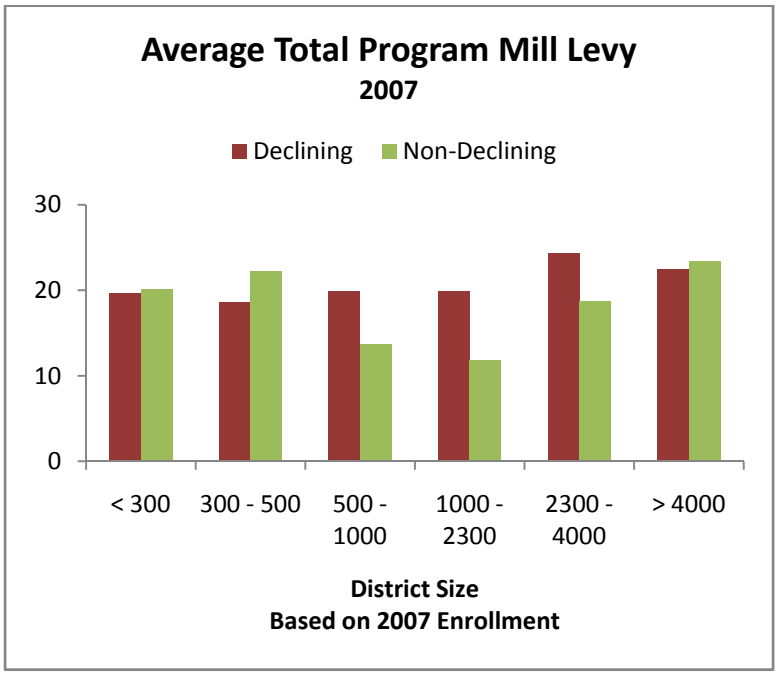
trend. For example, substantially greater override monies have been approved for larger school enrollment districts and in the urban and Denver metro areas, generally with larger provisions for the declining enrollment school districts. Non-declining districts with enrollments from 500 to 2,300 have approved higher level override dollars while very limited approved override dollars, relative to the other districts sizes or settings, are available in the small sized and rural districts as well as the districts with enrollments of 2,300 to 4,000 students.

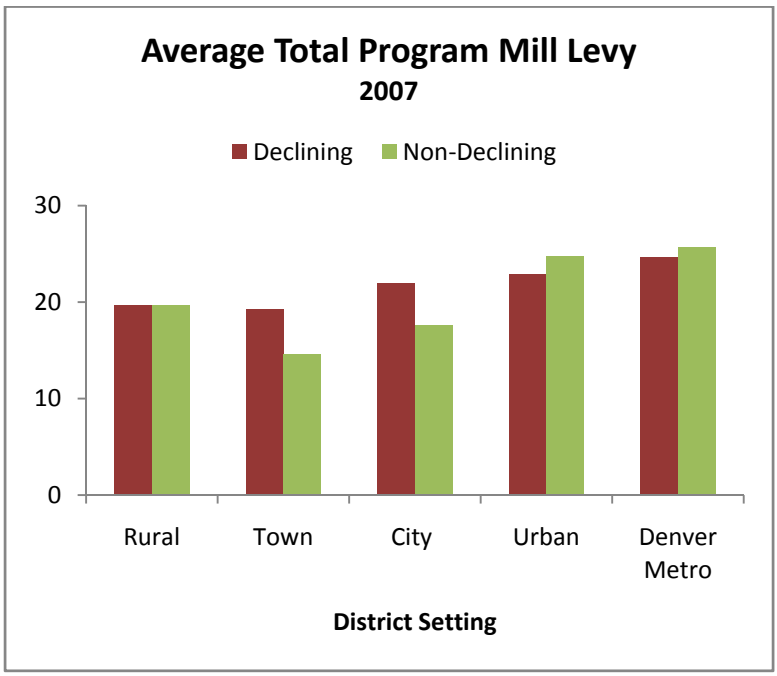

Revenue Sources
For Declining Districts in 2007
100%
80%
60%
40%
20%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment
State Share
State (Categorical)
Local
Federal

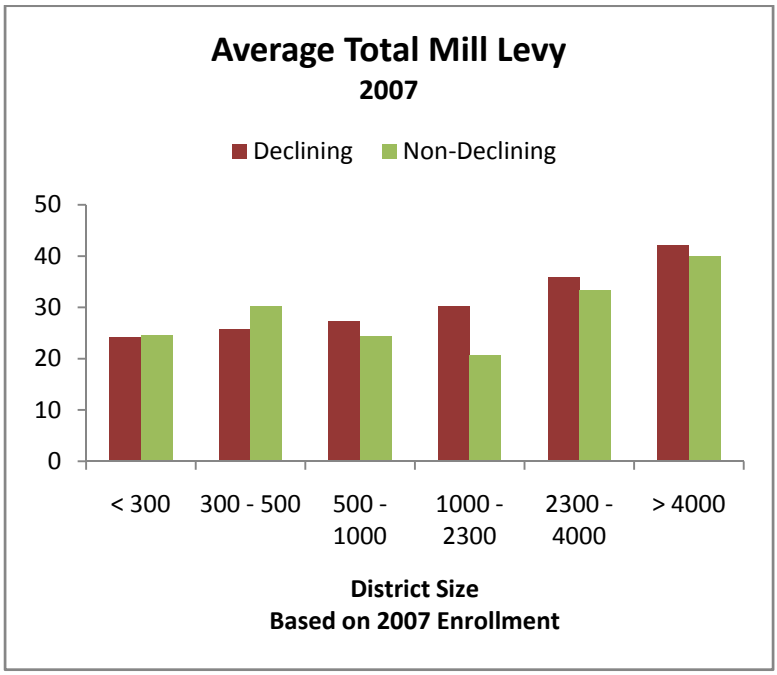

Revenue Sources
For Non-Declining Districts in 2007
100%
80%
60%
40%
20%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment
State Share
State (Categorical)
Local
Federal

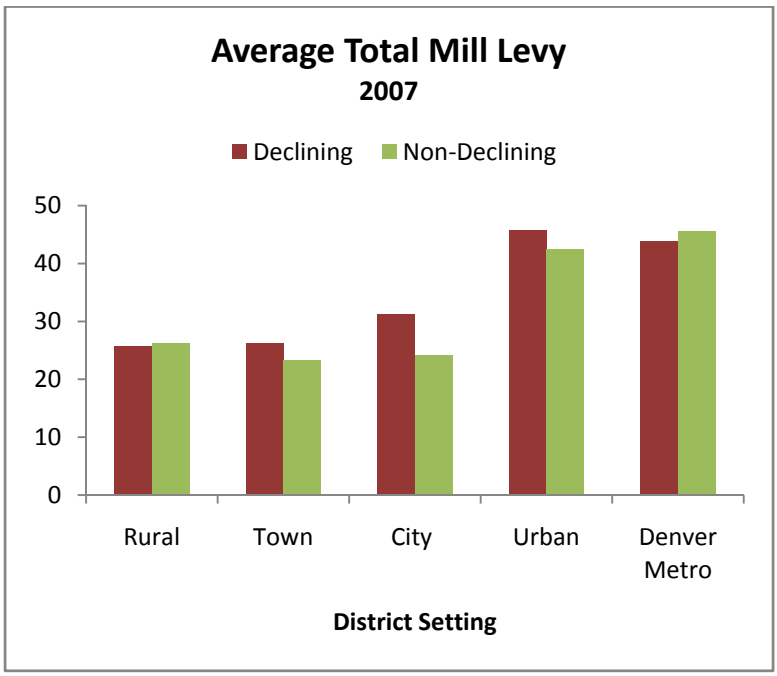

Revenue Sources
For Declining Districts in 2007
100%
80%
60%
40%
20%
0%
Rural
Town
City
Urban
Denver Metro
District Setting
State Share
State (Categorical)
Local
Federal

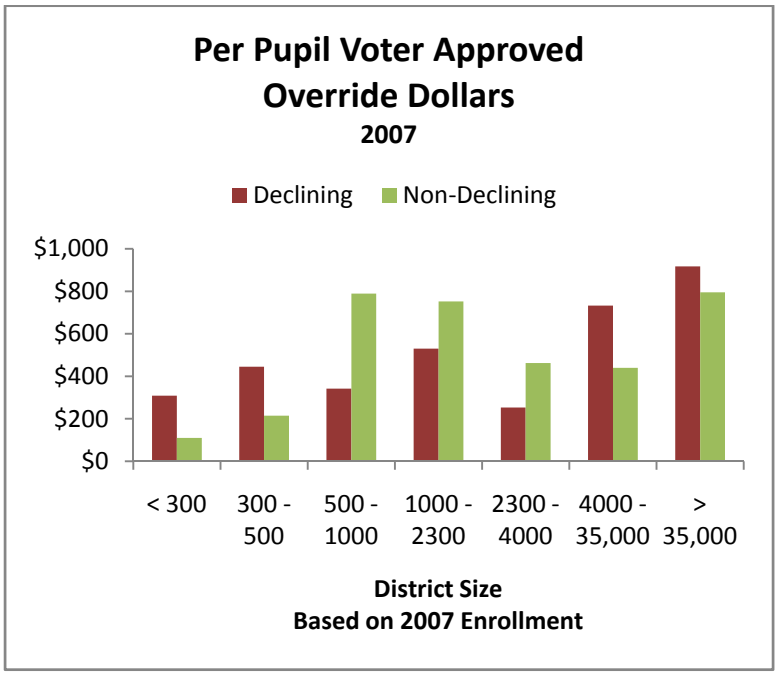

Revenue Sources
For Non-Declining Districts in 2007
100%
80%
60%
40%
20%
0%
Rural
Town
City
Urban
Denver Metro
District Setting
State Share
State (Categorical)
Local
Federal

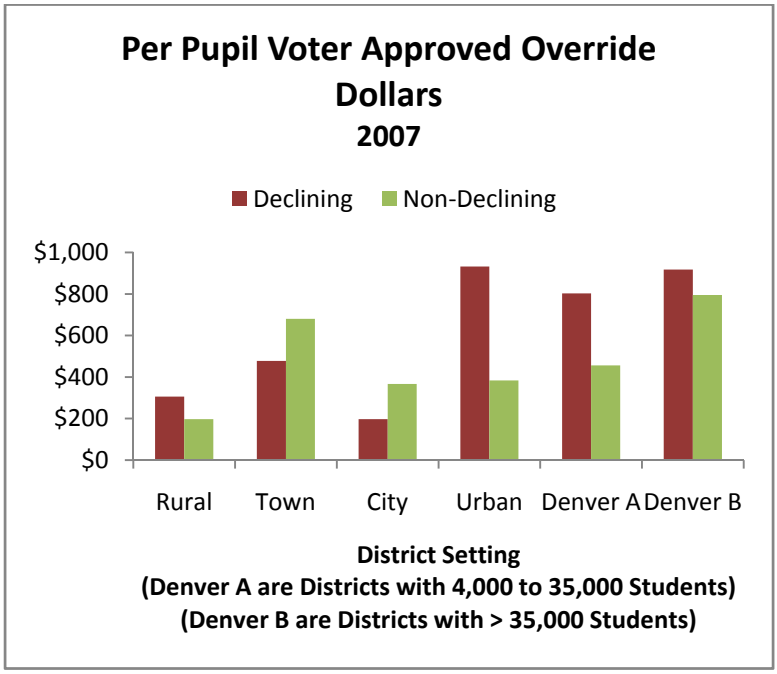

Average Total Program Mill Levy
2007
Declining
Non-Declining
30
20
10
0
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


Average Total Program Mill Levy
2007
Declining
Non-Declining
30
20
10
0
Rural
Town
City
Urban
Denver Metro
District Setting


Average Total Mill Levy
2007
Declining
Non-Declining
50
40
30
20
10
0
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


Average Total Mill Levy
2007
Declining
Non-Declining
50
40
30
20
10
0
Rural
Town
City
Urban
Denver Metro
District Setting


Per Pupil Voter Approved Override Dollars
2007
Declining
Non-Declining
$1,000
$800
$600
$400
$200
$0
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
4000 - 35,000
> 35,000
District Size
Based on 2007 Enrollment


Per Pupil Voter Approved Override Dollars
2007
Declining
Non-Declining
$1,000
$800
$600
$400
$200
$0
Rural
Town
City
Urban
Denver A
Denver B
District Setting
(Denver A are Districts with 4,000 to 35,000 Students)
(Denver B are Districts with > 35,000 Students)

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Chapter IV
Necessary Costs of Providing Education Services

When enrollment changes, school districts must reallocate resources across expenditure categories (e.g., salaries and benefits, administration, transportation). However, some categories may be easier to adjust than others.

- For example, hiring quality teachers is a complex task, and it may be difficult for districts to immediately add teachers when enrollment rises and districts may be reluctant (understandably so) to lay off teachers when enrollment falls due to the substantial efforts required to replace them if the decrease in enrollment is only temporary.

- Other categories, such as transportation, may involve large fixed expenses that do not scale immediately with enrollment; many of the same bus routes must be driven even with moderate changes in the number of students on each route.

- In addition, many of the costs of operating and maintaining buildings are independent of the number of students in those buildings.

- On the other hand, it may be somewhat easier to adjust the use of supplies and materials (despite the negative impact on instruction).

The ability of school districts to adjust expenditures in response to a change in enrollment depends on the relationship between changes in enrollment and changes in the main expenditure categories. The idea is that if all expenditure categories are proportional to the number of students, and if all expenditure categories can be

adjusted with the same ease, then for a given percent change in enrollment, would result in a constant percent change across the expenditure categories. However, if it is more difficult to adjust some expenditure categories than others, then those that are more difficult to adjust will exhibit a smaller percent change than those that are easier to adjust.

The relationship between changes in enrollment and changes in expenditures are analyzed by regressing the year-to-year percent change in each of the main expenditure categories on the year-to-year percent change in funded enrollment.[27] The estimated regression coefficient is best described as an adjustment factor. That is, the larger the regression coefficient the larger the adjustment factor and the greater the change in the expenditure category due to changes in enrollment. Conversely, the smaller the regression coefficient the smaller the adjustment factor and the smaller the change in the expenditure category, due to changes in enrollment.

The following table presents the estimated adjustment factors for the main expenditure categories.[28] The estimates imply that school districts are:

- Particularly limited in their ability to adjust expenditures from year-to-year for transportation and other support;

- School districts have somewhat more flexibility in adjusting expenditures on other support (instructional

[27] Regression is a statistical methodology for quantifying the relationship between variables. The particular methodology used in this analysis accounts for the pooled cross-sectional time-series nature of the data (data was available on 177 districts in each of five years giving 885 observations; one year is lost when computing percent changes) using a random-effects model. Percent change is computed using the year-to-year difference in the logarithms of the variables. This methodology provides more robust results as it attenuates the extremely large changes that sometimes occur in the data (for example, some districts have very large increases in enrollment due to adoption of online courses).

[28] All of the estimated coefficients were significant at the 0.01 level. The analysis was also performed including other factors such as district size and setting and whether the district was experiencing declining enrollment in the regression model with little change in the results.

staff assistance, purchased services, supplies and materials as well as employed students), operations and maintenance, instructional salaries and benefits, food services and general and school administration;

- School districts have the most flexibility adjusting expenditures on other instructional expenditures.

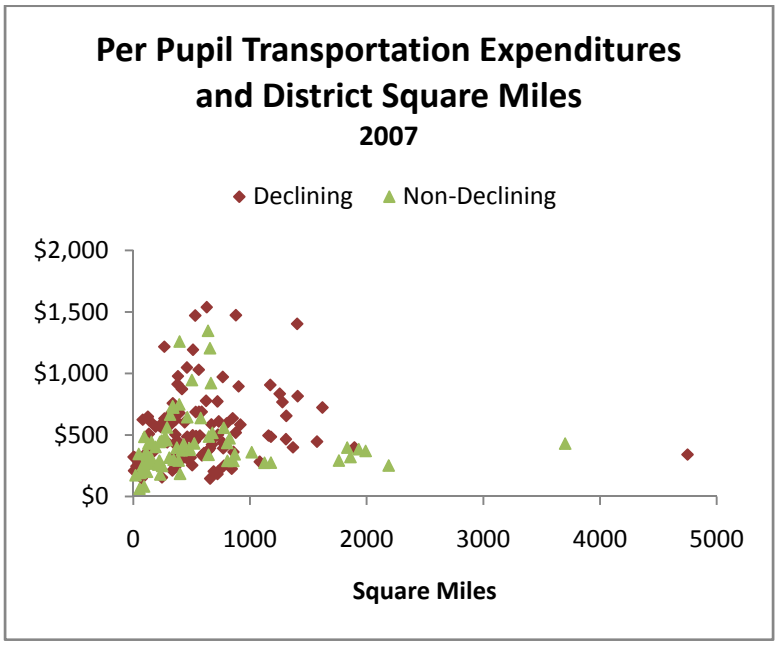
These quantitative results are consistent with the information obtained from the interviews and surveys. In particular, in response to declines in enrollment, school administrators indicated it was difficult to reduce expenditures on direct student services (i.e., teachers, transportation, and food) and on building operations.

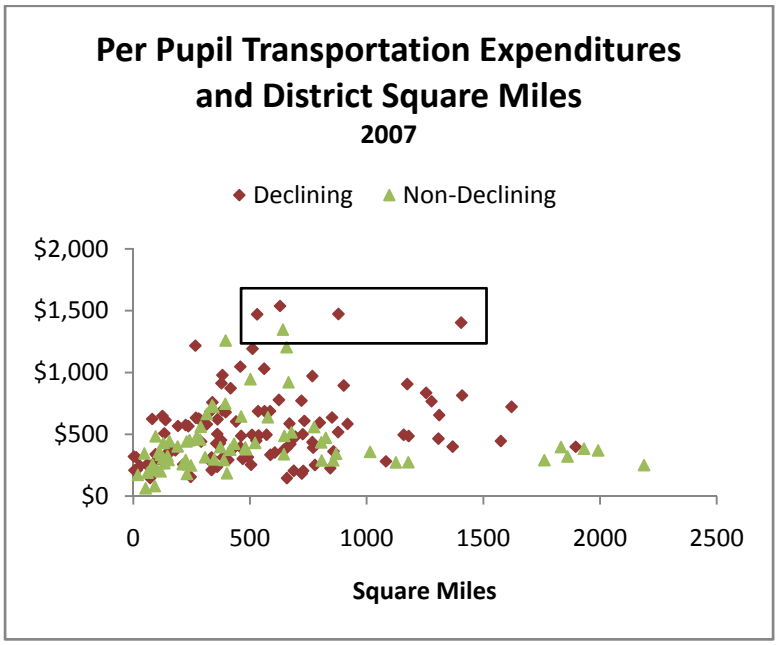
Adjustment of Expenditures to Funded Enrollment

Expenditure Category	Adjustment Factor
Transportation	0.24
Other Support	0.27
Operations & Maintenance	0.29
Salaries and Benefits	0.30
Food Services	0.32
Administration (General and School)	0.33
Other Instruction	0.52

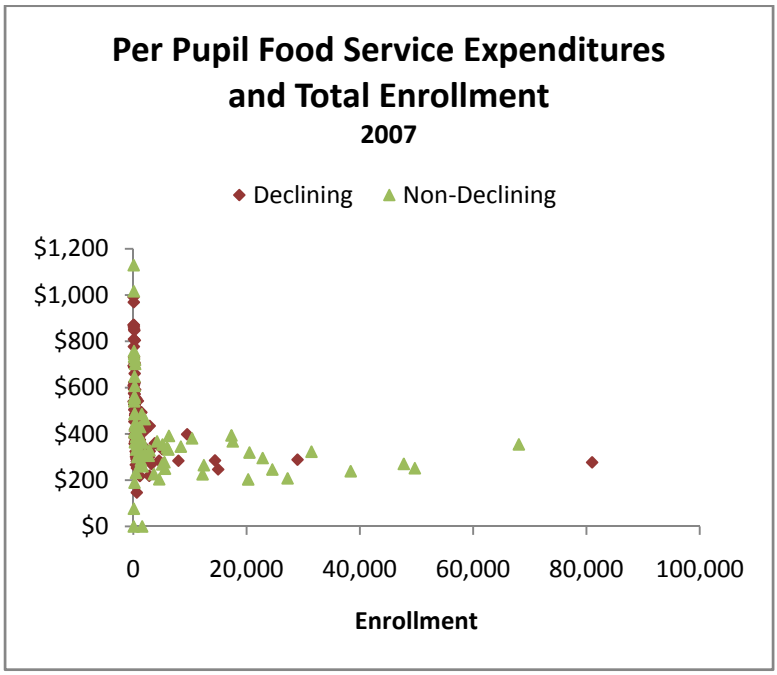
An alternative view of the variability in the components of school expenditures is provided by considering how these expenditures are related to appropriate measures of size. For example, the following charts illustrate how per pupil transportation expenditures are related to the size of the district in square miles; how per pupil food

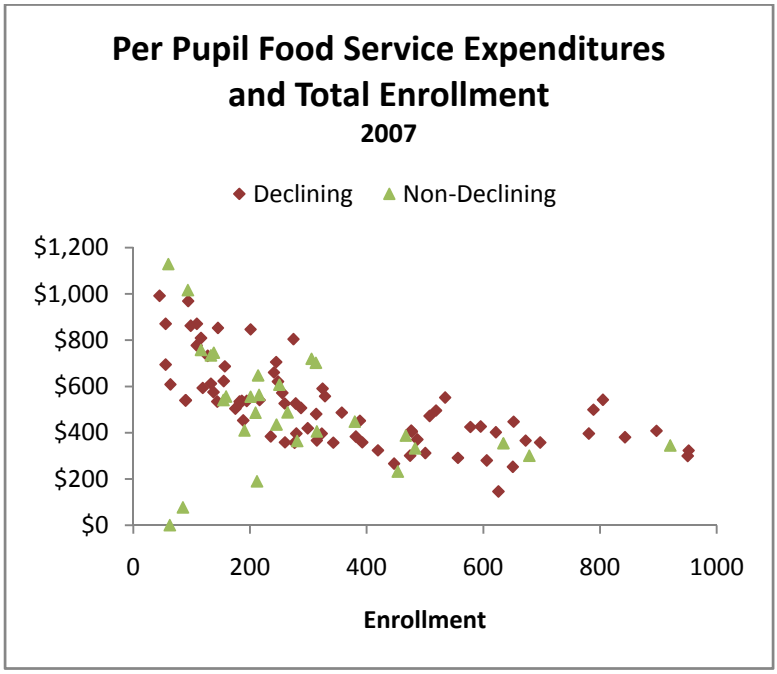
services expenditures are related to total enrollment; and how operations and maintenance expenditures are related to building square feet. The distinguishing characteristic of all the plots is that there is very little trend in per pupil expenditures over a wide range of district sizes, be it measured in square miles, enrollment, or building square feet. The implication is that the per pupil cost for these expenditure categories is relatively fixed with respect to district size. (That is, total costs in these categories are, in general, proportional to the number of students in the school district.) There does appear to be some increase in per pupil food service expenditures in districts with small enrollments (less than 400 students). Also, a few districts with very small building areas have relatively high operations and maintenance expenditures and a few districts of medium area (500-1,500 square miles) have relatively high transportation expenditures.

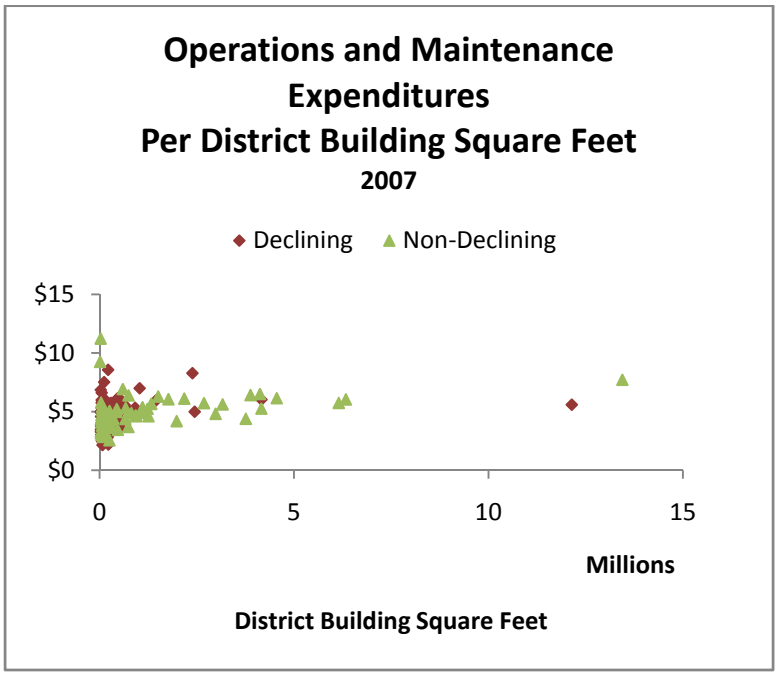


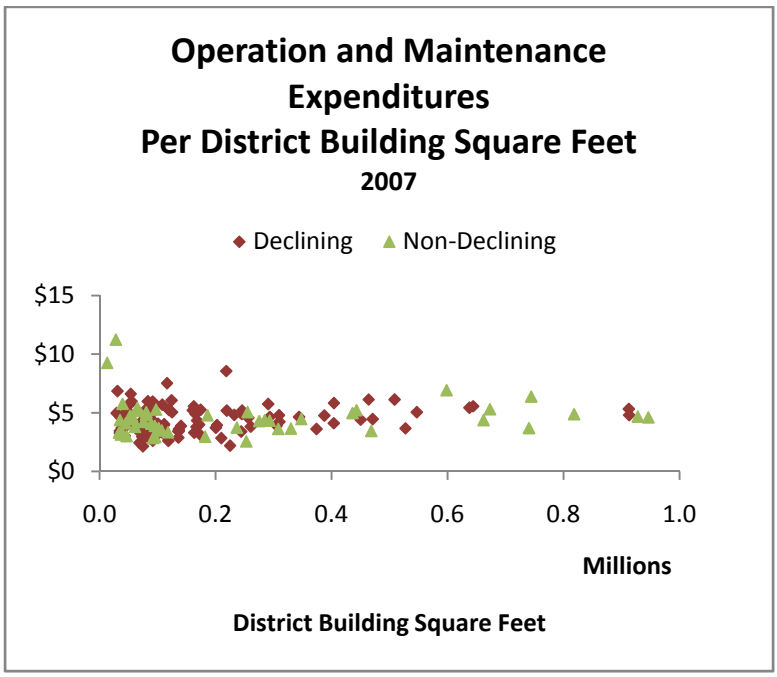


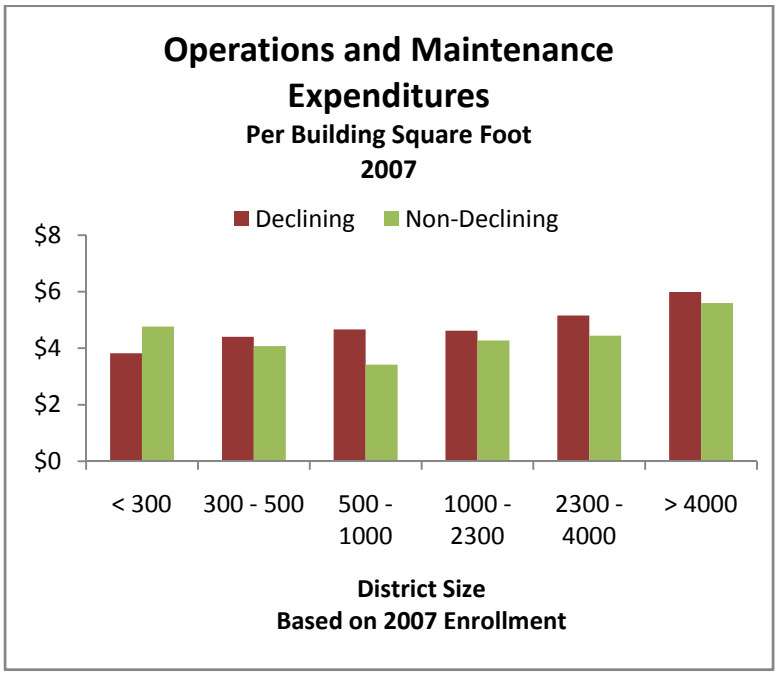
In the box: Woodlin R-104, Kit Carson R-1, Plainview Re-2, Kim Reorganized 88, Arickaree R-2
Removed: Gunnison Watershed RE1J and Moffat County RE1 (outliers) and, for reasons discussed earlier, Vilas RE-5.

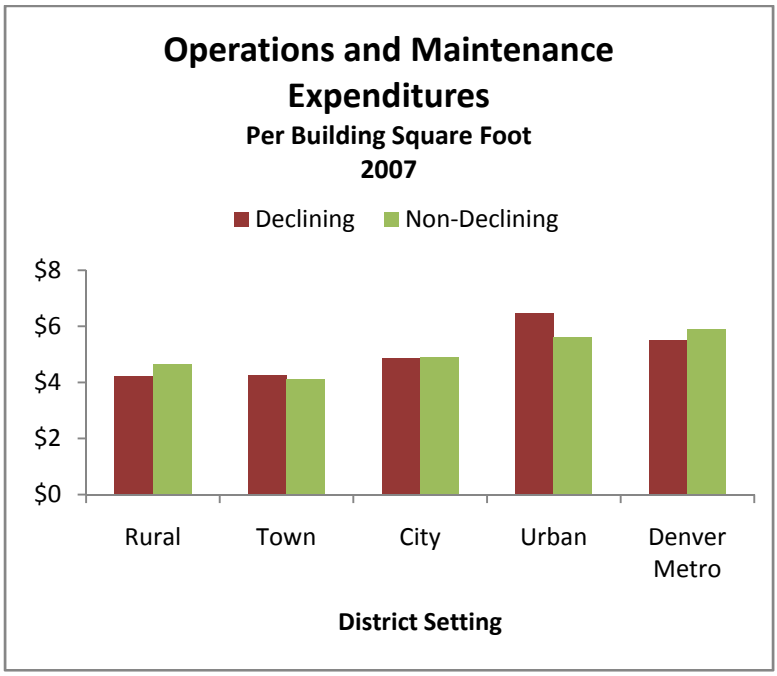

Per Pupil Food Service Expenditures and Total Enrollment
2007
Declining
Non-Declining
$1,200
$1,000
$800
$600
$400
$200
$0
0
20,000
40,000
60,000
80,000
100,000
Enrollment


Per Pupil Food Service Expenditures and Total Enrollment
2007
Declining
Non-Declining
$1,200
$1,000
$800
$600
$400
$200
$0
0
200
400
600
800
1000
Enrollment


Operations and Maintenance
Expenditures
Per District Building Square Feet
2007
Declining
Non-Declining
$15
$10
$5
$0
0
5
10
15
Millions
District Building Square Feet


Operation and Maintenance
Expenditures
Per District Building Square Feet
2007
Declining
Non-Declining
$15
$10
$5
$0
0.0
0.2
0.4
0.6
0.8
1.0
Millions
District Building Square Feet


Operations and Maintenance Expenditures
Per Building Square Foot
2007
Declining
Non-Declining
$8
$6
$4
$2
$0
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


Operations and Maintenance Expenditures
Per Building Square Foot
2007
Declining
Non-Declining
$8
$6
$4
$2
$0
Rural
Town
City
Urban
Denver Metro
District Setting

Salaries and benefits for teachers and instructional staff employed by the district represent half of state school expenditures in academic year 2007-08. This category is the largest expense for every school district.[29] Naturally, school districts that are experiencing declining enrollments have lower revenues and, therefore, may have a more difficult time paying competitive teacher salaries. Additionally, without a good measure of teacher "quality", parents may perceive a school district that is able to pay their teachers more as one that can provide a higher quality of education.

The following set of charts demonstrates nominal differences in average teacher salaries and benefits for similarly situated school districts whether measured by size or setting or enrollment trend.

- Although there is little variation in teacher salary by enrollment trend (declining/non-declining), the average salary clearly increases as school district size (enrollment) increases. That is, teacher salaries for small sized school districts of less than 500 students are lower than the teacher salary in the larger or urban and Denver Metro school districts.

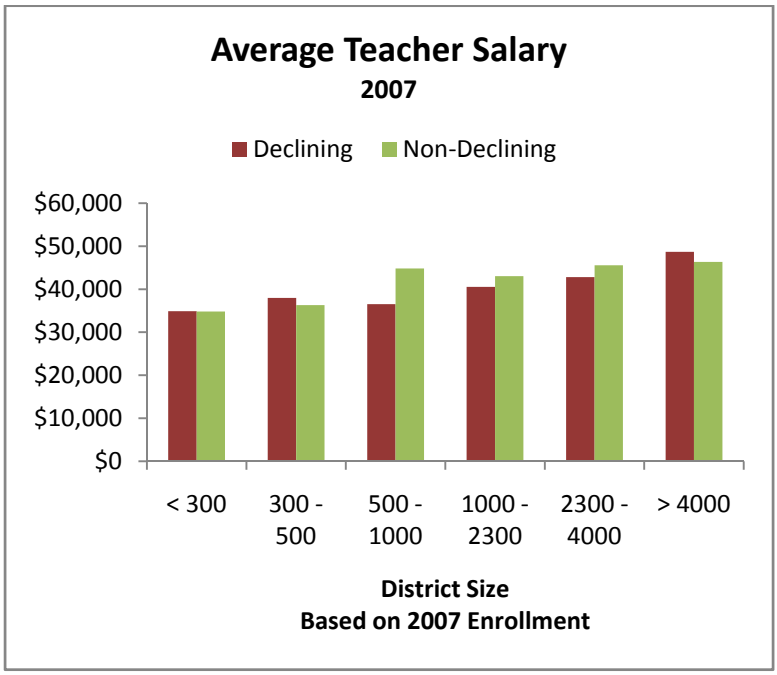
- Two main components of employee benefits are pension contributions and health insurance. All school districts in the State now participate in the Colorado Public Employees' Retirement Association (PERA), a defined

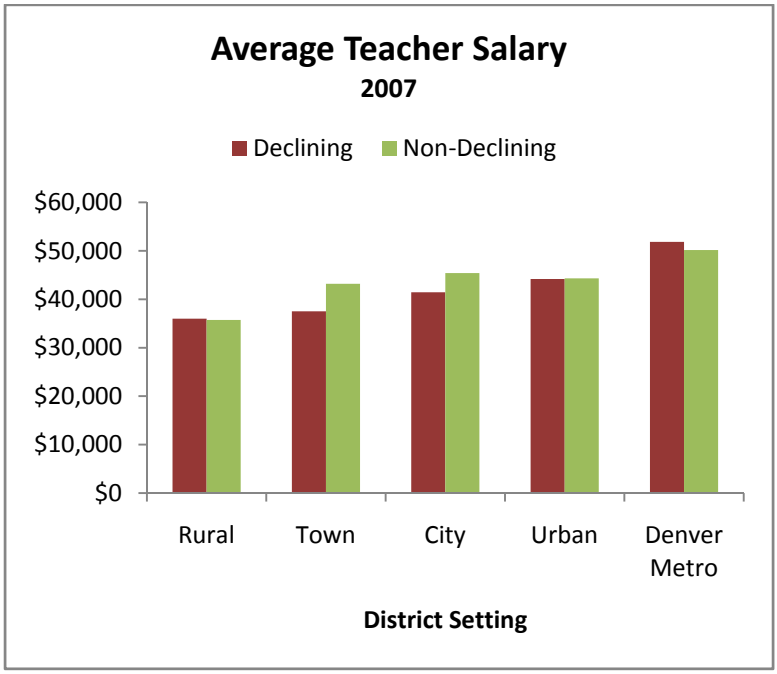
[29] The average teacher salary for academic year 2007-08 for each school district along with comparisons for similarly situated schools in terms of school district size (enrollment) and setting plus state averages are illustrated in Appendix A in the full report (the school district profiles). Similar comparisons for the percent increase in salary across the six year period are also included in this Appendix A.

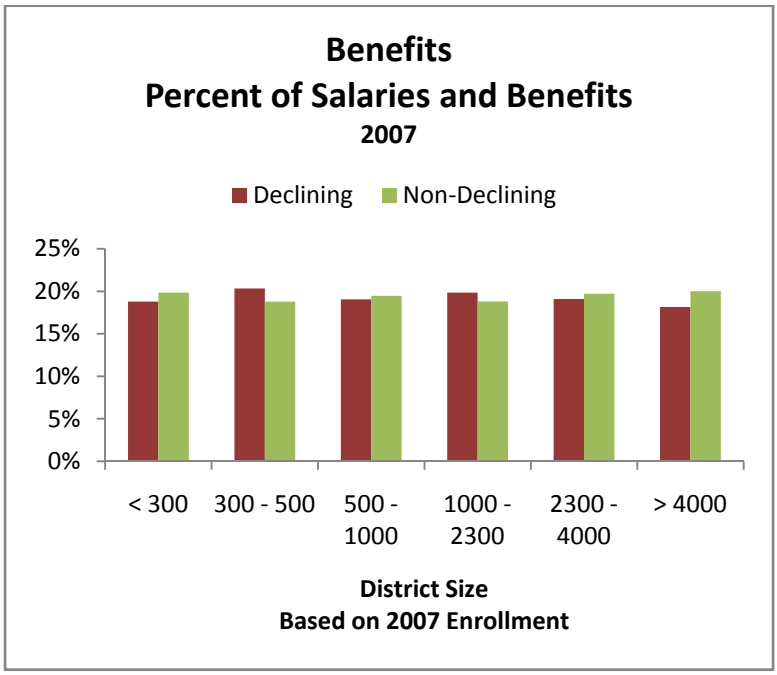
benefit plan and the employees are generally are not eligible for social security retirement benefits.[30]

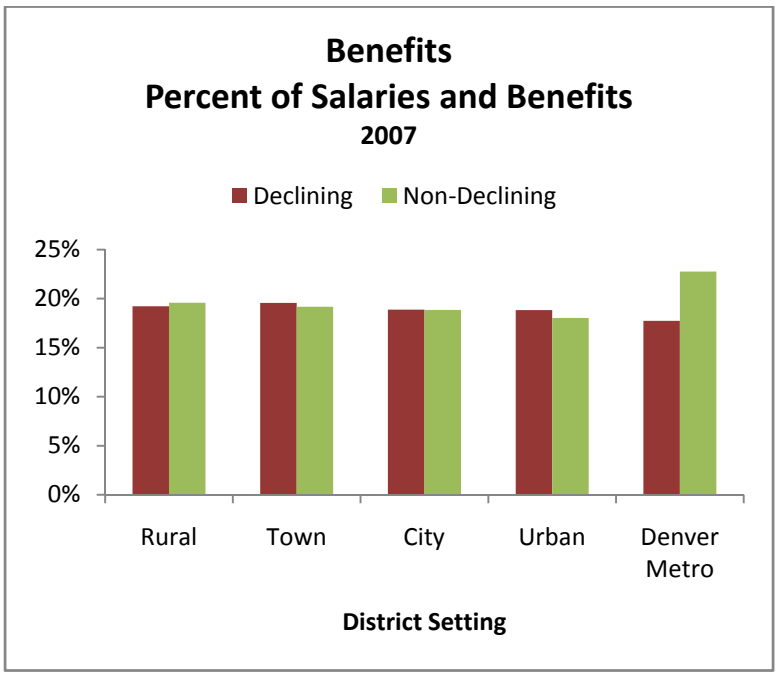
- Although there has been much popular discussion about the increased costs of benefits, the costs of benefits provided by school districts are fairly typical of costs in the private sector.

[30] Even with the requisite forty service quarters (10 years) in a private sector plan (when not working as a school teacher) where social security payments were made by both the employee and employer, a Colorado Public school teacher or employee will only be eligible for a nominal social security payment.


Average Teacher Salary
2007
Declining
Non-Declining
$60,000
$50,000
$40,000
$30,000
$20,000
$10,000
$0
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


Average Teacher Salary
2007
Declining
Non-Declining
$60,000
$50,000
$40,000
$30,000
$20,000
$10,000
$0
Rural
Town
City
Urban
Denver Metro
District Setting


Benefits
Percent of Salaries and Benefits
2007
Declining
Non-Declining
25%
20%
15%
10%
5%
0%
< 300
300 - 500
500 - 1000
1000 - 2300
2300 - 4000
> 4000
District Size
Based on 2007 Enrollment


Benefits
Percent of Salaries and Benefits
2007
Declining
Non-Declining
25%
20%
15%
10%
5%
0%
Rural
Town
City
Urban
Denver Metro
District Setting

Teacher Salaries, Course Offerings and Mobility

Superintendents have expressed concern about a geographically close neighbor that is able to provide more course offerings and higher teacher salaries, a legitimate issue as the regression analysis clearly found instructional dollars positively impact student performance.

- Parents may use teacher salaries and course offerings as "signals" for the quality of education. (That is, school districts that are able to provide better teacher salaries and more course offerings than its neighbor may be better able to attract students into its district).

- Moreover, for urban areas with relatively small (in square miles) school districts, it is easier for students to take advantage of open enrollment and it is also easier for teachers to shift districts to obtain a better salary.

The following maps cluster neighboring school districts generally by BOCES membership and/or with some additional nearby school districts and provide the average teacher salary in academic year 2007-08 for school district, their non-CSAP program offerings, and overall square miles represented by the cluster.[31]

[31] Of note, this analysis uses average, not entry-level salaries and, as such, will not fully explain the relationships between inter-district enrollment and teacher salaries which requires more sophisticated analysis than these basic observations. Also these mapping examples do not account for a number of important factors (e.g., teacher's years of experience).

Generally and not surprisingly, the more populated a region within any given BOCES, the higher the average teacher salary and usually the greater number of non-CSAP course offerings.

- The school district in the "more urban" area of each BOCES has a higher or somewhat higher average teacher salary than their neighboring school district, but also has greater than average housing prices (see Appendix A-School District Profiles for housing price information). For example:
    - Alamosa in the San Luis BOCES area
    - Lamar in the SouthEastern BOCES area
    - Canon City and Pueblo City in the South Central BOCES area
- School districts in destination resort areas such as Aspen, Durango, Telluride, Summit, Steamboat Springs, etc. have higher average teacher salaries than their neighboring school districts but also substantially greater housing prices (again, see Appendix A-School District Profiles for housing price information).
- More specifically, the school districts in the western portion of the Centennial BOCES (and surrounding areas) have higher average salaries and somewhat more non-CSAP offerings than the school districts on the eastern and more rural, less populated portion of the BOCES. Also, from Appendix A (school district profiles), the western

school districts have greater average housing prices than the school districts in the eastern portion of the BOCES. The school districts in the center of this BOCES have average teacher salaries that fall within the western and eastern school districts. Given a relatively large land area for this BOCES (approximately 8,400 square miles), the competition for teachers is likely only between school districts with neighboring borders and fairly similar circumstances.

- There are some select school districts, such as Sheridan within the Front Range BOCES, where the teacher salaries of neighboring school districts likely pose competitive issues.

    - Other school districts in this area have average teacher salaries that are 15-25% higher than Sheridan (e.g., Cherry Creek, Douglas, Englewood, Jefferson, Littleton).

    - Outlying school districts in the Front Range BOCES (and surrounding areas) such as Elizabeth have a much lower average teacher salary; however, given their location, are less likely to be in the same competitive arena as Sheridan and, hence, less likely to be an issue in attracting teachers. Elizabeth may well be competing with its neighbors to the east or south.

- Similarly, within the Pikes Peak BOCES (Colorado Springs area), there is a fairly wide range of average teacher salaries within a fairly small geographic area, posing increased pressure and competition for teachers given the likelihood of more teacher mobility.

- More rural, less populated, large geographic areas are less likely to have issues with competition with neighboring school districts and more likely to have issues with providing the salary level needed to attract and maintain quality teachers.

    - Although in specific instances, such as Rangely and Meeker in the Rio Blanco BOCES, the average teacher salary differential between the two school districts that are in close proximity to each other could pose competitive issues in attracting teachers.

Two more specific examples from the following maps are provided below.

Example #1: **DENVER METRO (FRONT RANGE BOCES) AND SURROUNDING AREAS**

- Average teacher salaries range from some $36,000 to $57,000 (when including the outskirts of the Denver Metro area) while non-CSAP course offerings range from only 1 to the full array of 12-14 in a relatively small land area for Denver Metro of 2,400 square miles.

- Sheridan School District, in the midst of Denver Metro, and with declining enrollment has an average teacher salary of $45,500, approximately 20 percent lower than most of its surrounding school districts but has a full array (12) of non-CSAP course offerings.

- Sheridan School District, although experiencing declining enrollment, also has more incoming than outgoing students, indicated demographic changes.

- Thus, the Sheridan School District has high mobility opportunities for both teachers and students despite the lower teacher salaries.

Example #2: **SOUTHEASTERN BOCES**

- The Southeast BOCES has much less variation in average teacher salary (which ranges from $25,800 to $38,700), has little variation in the number of non-CSAP course offerings (although they do vary in type), but has a relatively large land area.

- Exceptions are the Lamar School District with approximately 10% to 15% greater average teacher salary than the surrounding school districts and Kim Reorganized with 20% lower average teacher salary.[32]

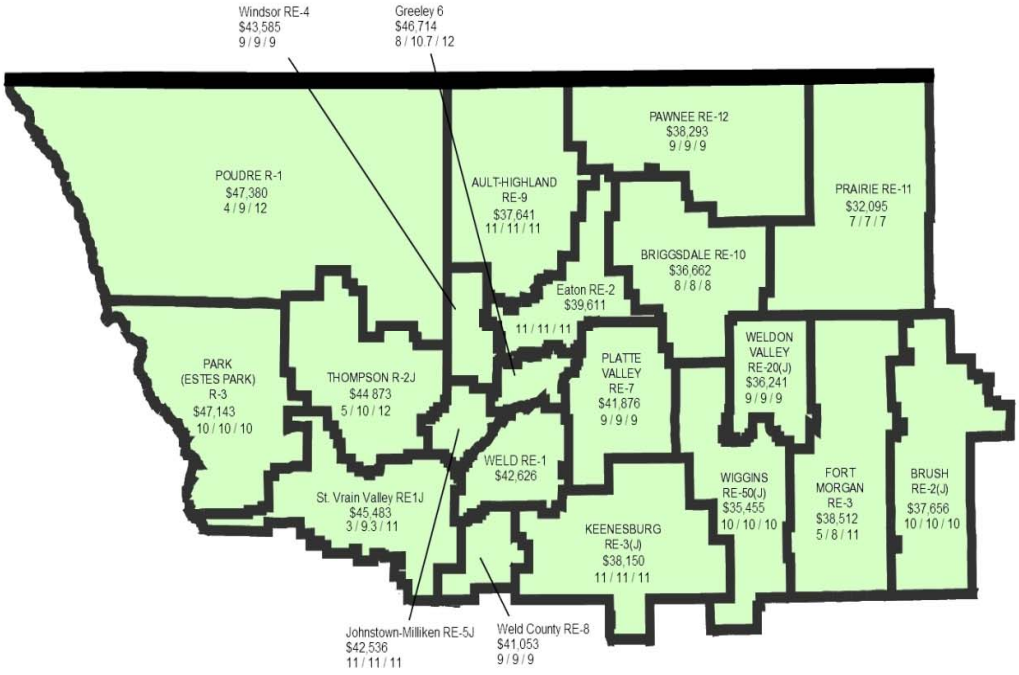
[32] As noted above, lower average teacher salary may be, in part, related to the fewer years experience or teacher education level, but the phenomena may also be intricately tied to the ability of these school districts to attract and maintain teachers with higher salary levels.

- However, transportation costs (both money and time) plus seasonal weather conditions are likely to limit the mobility of teachers (who have settled into the region) and students.

- A somewhat different but equally compelling limitation is that the average state teacher salary is nearly 20% higher than the Southeast BOCES average teacher salary. This likely limits the school districts' ability to attract and retain teachers. (Data on entry level salaries by school districts would assist in this evaluation, but were not sufficiently available to analyze.)

CENTENNIAL BOCES AND SURROUNDING AREAS

AVERAGE TEACHER SALARIES AND NON-CSAP COURSE OFFERINGS (MIN/MEAN/MAX)

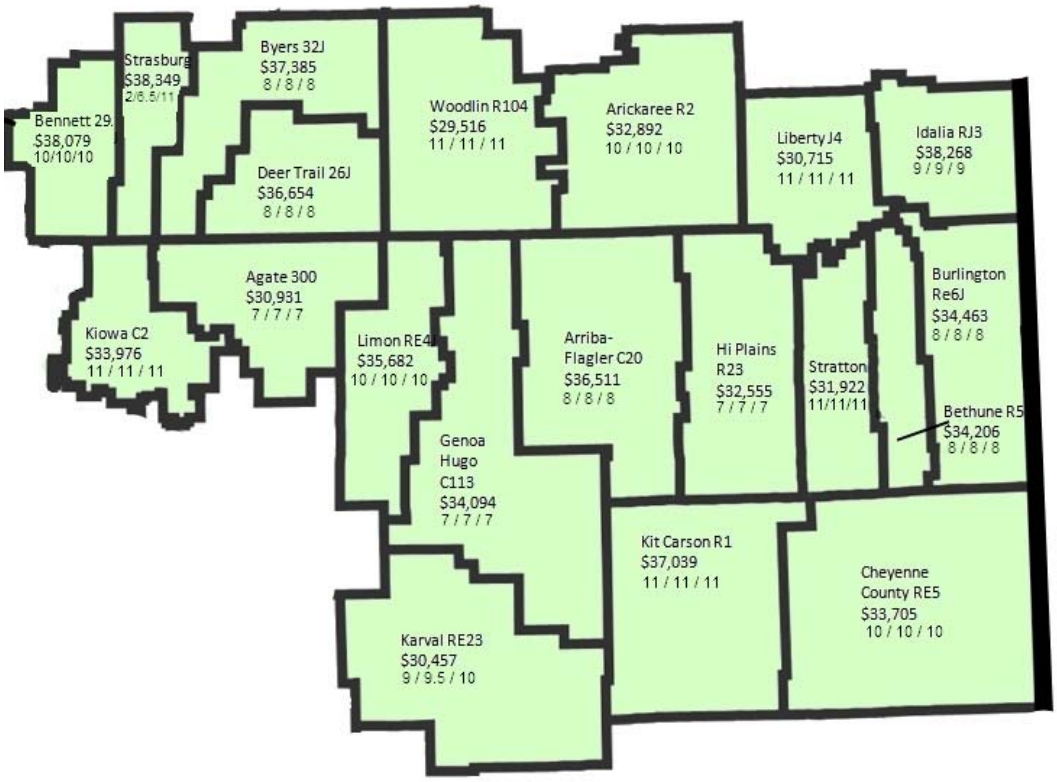


	Salary		Non-CSAP Offerings
	Centennial	State	BOCES Range
Minimum	32,095	25,825	3.0
Average	40,679	39,350	9.7
Maximum	47,380	57,152	12.0

CENTENNIAL BOCES SQUARE MILES: 8,352

EAST CENTRAL BOCES AND SURROUNDING AREAS

AVERAGE TEACHER SALARIES AND NON-CSAP COURSE OFFERINGS (MIN/MEAN/MAX)

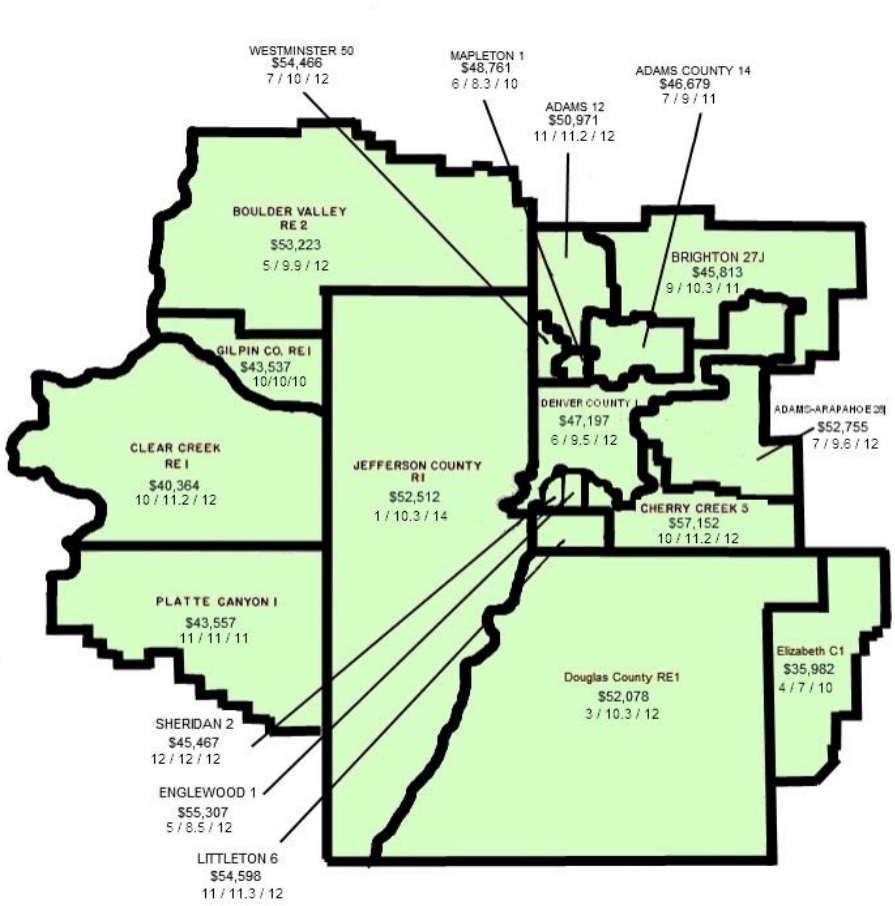


	Salary		Non-CSAP Offerings
	East Central	State	BOCES Range
Minimum	29,516	25,825	2.0
Average	34,370	39,350	9.1
Maximum	38,349	57,152	11.0

EAST CENTRAL BOCES SQUARE MILES: 10,461

FRONT RANGE BOCES AND SURROUNDING AREAS

AVERAGE TEACHER SALARIES AND NON-CSAP COURSE OFFERINGS (MIN/MEAN/MAX)



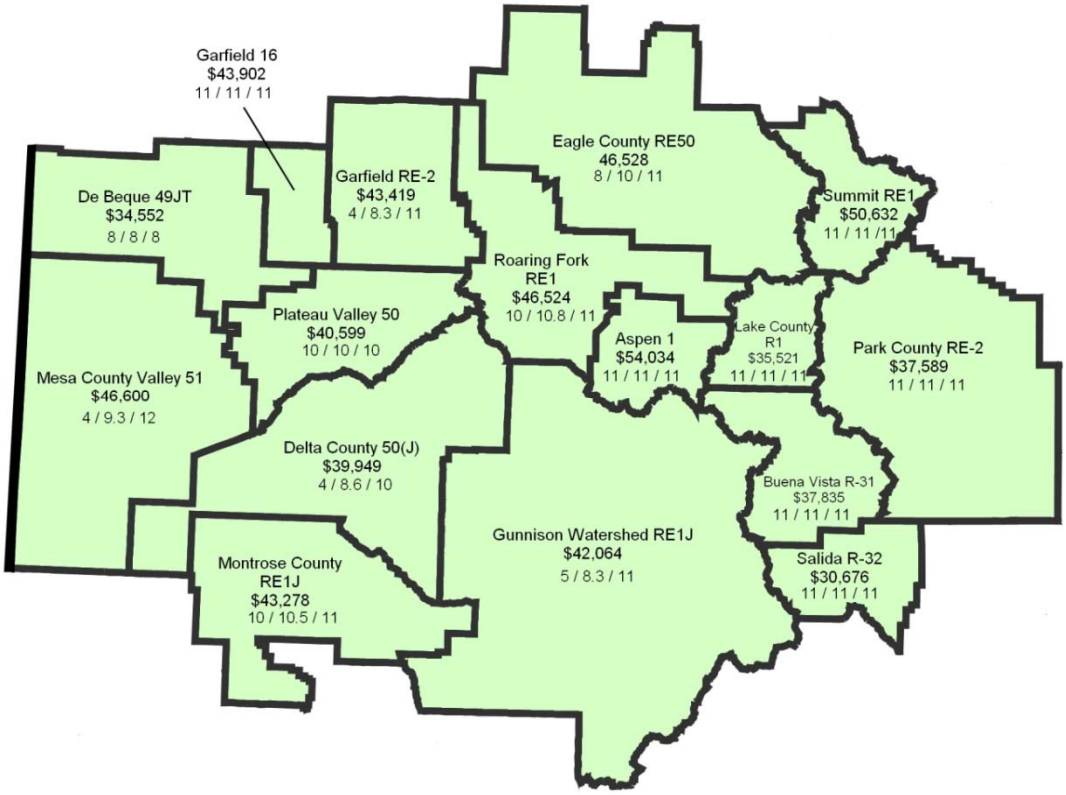
	Salary		Non-CSAP Offerings
	Front Range	State	BOCES Range
Minimum	35,982	25,825	1.0
Average	48,912	39,366	10.0
Maximum	57,152	57,152	14.0

FRONT RANGE SQUARE MILES: 3,848

DENVER METRO SQUARE MILES: 2,412

MOUNTAIN BOCES AND SURROUNDING AREAS

AVERAGE TEACHER SALARIES AND NON-CSAP COURSE OFFERINGS (MIN/MEAN/MAX)

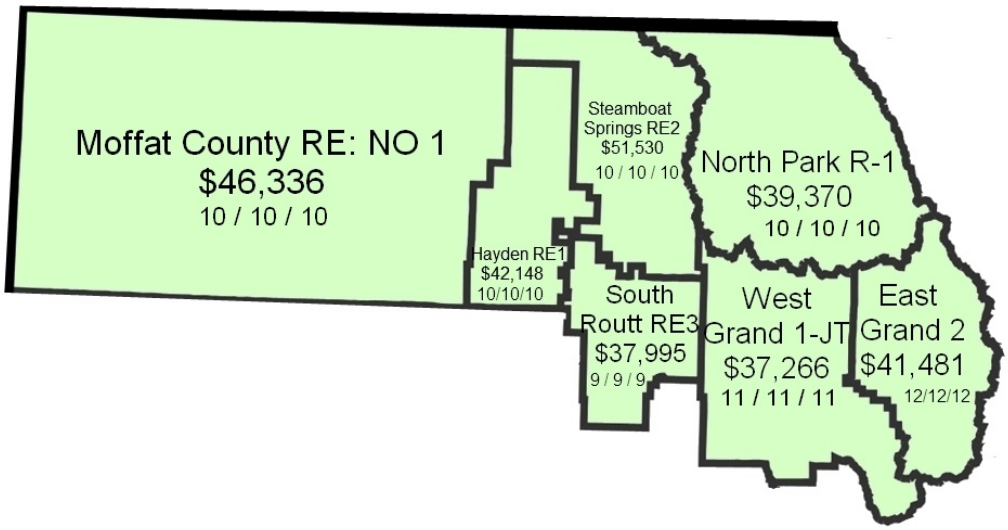


	Salary		Non-CSAP Offerings
	Mountain	State	BOCES Range
Minimum	30,676	25,825	4.0
Average	42,106	39,366	10.1
Maximum	54,034	57,152	12.0

MOUNTAIN BOCES SQUARE MILES: 19,404

NORTHWEST BOCES AND SURROUNDING AREAS

AVERAGE TEACHER SALARIES AND NON-CSAP COURSE OFFERINGS (MIN/MEAN/MAX)

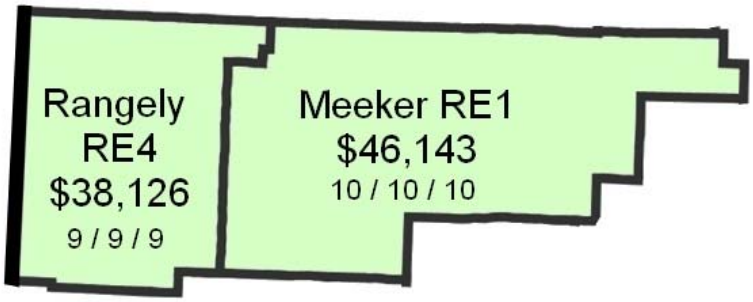


	Salary		Non-CSAP Offerings
	Northwest	State	BOCES Range
Minimum	37,266	25,825	9.0
Average	42,304	39,366	10.3
Maximum	51,530	57,152	12.0

NORTHWEST BOCES SQUARE MILES: 10,704

RIO BLANCO BOCES AND SURROUNDING AREAS

AVERAGE TEACHER SALARIES AND NON-CSAP COURSE OFFERINGS (MIN/MEAN/MAX)

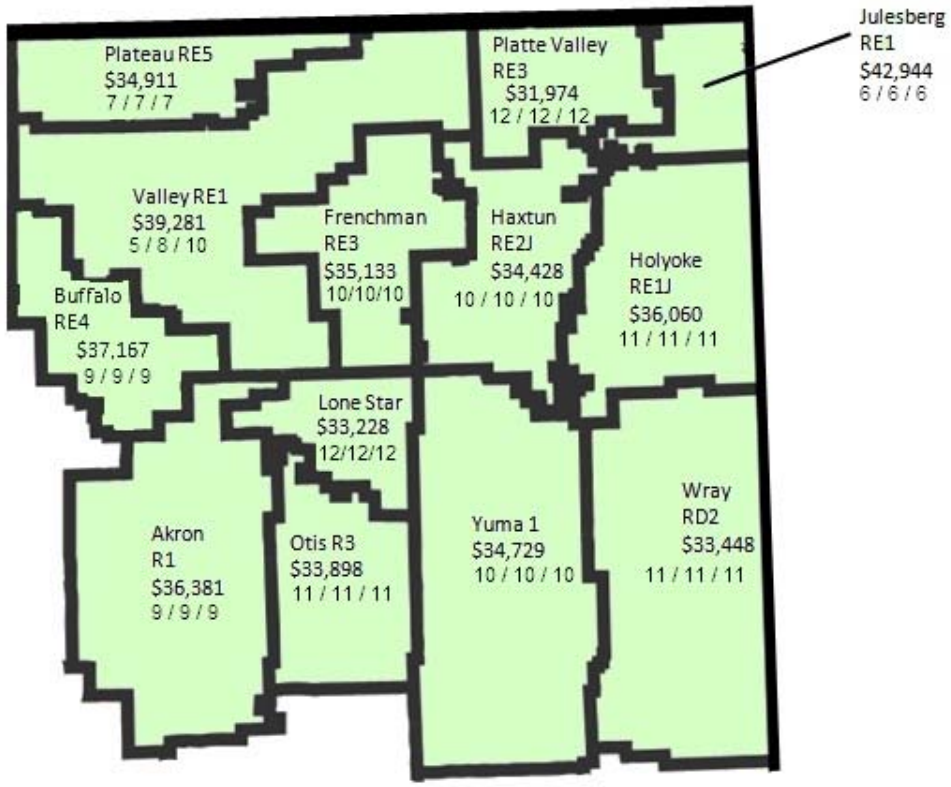


	Salary		Non-CSAP Offerings
	Rio Blanco	State	BOCES Range
Minimum	38,126	25,825	9.0
Average	42,135	39,366	9.5
Maximum	46,143	57,152	10.0

RIO BLANCO BOCES SQUARE MILES: 3,210

NORTHEAST BOCES AND SURROUNDING AREAS

AVERAGE TEACHER SALARIES AND NON-CSAP COURSE OFFERINGS (MIN/MEAN/MAX)

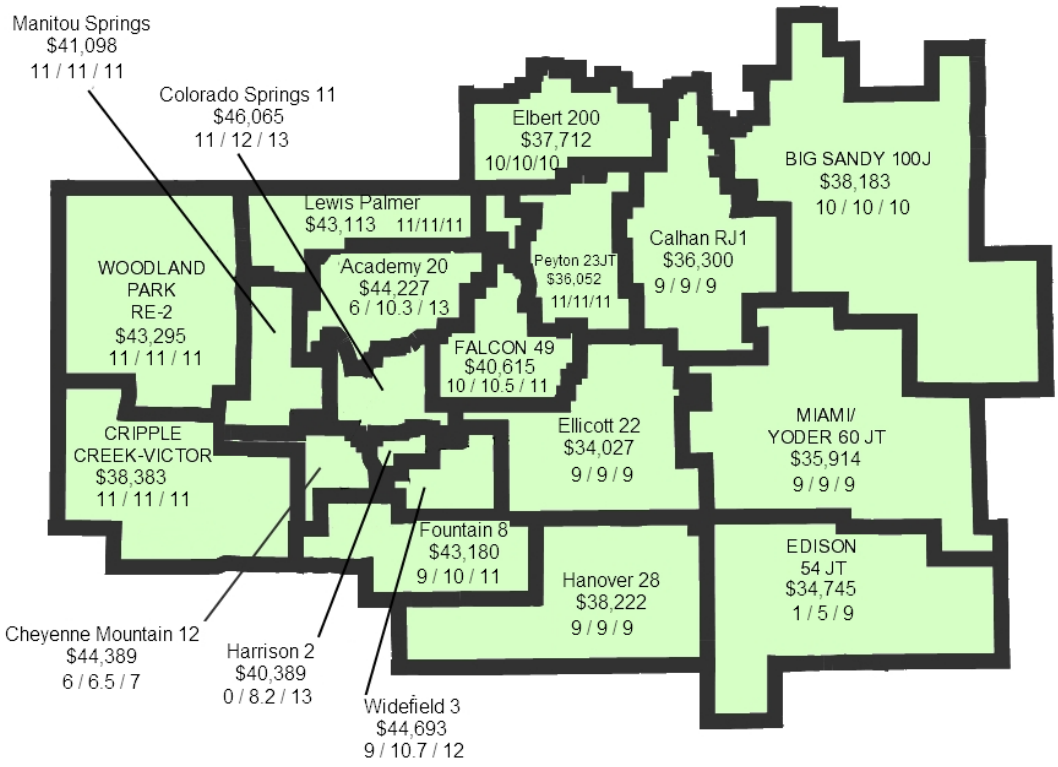


	Salary		Non-CSAP Offerings
	Northeast	State	BOCES Range
Minimum	31,974	25,825	5.0
Average	35,660	39,366	9.7
Maximum	42,944	57,152	12.0

NORTHEAST BOCES SQUARE MILES: 5,955

PIKES PEAK BOCES AND SURROUNDING AREAS

AVERAGE TEACHER SALARIES AND NON-CSAP COURSE OFFERINGS (MIN/MEAN/MAX)

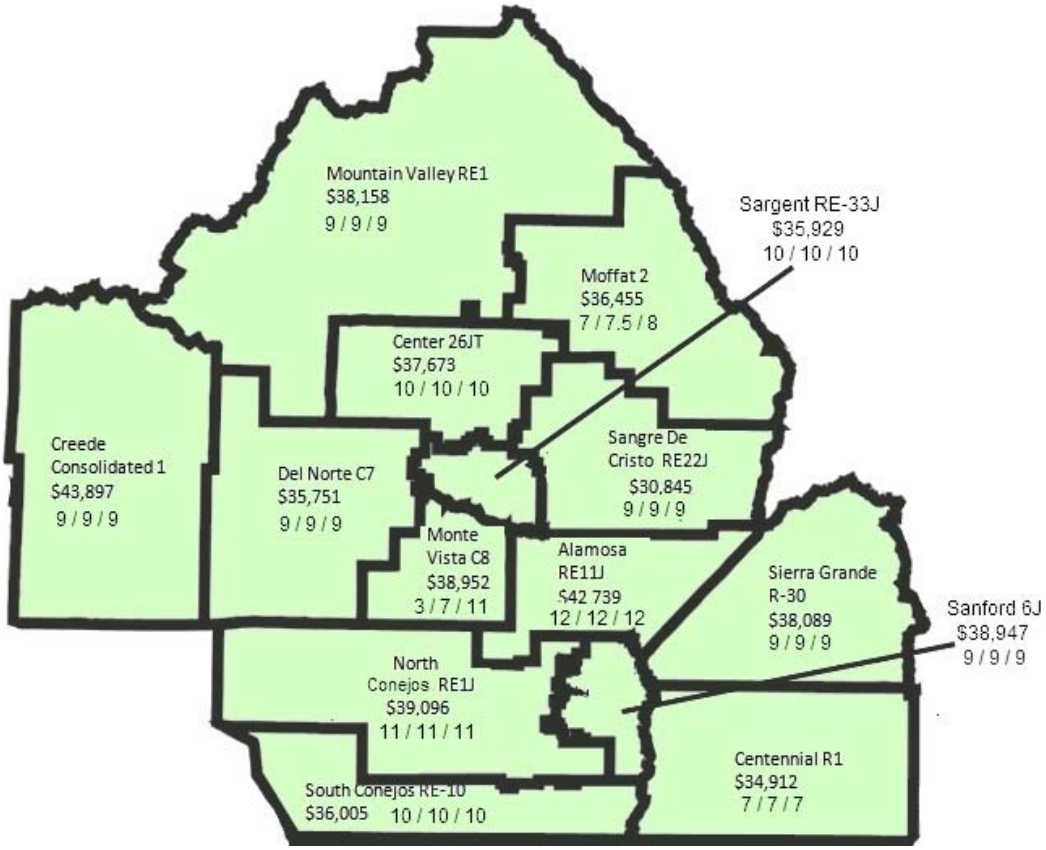


	Salary		Non-CSAP Offerings
	Pikes Peak	State	BOCES Range
Minimum	34,027	25,825	0
Average	40,032	39,366	9.7
Maximum	46,065	57,152	13

PIKES PEAK SQUARE MILES: 3,669

SAN LUIS VALLEY BOCES AND SURROUNDING AREAS

AVERAGE TEACHER SALARIES AND NON-CSAP COURSE OFFERINGS (MIN/MEAN/MAX)

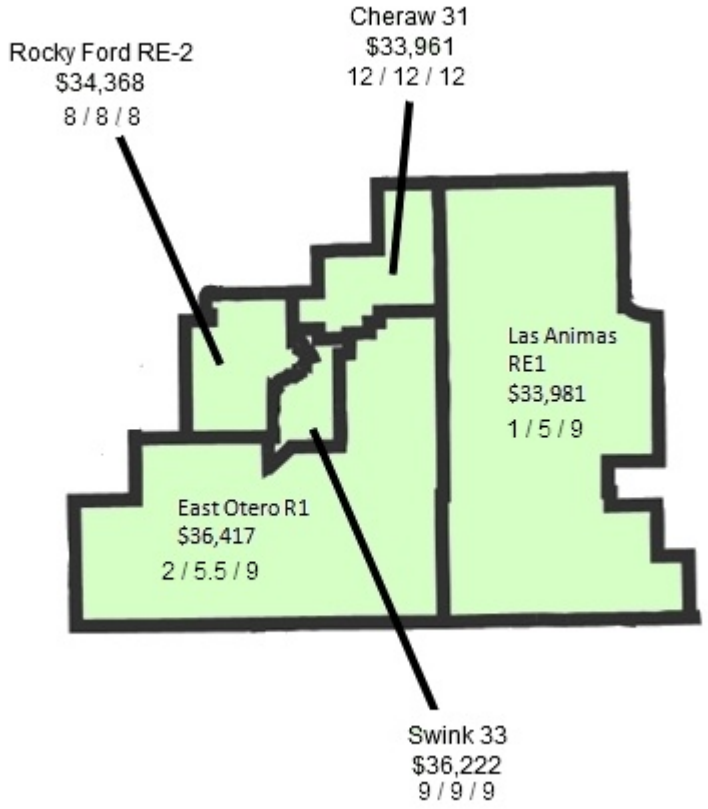


	Salary		Non-CSAP Offerings
	San Luis Valley	State	BOCES Range
Minimum	30,845	25,825	7.0
Average	37,675	39,366	9.2
Maximum	43,897	57,152	12.0

SAN LUIS VALLEY BOCES SQUARE MILES: 7,434

SANTA FE TRAILS BOCES AND SURROUNDING AREAS

AVERAGE TEACHER SALARIES AND NON-CSAP COURSE OFFERINGS (MIN/MEAN/MAX)

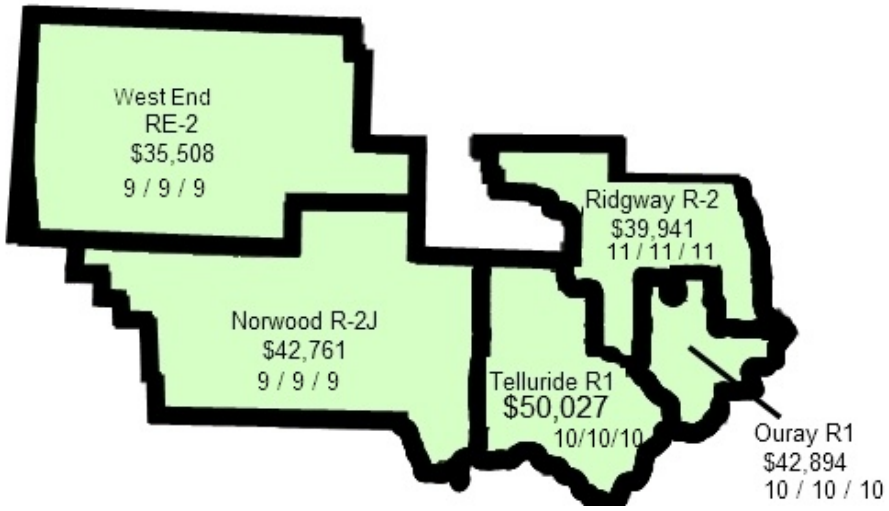


	Salary		Non-CSAP Offerings
	Santa Fe Trail	State	BOCES Range
Minimum	33,961	25,825	1.0
Average	34,990	39,366	7.9
Maximum	36,417	57,152	12.0

SANTA FE TRAILS BOCES SQUARE MILES: 1,918

UNCOMPAHGRE AND SURROUNDING AREAS

AVERAGE TEACHER SALARIES AND NON-CSAP COURSE OFFERINGS (MIN/MEAN/MAX)

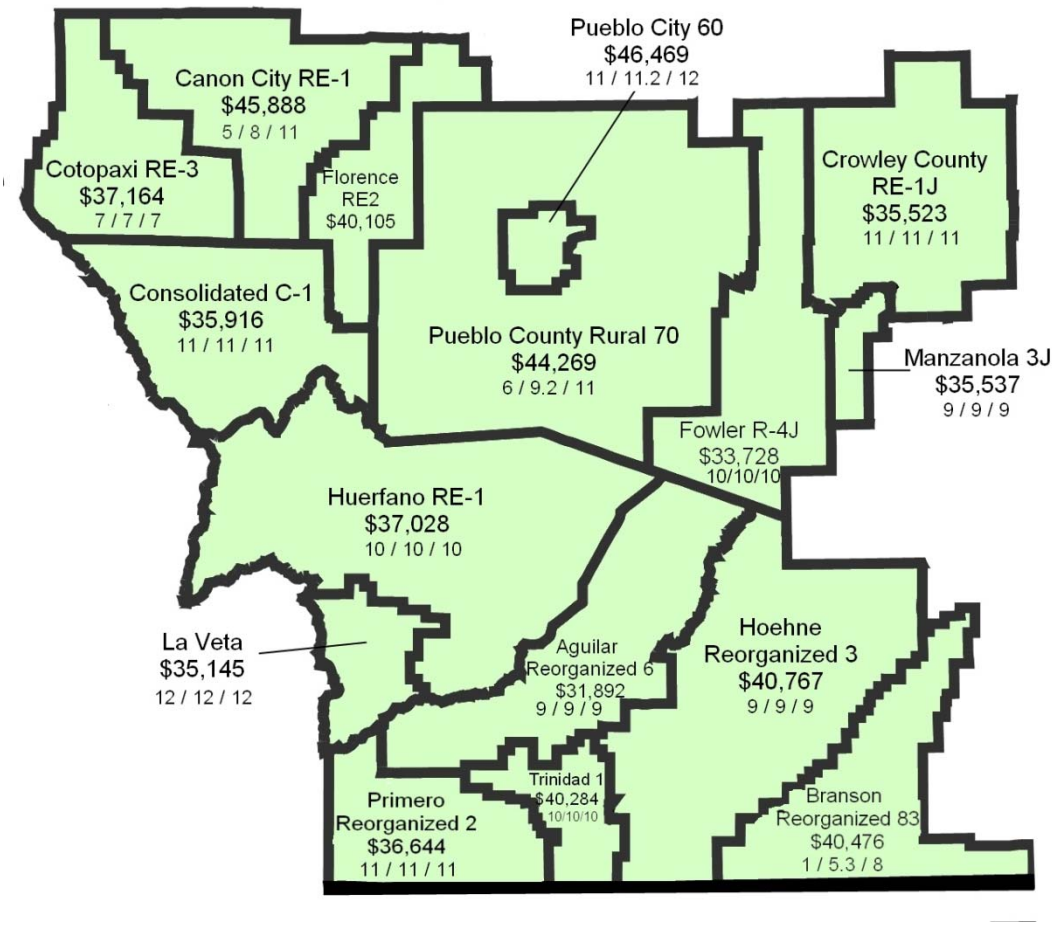


	Salary		Non-CSAP Offerings
	Uncompahgre	State	BOCES Range
Minimum	35,508	25,825	9.0
Average	42,226	39,366	9.8
Maximum	50,027	57,152	11.0

UNCOMPAHGRE SQUARE MILES: 2,529

SOUTH CENTRAL BOCES AND SURROUNDING AREAS

AVERAGE TEACHER SALARIES AND NON-CSAP COURSE OFFERINGS (MIN/MEAN/MAX)

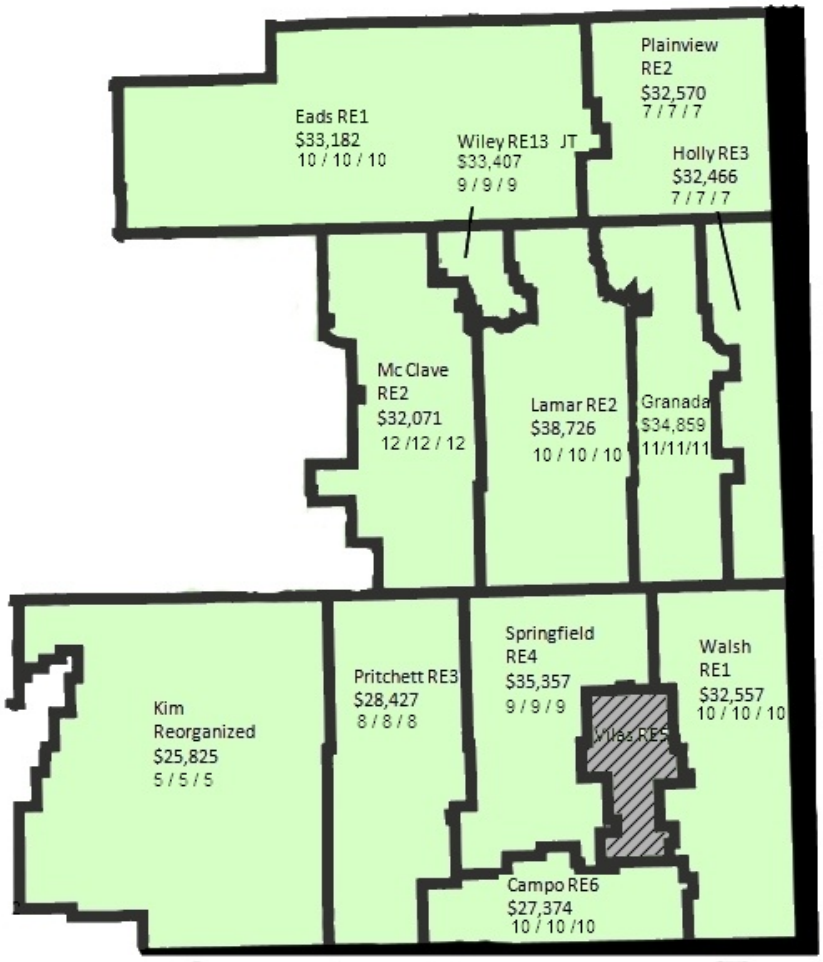


	Salary		Non-CSAP Offerings
	South Central	State	BOCES Range
Minimum	31,892	25,825	1.0
Average	38,552	39,366	9.5
Maximum	46,469	57,152	12.0

SOUTH CENTRAL BOCES SQUARE MILES: 10,616

SOUTHEASTERN BOCES AND SURROUNDING AREAS

AVERAGE TEACHER SALARIES AND NON-CSAP COURSE OFFERINGS (MIN/MEAN/MAX)

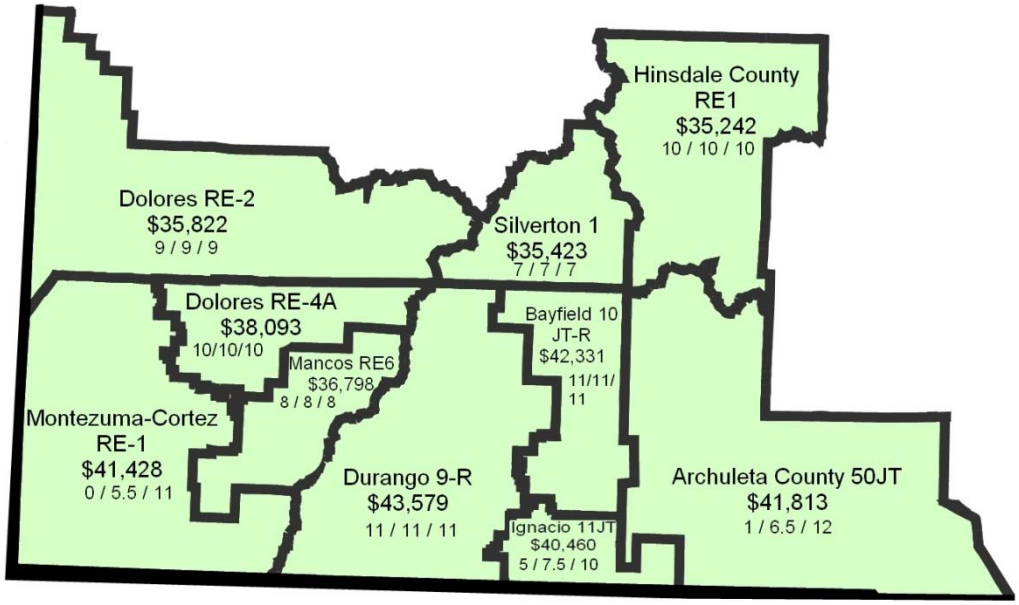


	Salary		Non-CSAP Offerings
	South Eastern	State	BOCES Range
Minimum	25,825	25,825	5.0
Average	32,235	39,366	9.0
Maximum	38,726	57,152	12.0

SOUTHEASTERN BOCES SQUARE MILES: 8,075

SOUTHWEST, SAN JUAN BOCES AND SURROUNDING AREAS

AVERAGE TEACHER SALARIES AND NON-CSAP COURSE OFFERINGS (MIN/MEAN/MAX)



	Salary		Non-CSAP Offerings
	Southwest San Juan	State	BOCES Range
Minimum	35,242	25,825	0
Average	39,099	39,366	8.6
Maximum	43,579	57,152	12.0

SOUTHWEST, SAN JUAN BOCES SQUARE MILES: 7,917

Chapter V
Funding Formula and Declining Enrollments

Most school district funding is based upon the per pupil funding formula as outlined in the Public School Finance Act of 1994 (Article 54). The funding formula provides a base per pupil amount which, in academic year 2007-08, was $5,087.61 (in academic year 2009-10 the base is $5,507.68 per pupil). Additions to the base amount to arrive at a total per pupil funding amount for each district are made as described below[33].

- ***Cost of Living Factor*** -- The cost of living factor reflects the differences in the costs of housing, goods, and services among each of the 178 school districts in the state. Cost differences are reviewed every two years to allow for timely recognition of economic changes. This factor is index-based, with a range from 1.010 to 1.647 in budget year 2009-10. The cost of living factor was modified in fiscal year 2004-05, replacing inflation with the increase in household income level. Now, a district's cost of living factor is increased based on its cost of living increase above the household income increase, rather than its increase above inflation.

- ***Personnel Costs Factor*** -- The personnel costs factor varies by school district based on enrollment. For all districts, employee salaries and benefits represent the largest single expense. As such, the formula directs funding based on these costs, using historical information and incorporating the above cost of living factor.

[33] These descriptions are from *Understanding Colorado School Finance and Categorical Program Funding*, Colorado Department of Education, July 2009.

- ***Size Factor*** -- Like the above personnel costs factor, the size factor is determined using an enrollment-based calculation and is unique to each school district. This factor is included to recognize purchasing power differences among districts and to reflect the expression of funding on a per-pupil basis. "Smaller" districts (fewer than 4,023 pupils) receive greater size factors and, thus, increased funding (there are steps at 276, 459, 1027, 2,293, and 4,023 pupils). Districts with greater than 4,023 pupils receive more moderate size factor adjustments. A district with fewer than 500 pupils in which a charter school operates, receives an additional, compensating adjustment via an increased size factor designed to help mitigate the impacts of such an arrangement in a small district. Size factors are projected to range from 1.0297 to 2.3981 in fiscal year 2009-10. Each size factor was reduced by .0045 in fiscal year 2003-04.

- ***At-Risk Funding*** -- Eligibility for participation in the federal free lunch program is used as a proxy of each school district's at-risk pupil population. Increased funding is provided to recognize that expenses among districts vary, as pupil populations vary, especially at-risk populations. For each at-risk pupil, a district receives funding equal to at least 12%, but no more than 30%, of its Total Per-Pupil Funding (see prior discussion). As a district's percent of at-risk population increases above the statewide average (roughly 32.61%), an increased amount of at-risk funding is provided.

  A district receives funding for the greater of: (1) each *actual* pupil eligible for the federal free lunch program; or

(2) a *calculated* number of pupils based on the number of pupils in grades 1-8 eligible for the federal free lunch program as a percent of the district's entire population. Beginning in fiscal year 2005-06 the definition of at-risk students was expanded to include students whose CSAP scores are not included in calculating a school's performance grade because the student's dominant language is not English and who are also not eligible for free lunch.

- ***On-Line Funding*** -- Pupils enrolled in a certified multi-district on-line program are funded at a fixed per pupil amount ($6,135 in academic year 2007-08 and $6,641 in 2009-10). Pupils enrolled in a single-district on-line program are funded at the district's current per pupil funding amount. A single-district program is defined as a district on-line program which enrolls no more than 10 students from another district.

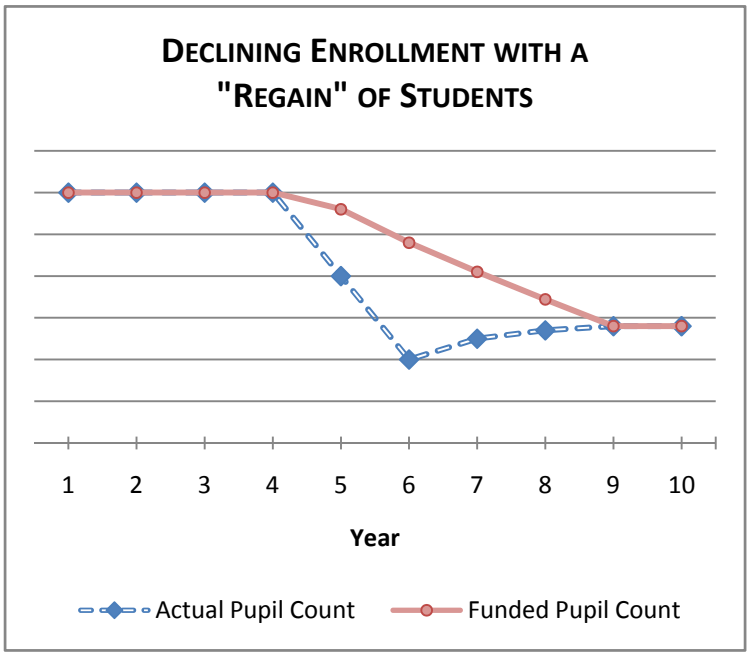
Averaging Enrollment in the Funding Formula

Because the funding formula is based on funded pupil count, which in turn is based on enrollment, changes in enrollment can have a major impact on school district funding, especially for school districts experiencing declining enrollments. However, the funding formula includes an adjustment to help mitigate the financial impact of declining enrollment. For districts with declining enrollment, the public school funding formula allows districts to utilize the average enrollment over the last two to five years (whatever is most advantageous to the school district) when determining their funded pupil count. This averaging allows school districts time to adjust instructional and/or other staffing or administration costs in response to declining enrollment.

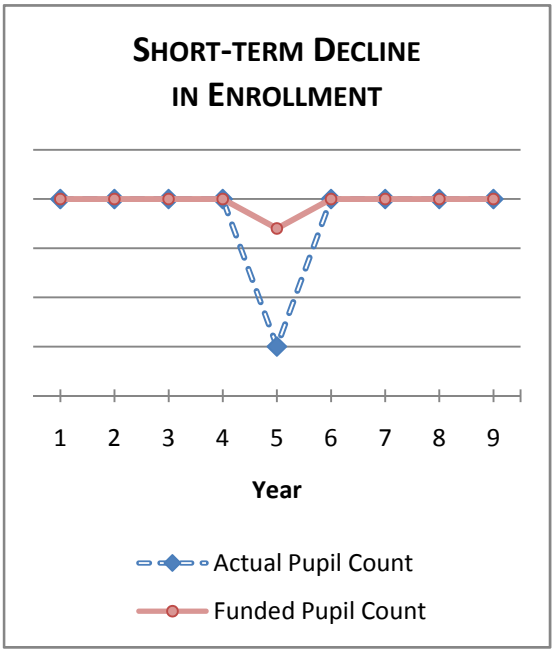
Several superintendents in declining enrollment districts noted that if their school district had inconsistent enrollments (e.g., they regained students in a year after several years of decline), their total program funding could continue to decline over the prior year. This is a legitimate concern in the short-term for school districts but not necessarily a flaw in the funding formula. A hypothetical example (illustrated in the chart below) demonstrates the reason for this seemingly anomalous result.

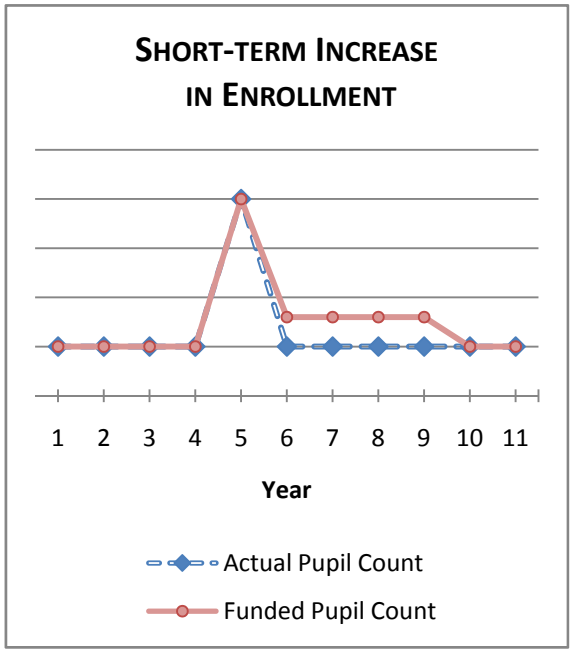
- From years 6 to 9, the actual pupil count increases although the funded pupil count (and per pupil funding) continues to decline. This is the result of the averaging of the declining enrollments.

- The five year average continues to be greater than the actual pupils until year 9, and although revenues to the school district continue to decline, they remain higher than they otherwise would have been absent the five year averaging.



In fact, whenever enrollment decreases, enrollment averaging criteria will increase funding relative to what it would be without averaging. This is illustrated in the two following charts, which depict the impact of a one-year increase and decrease in enrollment, respectively. In both cases, enrollment averaging provides the school district greater funding than they otherwise would have had, absent the averaging provision.





Enrollment averaging can provide short-term funding stability to districts facing decreases in enrollment, although the school district superintendents indicate this averaging (and potential change in size adjustment) is not adequate to offset the impacts of declining enrollment because of the "fixed" nature of many of their costs as:

- teachers may be under contract and/or districts are understandably reluctant to let go of these critical resources

- the operations and maintenance of buildings is largely independent of the number of students in them

- the cost of providing transportation is largely independent of the number of students on each route, etc.

Two important caveats to enrollment averaging relate to charter schools.

- When a student transfers from a traditional school to a charter school within the same district, almost all of their per pupil funding also transfers to the charter school.[34] Consequently, when traditional enrollment falls because of charter enrollment, the traditional schools must accommodate those decreases immediately rather than over the five year period allowed by enrollment averaging when students leave for other reasons.

- Additionally, enrollment averaging provides incentive to reallocate charter schools to the Charter School Institute with no apparent increase in "choice" but resulting in an increased cost to the state in the delivery of educational services.

Both of these phenomena and their impacts are described in detail in the next chapter while the following pages discuss potential issues of extending the enrollment averaging to individual charter schools.

[34] Except for up to 5% which can be retained by the school district to help offset the increased administration expenses associated with the charter school.

Effect of Averaging Enrollment for a Charter School

Inquiries have been forwarded regarding the effect of adjusting the present "averaging enrollment" criteria to allow a charter school to average enrollment in a similar manner as the school district is allowed to average enrollment. (Recall, the school finance act currently is based on the enrollment of the school district, not on individual school enrollments and, as such, this charter school enrollment averaging would require a change in the present funding formula.)

- This would suggest all charter schools in the state would be included in a calculation within the school finance formula separate from the present "averaging enrollment" calculation for a school district.

- To allow charter schools such an adjustment also raises the argument for an adjustment for individual schools within a school district.

- That is, the equity of such an adjustment for only charter schools *vis-à-vis* other individual schools within the school district should be considered in any policy decision, as a change in the funding formula impacts all schools within the school district.

Additionally, unintended consequences could arise. For example, the student population of a specific charter may be in a declining enrollment situation that may NOT trigger a declining enrollment calculation for the entire school district.

- Additional funding would be necessary in a case where an individual charter school's averaging would result in a higher funded pupil count than the actual pupil count of

the school, if the school district's pupil count as a whole was in a growth mode and did not fall into the averaging calculation.

- Also, it would not be prudent to expect the school district to pay the charter school for a higher number of students when the district is only receiving per pupil funding for the actual number of students being counted.

On the other hand, if the school district as a whole is in a declining enrollment environment, the district receives funding for the averaged enrollment, which is higher than the number of students actually being served.

- It may be that the charter school is also in declining enrollment, generating a portion of the additional revenue the district receives.

- In that instance, the charter school is still only being funded for the actual number of students it is serving and the district receives the benefit of the averaged count increase.

Recognizing that the school finance formula is district enrollment focused, it may be possible to complete a calculation for charter schools outside the formula that would create a funding stream to offset declining enrollment within the charter schools.

- Of note, this also impacts the charter schools within the Charter School Institute. The enrollments of these charter schools are added to the enrollments of the school district within whose boundaries the charter school is located. These charter schools receive the per pupil funding of

those districts and are funded for the number of students actually being served. These charter schools do not get the benefit of averaged counts.

To incorporate such a calculation into the existing formula increases the complexity of the funding formula and potentially creates other unintended consequences, especially as the number of charter schools continues to grow.

- The effects of averaging charter school enrollments would be conditional on the change in enrollment at each individual school from year to year.

- Online pupil counts are not included in the averaging formula, so charter schools with predominately online students would not benefit from enrollment averaging for any decline in online pupil counts.

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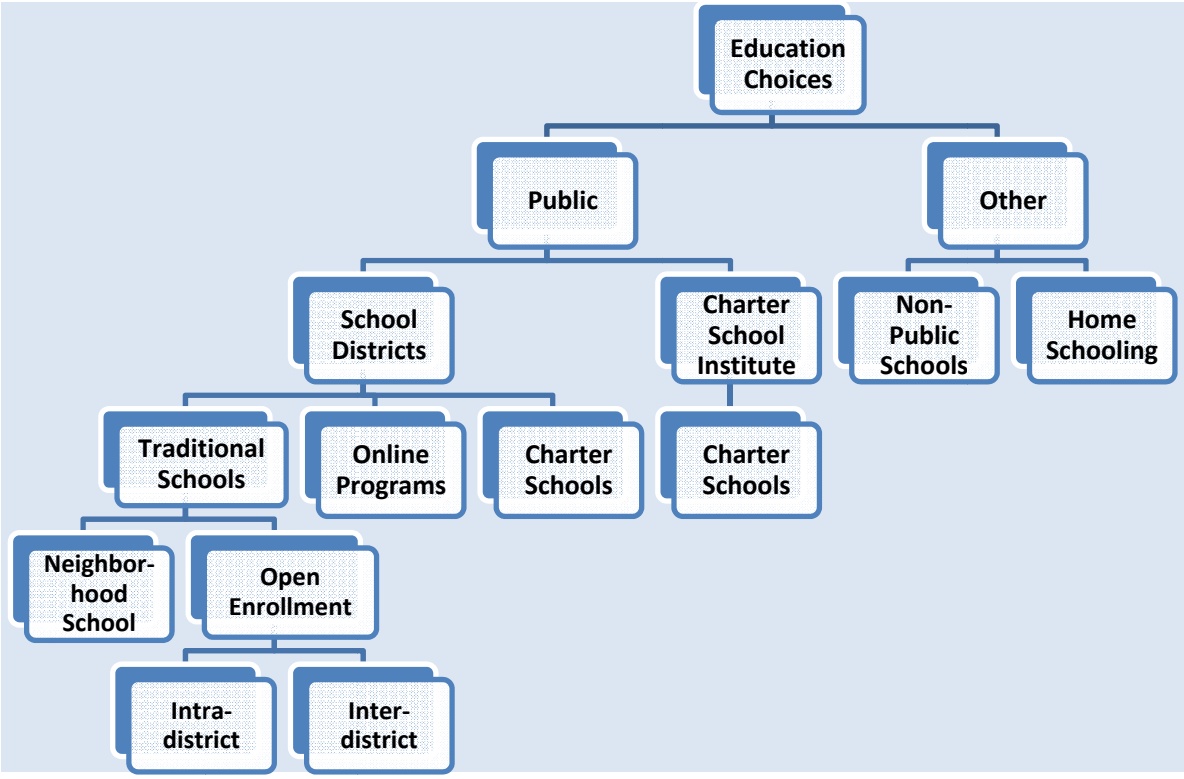
Chapter VI
Education Choice

Colorado students have an increasing number of options for their education including traditional public schools in any district, charter schools, online education, non-public education and home schools. These options are illustrated in the following diagram with more detail afterwards.

Colorado Education Choices[35]



[35] Note: Online programs are not necessarily distinct from other schools, as traditional and charter schools may both operate an online program.

Traditional Public Schools and Open Enrollment

Historically, students attended what is referred to as the "neighborhood school". The school districts determined the boundaries for each school, and if a child lived within those boundaries, they would attend that school. More recently, new educational choices have become available both within and outside the school district. Open enrollment commenced (initially on a limited basis) in the mid 1990s, allowing students to attend a different school within the same district as their "neighborhood school" (intra-district enrollment) or a school from a different district altogether (inter-district enrollment). Although there are some restrictions on open enrollment (largely related to the availability of space or teaching staff), students in Colorado may generally choose to attend any public school within the state. (For purposes of this study, "traditional students" refers to students who are attending public schools that are not charter schools.)

Open enrollment has created mobility among school districts and, in academic year 2009-10, approximately 61,000 students were considered "outgoing," i.e., were educated in a district other than their own.[36] In smaller sized school districts (as measured by square miles), the mobility across district lines is relatively easier as in most instances the incoming students are not provided transportation to a school that is not within their neighborhood district. Charts at the end of this chapter identify the numbers of incoming and outgoing students by school district.

[36] This "outgoing" figure includes students attending charter schools outside the school district in which they reside and students attending Charter School Institute schools.

Charter Schools

The General Assembly enacted the Colorado Charter Schools Act in 1993 and, since then, the number of charter schools has increased to 154 schools as of academic year 2009-10. [37] Most of Colorado's charter schools exist in the front range cities although there are some rural charter schools in the mountain and plains regions of the state. The Charter School Institute (CSI) was established in 2004 as a second charter school authorizer (the first is the district where the charter school is located). The CSI may authorize charter schools in districts that have not retained exclusive authority to authorize charter schools. Therefore, a charter school may now be administered by a school district or the CSI. Key characteristics of charter schools relative to other schools funded by the state are presented in the following table. Of note, charter schools tend to have a higher student-teacher ratio as well as teachers who, on average, have less experience and who are being paid lower salaries. The charter schools also have a lower percent of students with special needs or at-risk students.

Charter School Characteristics

	Charter Schools 2007-2008	Statewide 2007-2008	Districts where the Charter Schools Reside 2007-2008
Student to teacher ratio	17.9	13.1	
Percent of students eligible for free or reduced-price lunch	25%	35%	
Percent of students with disabilities	7%	10%	
Average teacher salary	$34,657		$45,950
Average teacher experience	6.53 years	11 years	
Average percent of teachers teaching the subject in which they received their degree	55%		70%
Average administrator salary	$68,094		$79,847

Source: The State of Charter Schools in Colorado, June 2009. Colorado Department of Education.

[37] Carpenter, D. and K. Kafer. *The State of Charter Schools in Colorado, June 2009*. Colorado Department of Education.

Online Learning

An increasing number of Colorado students are choosing online learning. From academic year 2002-03 to 2007-08, the number of online students increased from about 1,400 to over 5,200 (if Vilas RE-5 is included, the number of online students increased from about 1,400 to over 8,700). There are single-district online programs as well as programs that have received multi-district certification. When an online program services over ten students from outside of the authorizing district, the program must receive multi-district certification from CDE. A few school districts have a very large number of online students relative to total funded enrollment (in academic year 2007-08, Branson Reorganized 82 had 575 online students out of a total funded of 626, Karval RE-23 had 154 out of 212, and, although not included in our analysis, Vilas RE-5 had 3,444 out of 3,508). Beginning with the 2008-09 school year, Senate Bill 07-215 repealed a requirement that students not be home schooled or in a private school in the preceding school year. The repeal of this requirement allowed an additional 2,031 students to enroll in Colorado's Online Programs for the 2008-09 academic year.[38]

Other (Non-Public Schools and Home Schooling)

Non-public schools are private, parochial, or independent schools which provide education to school age children. Neither the State Board of Education nor any local board of education has jurisdiction over the internal affairs of these schools. These schools are not funded by the state of Colorado.

Homeschooling is deregulated in Colorado so that parents or guardians who wish to home school their children take on all of the responsibility for their students' education including acquisition of books, supplies and tests. No public funding is available for home schooled students.

[38] *Summary Report of the Operations and Activities of Online Programs in Colorado, February 1, 2009.* Colorado Department of Education, Unit of Online Learning.

Economic Impact of Education Choice on Funding

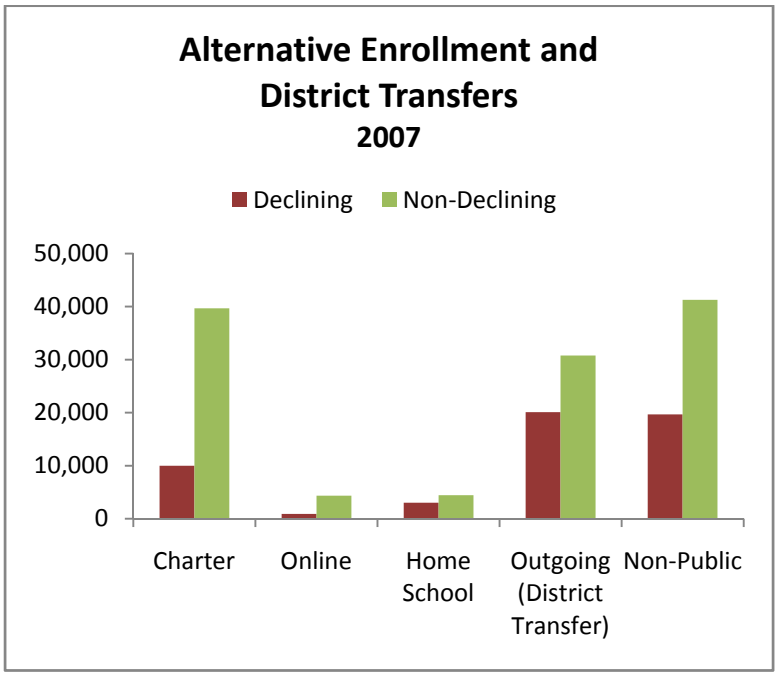
The following charts illustrate that enrollment in non-traditional schools is larger in non-declining school districts than in declining school districts (this may result because declining school districts tend to have smaller total enrollment). Education choice may be shifting students away from declining districts towards non-declining school districts (e.g., declining districts have a higher percent of outgoing students and a lower percent of charter students). The various education choices illustrated in those charts differ in their impact on school finance. Some choice options that have had nominal impact on school district funding and on total state costs over academic years 2002-03 to 2007-08 include non-public, home schooling, online learning, and intra-district enrollment (attending a different school within same school district).

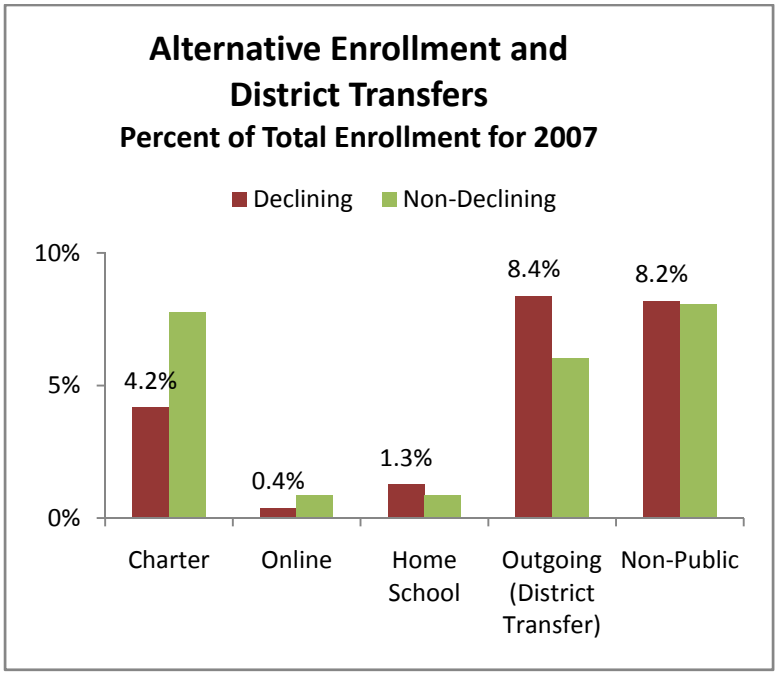
Inter-district enrollment (attending a different school district) can impact school district funding as it increases the funded pupil count in districts with a net import of students and decreases the funded pupil count in districts with a net export of students, although the impact on the total cost to the state is likely nominal.

The funding of school district authorized charter schools also has little impact on state costs but does impact funding for the traditional schools within the school district as most of the per pupil funding follows a student to whatever type of school (traditional or charter) they attend (illustrated below in Example 1).[39]

However, shifting the authorization of a charter school from the district to the CSI costs the state additional monies to educate the same students with no increase in choice options (illustrated below in Example 2). (The increased costs are associated with the enrollment averaging opportunities for the school district as well as a potential size factor change.)

[39] Although the district may retain up to 5% (with some exceptions) of the per-pupil charter school funding to cover administration expenses.


Alternative Enrollment and
District Transfers
2007
Declining
Non-Declining
50,000
40,000
30,000
20,000
10,000
0
Charter
Online
Home School
Outgoing (District Transfer)
Non-Public


Alternative Enrollment and
District Transfers
Percent of Total Enrollment for 2007
Declining
Non-Declining
10%
5%
0%
4.2%
0.4%
1.3%
8.4%
8.2%
Charter
Online
Home School
Outgoing (District Transfer)
Non-Public

Example 1: *Most of the per pupil funding follows a student to whatever type of school (traditional or charter) they attend.*[40]

As a simplified example, suppose absent charter schools, charter school students would have attended the district schools in which they reside.

- If the number of funded students (traditional plus charter) is 30,000 and the district per pupil funding is $6,500, the total program funding to the district amounts to $195 million.

- If the school district has 3,000 charter school students, at the same per pupil funding of $6,500, $19.5 million of the $195 million (or 10%) is now not available to the traditional schools in the district although the costs to the state are the same.

- While there is no avenue in the short-term to adjust instructional, administration or operations/maintenance costs, there are some cost savings for food service, transportation, etc. The data indicate that likely as much as 20 percent of these costs would not be incurred, still leaving an 8% loss in funding for existing traditional schools.

[40] School district professionals also indicate that a related but slight different issue is that there is a financial disincentive for school districts to open a charter school, especially for declining enrollment districts.

- If there is advanced notice, the school districts may adjust class sizes, course offerings, and other instruction related expenses to provide for reductions in instructional expenditures associated with reductions in traditional enrollment.

- If a school district would have required an additional facility to meet demographic needs, the funding losses to the traditional school may be further mitigated.

<u>Example 2</u>: Shifting the authorization of a charter school from the district to the CSI costs the state additional monies to educate the same students with no increase in choice options.

Although a likely unintended consequence of the interaction between the enrollment averaging and the creation of the CSI, it nonetheless costs the state and local taxing districts additional monies to educate the same number of students under essentially the same circumstances. This additional cost occurs because the district is allowed to use the enrollment averaging once the charter school is designated as a CSI school as those students are no longer considered district students.

- Again for simplicity, consider a school district of 10,000 students with a per pupil funding of $6,500, amounting to total program funding of $65 million. Of the 10,000 students in the school district, suppose 1,000 students begin to attend charter schools.

- Once the authorization of the charter schools is shifted to the CSI, the school district becomes eligible for enrollment averaging, which allows the school district to essentially keep 80% of the funding for those charter school students in the first year of enrollment averaging (amounting to $5.2 million = 800 * $6,500), 60% in the second year, etc. for a total in this example of $13 million.

- This is an additional cost to the state and local taxing districts because those students are now also fully funded as CSI students. However, this increased cost to the state provides no additional school choice options.

Other Economic Costs of Education Choice

Education choice also impacts the cost of operating traditional schools. That is, cost is related to choice because some students are more expensive to educate than others but the state is required to provide an adequate education to all students.

- The data indicate that, irrespective of the enrollment trend, the traditional schools carry a disproportionate share of the responsibilities for the more expensive students, specifically those at-risk and with special needs.

- It is broadly acknowledged that the additional monies allocated to school districts for at-risk and special education do not fully cover the expenses associated with these students, and districts must spend less elsewhere to

provide educational services to at-risk or special education students.

- Another alternative education choice, online learning, may also be impacting school district costs as the expenditure requirements for online instruction differ from a traditional classroom; however, limited data did not allow analysis of this cost in the study.

A second way education choice impacts costs is if a new school facility (which would not otherwise be needed) is required to house this education alternative.

- Regardless of how monies are allocated between traditional and charter schools, the addition of a school will generally increase the total district overhead and reduce the funds, particularly impacting instructional expenditures. If a new school facility would have been required because of enrollment increases or changes in demographics, some of the extra costs associated with the opening of a new school would be mitigated.

- Also, there are capital needs associated with a new school that impact operating costs. If the provisions for capital needs are from the state and the new facility is strictly to meet education choice (and not an increase in enrollment or demographic change), then this choice has increased the cost to the state and taxpayers. Similarly, if the school district was in need of a new facility, then the capital costs would be mitigated.

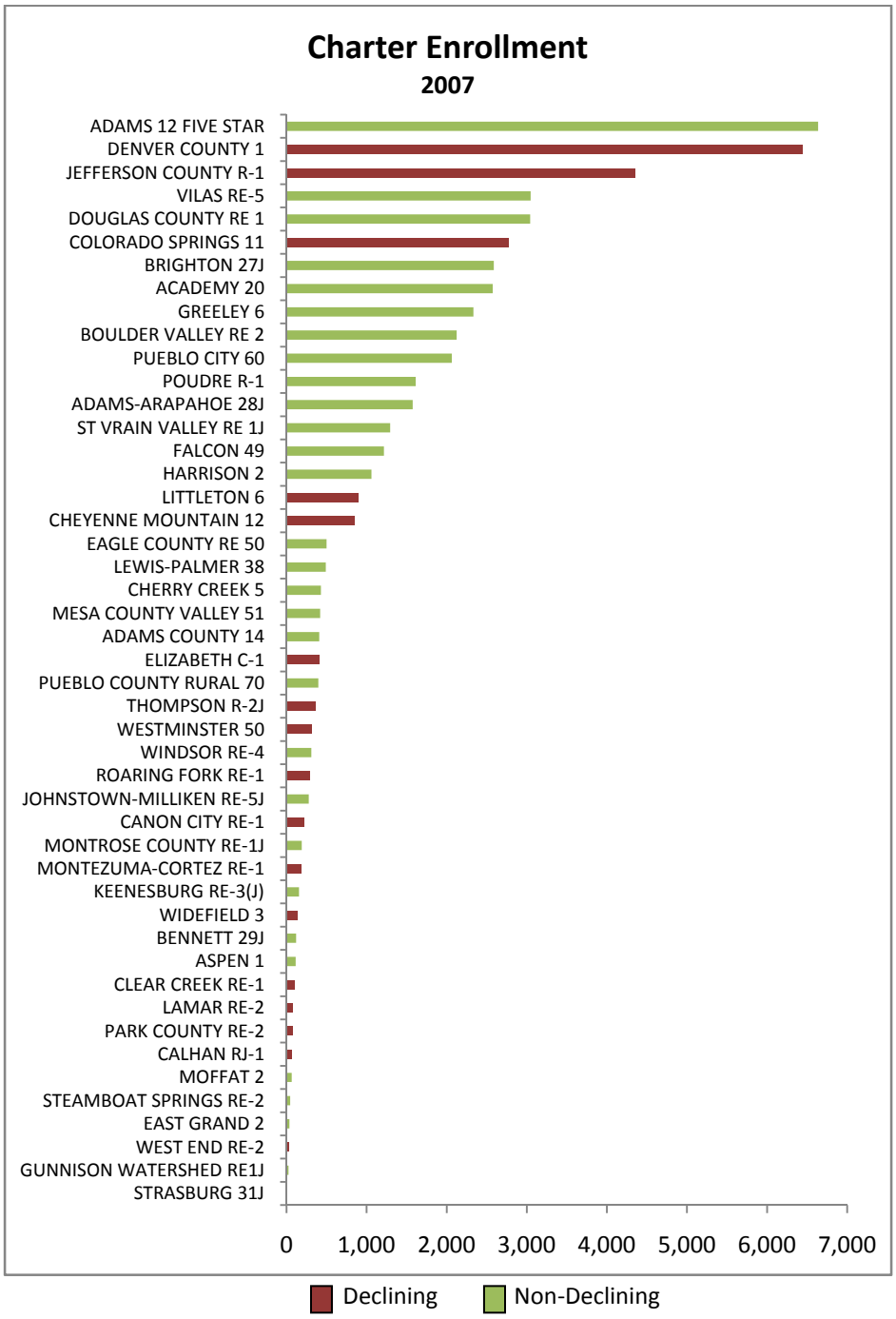
Given the recent environment where charter school students have increased by approximately 85% from academic years 2002-03 and 2007-08 (from approximately 27,000 to 49,700 students), it is important to understand how the growth in charter enrollment impacts the expenditures of the traditional schools because of the potentially large impacts on the financing.

- The analysis indicates that, to date, school districts have decreased expenditures proportionally across all major budget categories. That is, they have been able to maintain the same relative spending on budget categories, albeit at lower spending levels. [41]

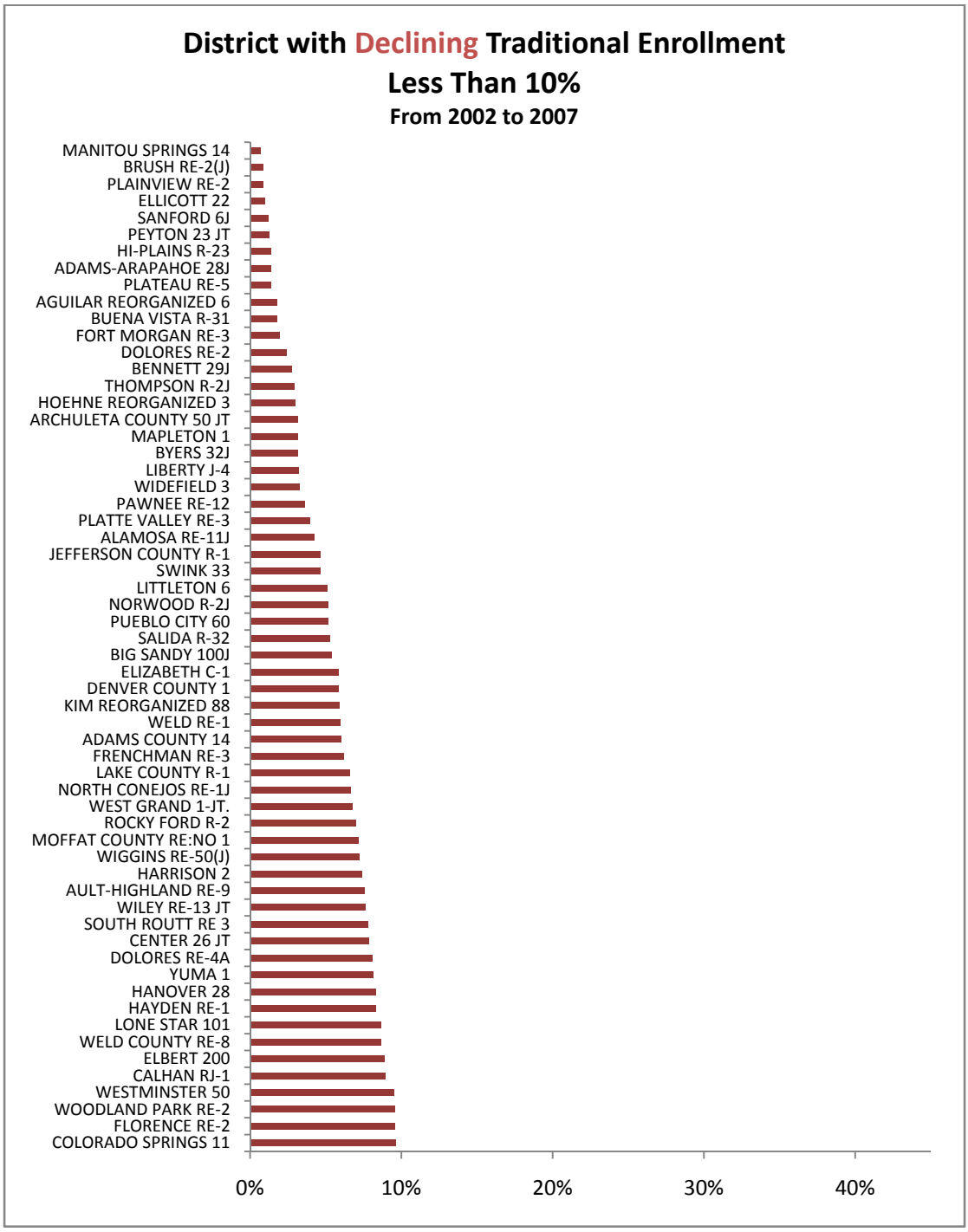
- However, if budgets do not increase by at least an inflationary per pupil rate, increases in charter enrollment would be expected to negatively impact expenditure categories given the fixed costs identified in the delivery of education services. The budget categories likely to be affected include other instruction but more importantly (although to a lesser degree) administration, salaries and benefits, and food service expenditures.

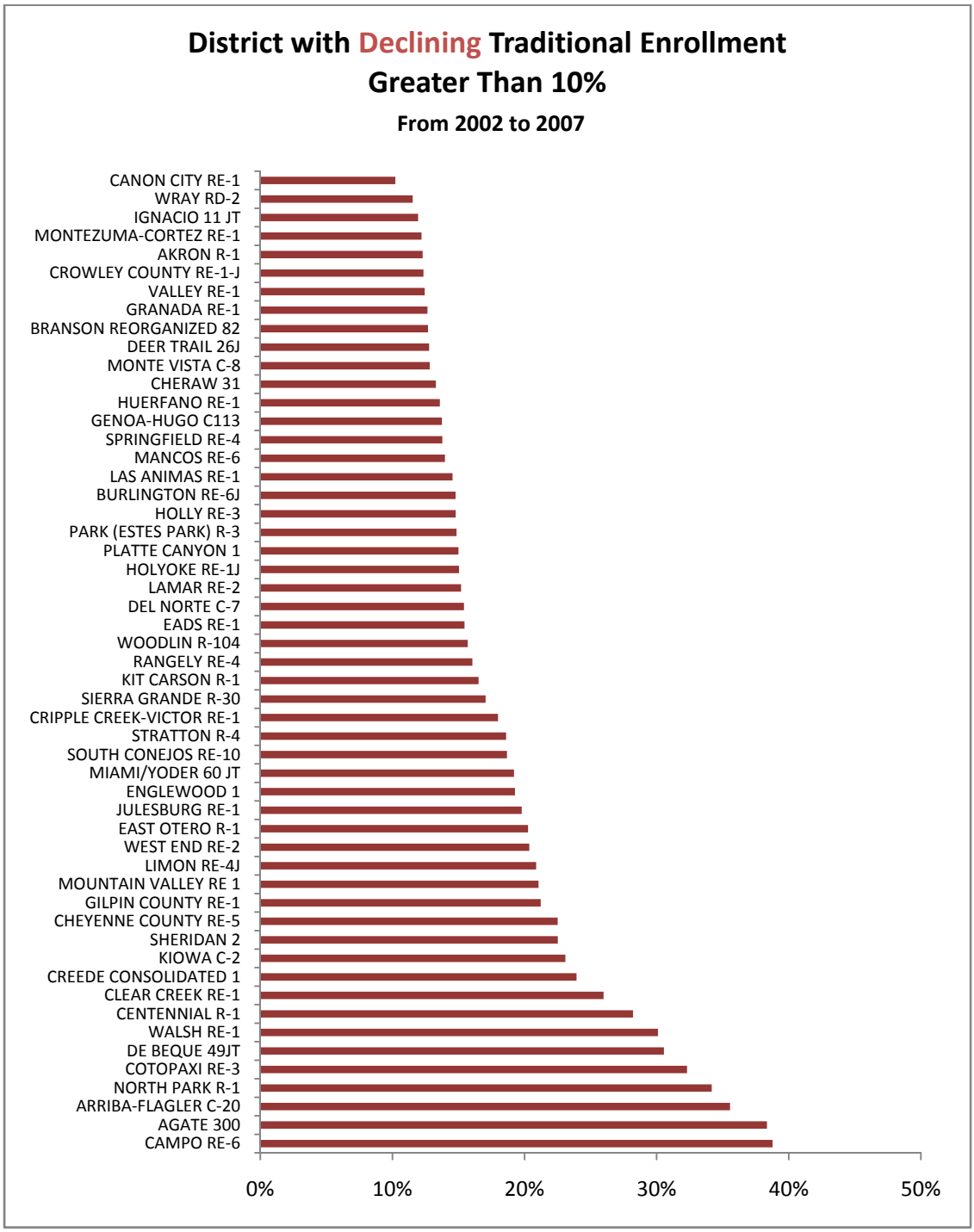
The following charts provide school district information for charter, traditional, and incoming/outgoing enrollments.

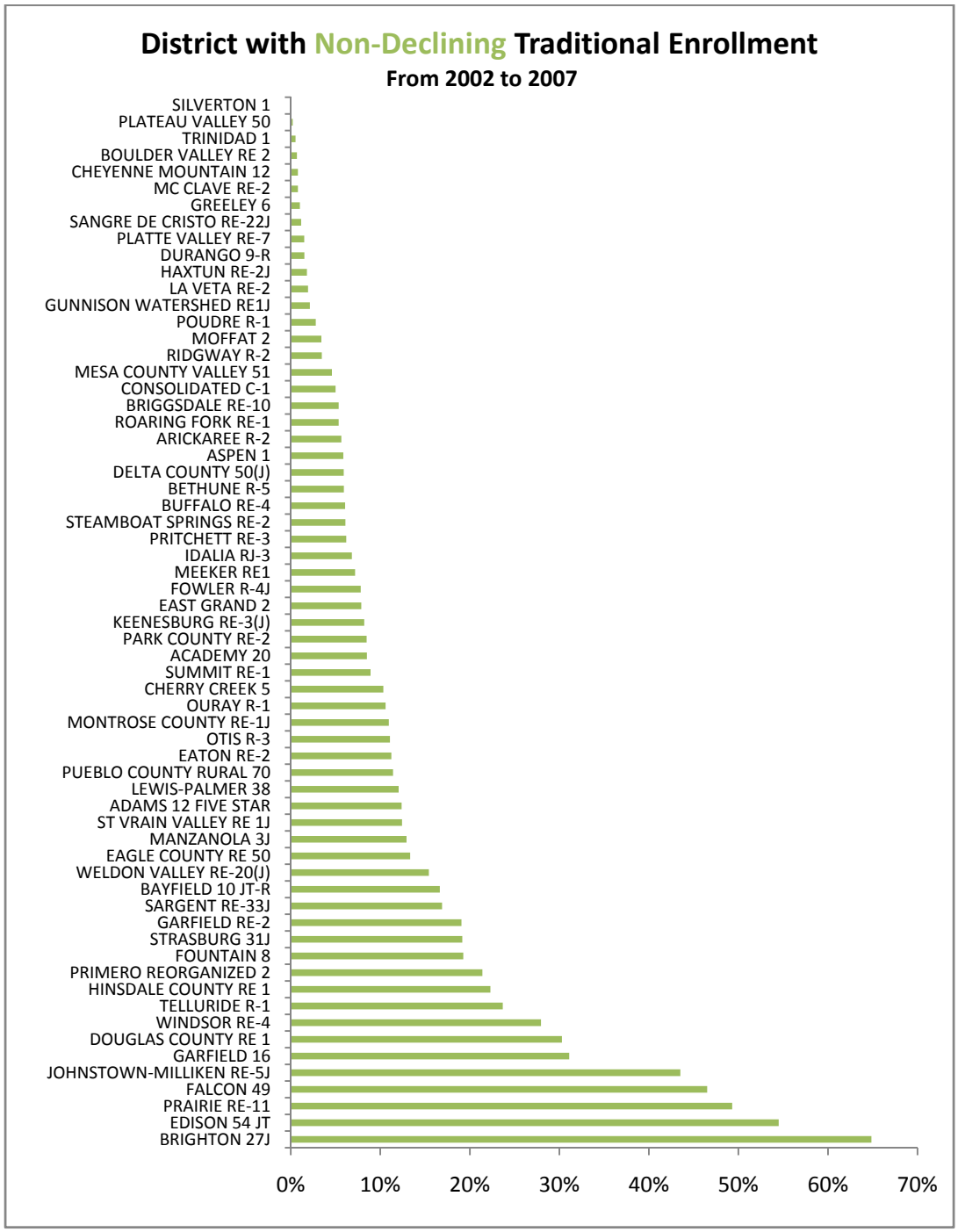
[41] This analysis included the same descriptive statistics and regression analysis (but isolating charter school expenditures as discussed in Chapter 4 of the full report).



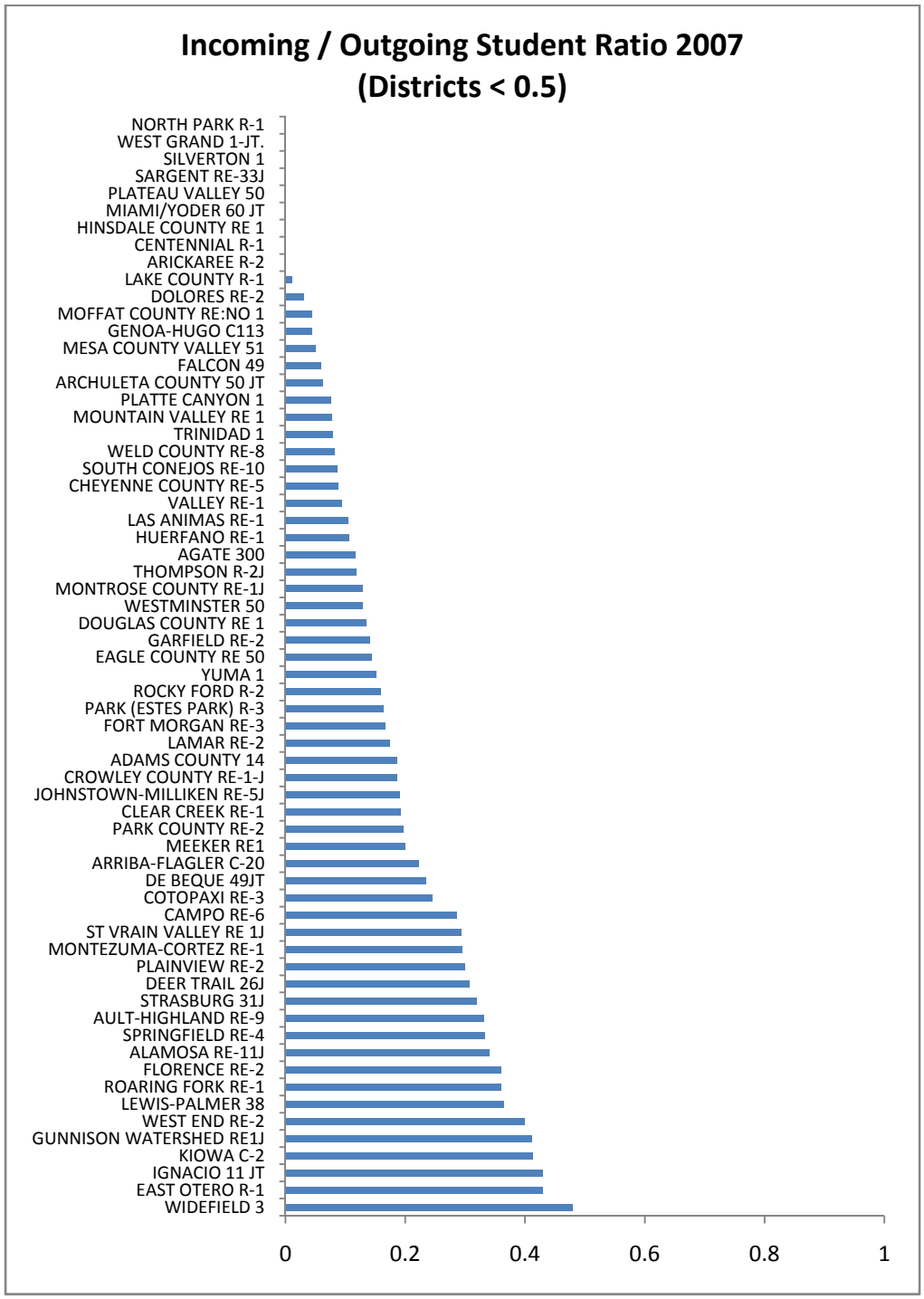
Includes Vilas RE-5 for informational purposes.

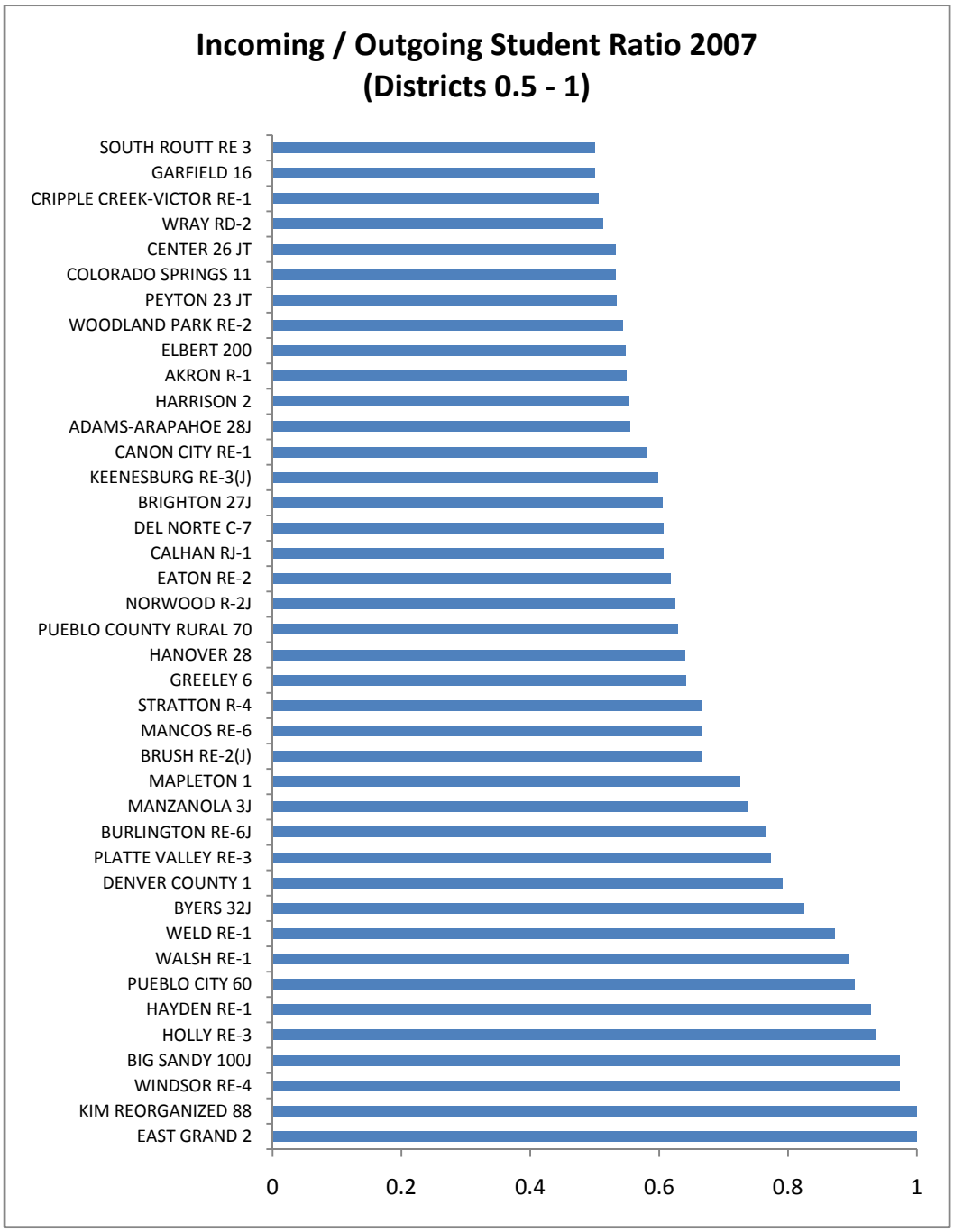

District with Declining Traditional Enrollment
Less Than 10%
From 2002 to 2007
MANITOU SPRINGS 14
BRUSH RE-2(J)
PLAINVIEW RE-2
ELLICOTT 22
SANFORD 6J
PEYTON 23 JT
HI-PLAINS R-23
ADAMS-ARAPAHOE 28J
PLATEAU RE-5
AGUILAR REORGANIZED 6
BUENA VISTA R-31
FORT MORGAN RE-3
DOLORES RE-2
BENNETT 29J
THOMPSON R-2J
HOEHNE REORGANIZED 3
ARCHULETA COUNTY 50 JT
MAPLETON 1
BYERS 32J
LIBERTY J-4
WIDEFIELD 3
PAWNEE RE-12
PLATTE VALLEY RE-3
ALAMOSA RE-11J
JEFFERSON COUNTY R-1
SWINK 33
LITTLETON 6
NORWOOD R-2J
PUEBLO CITY 60
SALIDA R-32
BIG SANDY 100J
ELIZABETH C-1
DENVER COUNTY 1
KIM REORGANIZED 88
WELD RE-1
ADAMS COUNTY 14
FRENCHMAN RE-3
LAKE COUNTY R-1
NORTH CONEJOS RE-1J
WEST GRAND 1-JT.
ROCKY FORD R-2
MOFFAT COUNTY RE:NO 1
WIGGINS RE-50(J)
HARRISON 2
AULT-HIGHLAND RE-9
WILEY RE-13 JT
SOUTH ROUTT RE 3
CENTER 26 JT
DOLORES RE-4A
YUMA 1
HANOVER 28
HAYDEN RE-1
LONE STAR 101
WELD COUNTY RE-8
ELBERT 200
CALHAN RJ-1
WESTMINSTER 50
WOODLAND PARK RE-2
FLORENCE RE-2
COLORADO SPRINGS 11
0%
10%
20%
30%
40%

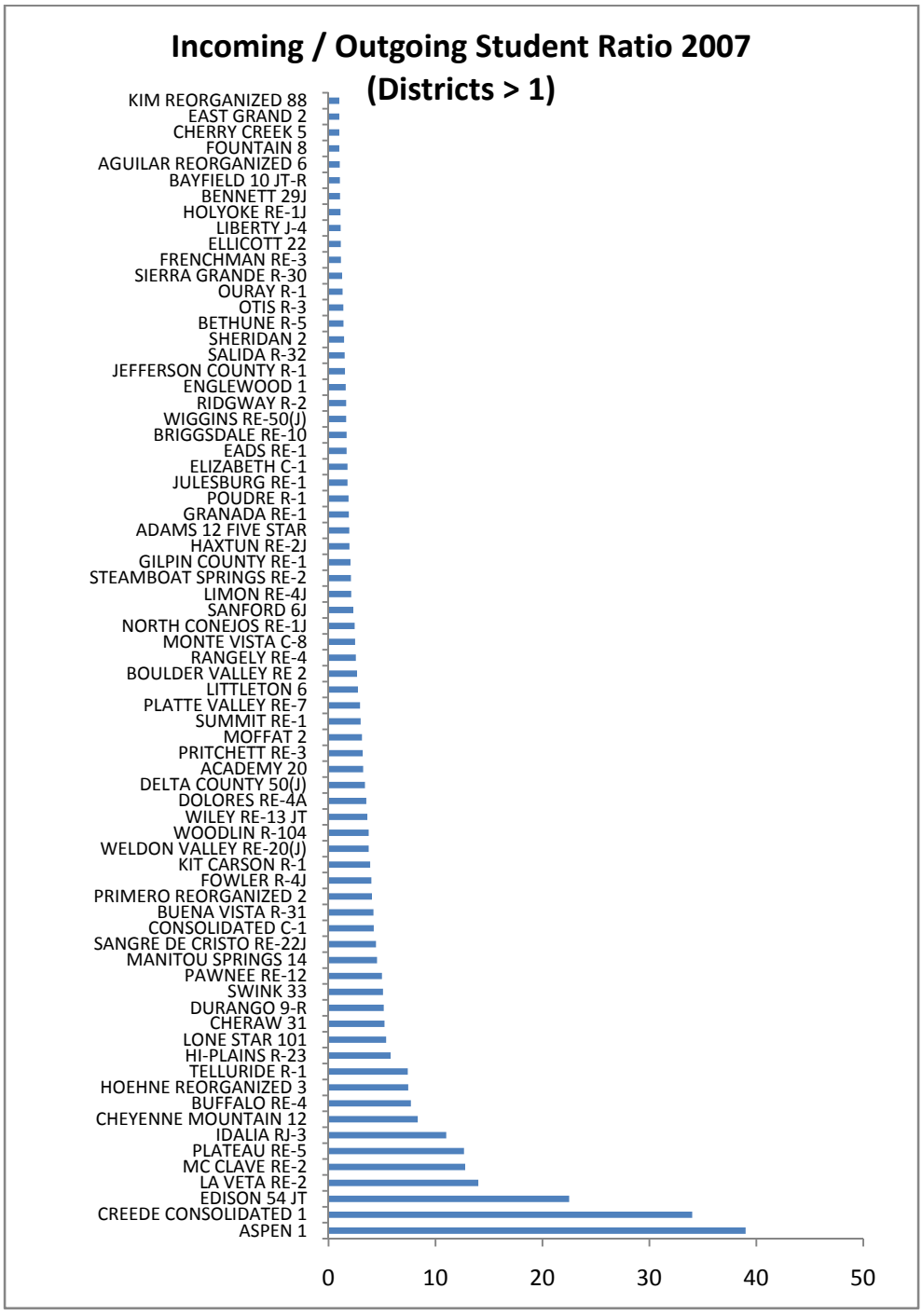

District with Declining Traditional Enrollment
Greater Than 10%
From 2002 to 2007
CANON CITY RE-1
WRAY RD-2
IGNACIO 11 JT
MONTEZUMA-CORTEZ RE-1
AKRON R-1
CROWLEY COUNTY RE-1-J
VALLEY RE-1
GRANADA RE-1
BRANSON REORGANIZED 82
DEER TRAIL 26J
MONTE VISTA C-8
CHERAW 31
HUERFANO RE-1
GENOA-HUGO C113
SPRINGFIELD RE-4
MANCOS RE-6
LAS ANIMAS RE-1
BURLINGTON RE-6J
HOLLY RE-3
PARK (ESTES PARK) R-3
PLATTE CANYON 1
HOLYOKE RE-1J
LAMAR RE-2
DEL NORTE C-7
EADS RE-1
WOODLIN R-104
RANGELY RE-4
KIT CARSON R-1
SIERRA GRANDE R-30
CRIPPLE CREEK-VICTOR RE-1
STRATTON R-4
SOUTH CONEJOS RE-10
MIAMI/YODER 60 JT
ENGLEWOOD 1
JULESBURG RE-1
EAST OTERO R-1
WEST END RE-2
LIMON RE-4J
MOUNTAIN VALLEY RE 1
GILPIN COUNTY RE-1
CHEYENNE COUNTY RE-5
SHERIDAN 2
KIOWA C-2
CREEDE CONSOLIDATED 1
CLEAR CREEK RE-1
CENTENNIAL R-1
WALSH RE-1
DE BEQUE 49JT
COTOPAXI RE-3
NORTH PARK R-1
ARRIBA-FLAGLER C-20
AGATE 300
CAMPO RE-6
0%
10%
20%
30%
40%
50%



**Villas RE-5, and Karval RE-23 removed (outliers)*


Incoming / Outgoing Student Ratio 2007
(Districts < 0.5)
NORTH PARK R-1
WEST GRAND 1-JT.
SILVERTON 1
SARGENT RE-33J
PLATEAU VALLEY 50
MIAMI/YODER 60 JT
HINSDALE COUNTY RE 1
CENTENNIAL R-1
ARICKAREE R-2
LAKE COUNTY R-1
DOLORES RE-2
MOFFAT COUNTY RE:NO 1
GENOA-HUGO C113
MESA COUNTY VALLEY 51
FALCON 49
ARCHULETA COUNTY 50 JT
PLATTE CANYON 1
MOUNTAIN VALLEY RE 1
TRINIDAD 1
WELD COUNTY RE-8
SOUTH CONEJOS RE-10
CHEYENNE COUNTY RE-5
VALLEY RE-1
LAS ANIMAS RE-1
HUERFANO RE-1
AGATE 300
THOMPSON R-2J
MONTROSE COUNTY RE-1J
WESTMINSTER 50
DOUGLAS COUNTY RE 1
GARFIELD RE-2
EAGLE COUNTY RE 50
YUMA 1
ROCKY FORD R-2
PARK (ESTES PARK) R-3
FORT MORGAN RE-3
LAMAR RE-2
ADAMS COUNTY 14
CROWLEY COUNTY RE-1-J
JOHNSTOWN-MILLIKEN RE-5J
CLEAR CREEK RE-1
PARK COUNTY RE-2
MEEKER RE1
ARRIBA-FLAGLER C-20
DE BEQUE 49JT
COTOPAXI RE-3
CAMPO RE-6
ST VRAIN VALLEY RE 1J
MONTEZUMA-CORTEZ RE-1
PLAINVIEW RE-2
DEER TRAIL 26J
STRASBURG 31J
AULT-HIGHLAND RE-9
SPRINGFIELD RE-4
ALAMOSA RE-11J
FLORENCE RE-2
ROARING FORK RE-1
LEWIS-PALMER 38
WEST END RE-2
GUNNISON WATERSHED RE1J
KIOWA C-2
IGNACIO 11 JT
EAST OTERO R-1
WIDEFIELD 3
0
0.2
0.4
0.6
0.8
1


Incoming / Outgoing Student Ratio 2007
(Districts 0.5 - 1)
SOUTH ROUTT RE 3
GARFIELD 16
CRIPPLE CREEK-VICTOR RE-1
WRAY RD-2
CENTER 26 JT
COLORADO SPRINGS 11
PEYTON 23 JT
WOODLAND PARK RE-2
ELBERT 200
AKRON R-1
HARRISON 2
ADAMS-ARAPAHOE 28J
CANON CITY RE-1
KEENESBURG RE-3(J)
BRIGHTON 27J
DEL NORTE C-7
CALHAN RJ-1
EATON RE-2
NORWOOD R-2J
PUEBLO COUNTY RURAL 70
HANOVER 28
GREELEY 6
STRATTON R-4
MANCOS RE-6
BRUSH RE-2(J)
MAPLETON 1
MANZANOLA 3J
BURLINGTON RE-6J
PLATTE VALLEY RE-3
DENVER COUNTY 1
BYERS 32J
WELD RE-1
WALSH RE-1
PUEBLO CITY 60
HAYDEN RE-1
HOLLY RE-3
BIG SANDY 100J
WINDSOR RE-4
KIM REORGANIZED 88
EAST GRAND 2
0
0.2
0.4
0.6
0.8
1



Villas RE-5, Branson Reorganized 82, Prairie RE-11, and Karval RE-23 removed (outliers)

Chapter VII
Costs of Providing an "Adequate Education"

The state's role in public education is to set student performance expectations and to measure how well schools and districts are operating, given allocated resources. Such expectations and accountability require determining the costs necessary to provide pupils with a public education that meets both state and federal mandates.

The approach followed by Colorado to provide elementary and secondary education using the foundation formula, referred to in Colorado as the "funding formula" is outlined in the Public School Finance Act of 1994 (as Amended) allocates funds across the school districts in Colorado. Under this "standard based approach", the state

- Sets student performance standards (proficiency, advanced, etc.);
- Creates the measurement for such standard, CSAP, and;
- Establishes the accountability system and consequences.[42]

When using a foundation program methodology, the state sets revenue targets for school districts and contributes, via state contributions, the difference between the target (formula based dollar amount) and the contribution from local property and specific ownership taxes.[43]

There are several analytical models developed to address the cost of providing an adequate education, i.e., offer the appropriate classes and programs to meet specific

[42] Most states, including Colorado, use some form of a "foundation formula" to determine the basic level of financial support with recognition of provisions for additional monies for differential needs of school districts and for students who are at-risk or have special learning needs in order to meet performance expectations.

[43] In Colorado, as in many states, the dollar amounts provided are viewed by education professionals as minimally correlated to the services districts are expected to provide or the performance levels of the students the school districts are expected to achieve.

student performance expectations. Most recent studies estimating the cost school districts face in fulfilling the "adequacy requirement" have employed one (or both) of two analytical methodologies—the professional judgment approach (PJ) and/or the successful school district approach (SSD).[44]

Other analytical methodologies, recognized in the education field, include both cost and production function models. The cost function is less a forecasting tool and more a representation of the statistical relationship (not causal) between district spending and student outcomes when accounting for factors within and outside of the control of local state or school officials (such as socioeconomic and demographic characteristics, geography, population density, etc.). Although cost functions have come to be viewed by professionals as less useful as a forecasting tool, it is the foundation for the SSD approach.

The production function methodology focuses on explaining how student performance depends on school district resources, school district attributes, and the socioeconomic characteristics of the students and the demographic factors of the community. The limited use of the production function approach in the past is often related to limited availability of the appropriate data; however, in more recent years, more accessible and detailed student, school district, and community data have made this approach more common.

This report was not tasked and does not undertake an independent study or analysis to measure adequacy for Colorado, but rather compiles and summarizes these cost estimates as derived from the studies of professionals within the education system. In the most recent years, PJ and SSD have become the more prevalent cost estimate approaches. A review of these two approaches are outlined below.

[44] Models referred to as the Evidence-Based PJ and Modified SSD reflect modifications to these two general methodologies.

The ***professional judgment (PJ)*** approach surveys and compiles information from experienced educators (teachers, principals, superintendents, etc.) as to the resources needed in a "typical/prototype" school in order for students to achieve a specific set of objectives. Once resources are specified and base requirements determined, the costs can be measured for a "hypothetical classroom". The PJ approach is an "input-based" process to determine the base costs (cost of serving students with no special needs) necessary to educate a student to be ready for post-secondary training. The PJ approach also identifies and measures the additional resources necessary to incorporate high cost programs needed to assist at-risk, special needs and/or especially talented students, etc. This is identified as a separate costs component and incorporated into the "cost" using a weighted (per relevant student) factor. Naturally, resources and costs differ for elementary, middle, and high school plus cost requirements for high cost programs and additional costs for administration, site, maintenance, etc. are also evaluated and incorporated for a full measure of "adequate costs per student" in the PJ approach.

The ***successful school district (SSD)*** approach assumes the "base cost" per student can be measured by identifying the actual spending of school districts determined to be "successful". Successful is defined as school districts meeting specified performance and efficiency criteria and also fall within a reasonable range of student and socioeconomic characteristics. Simply stated, the SSD approach assumes other similarly situated school districts should meet the same performance expectations as the successful school district. Once a set of school districts are

identified as meeting this criteria, the expenditures for the typical, non-special needs student are measured. That is, excluded from the base cost measure are expenditures for transportation, special education, or other special needs programs, federal funding, capital outlays, etc. Obviously, this approach is predicated on current funding levels. Clearly the key to such an analysis is the determination of a "successful school district".

Each approach represents a legitimate effort to measure the parameters needed to determine school finance adequacy.

The PJ approach and associated cost measure is predicated upon the views and recommendations of actual service providers/educators. The underlying assumption is educators and educational experts are likely in the best position to identify the curriculum necessary to assure a high school graduate could meet the requirements to be admitted into an institution of higher learning within the state, i.e., meet student performance expectations. The concern voiced regarding the professional judgment approach is a potential propensity to overstate the needs and costs.

Underlying the SSD district approach is the recognition that certain school districts have met the stated criteria and have done so within the confines of the current budget. The concern expressed with the successful school district approach is the need to modify the definition of "successful" to identify a sufficient set of school districts meeting the criteria and, hence, a propensity to understate funding needs.

The various methodologies are all aimed to identify the costs of an adequate education and should result in reasonably similar estimates, all other things being equal. That is, well-informed professionals (PJ) advising districts on how to meet a specific performance goal should prescribe a similar mix of resources as an analyst determining the costs based on a successful school district or an economist optimizing an education production function. Different cost estimates arise because it is impossible to expect all other factors (e.g., geography, density, distribution of student talents, etc.) to be the same. However, if key factors are reasonably accounted for in the analysis, cost estimates from differing methodologies should fall within a reasonable range of each other with at least qualitatively plausible explanations for the cost differences.

Additionally, cost estimates across states are not likely, nor would we expect them to be, all the same as:

> States are likely to have different standards and variances in the input prices.
>
> The SSD approach is developed using actual expenditures and to that extent is constrained by state expenditure decisions. Predictably, even when the same researcher uses different methodologies for the same state during the same time frame the SSD approach is typically a lower cost (although not dramatically) than the PJ approach.
>
> As the SSD approach is constrained by actual state expenditures and these expenditures may not address all the recommended educational services desired by or proffered in the PJ approach, base costs would be lower in the SSD approach.
>
> Another explanation for a lower cost estimate in the SSD approach is the acceptance of modifications in the "set of

SSD", in order to have a sample sufficient to meet the basic statistical criteria.

Indeed, cost measures using the PJ and SSD approaches during approximately the same time frame and for the same state did not result in dramatic differences in adequacy cost estimates. For example, both the PJ and SSD approaches have been used in the same state at the same time—in Kansas and Maryland.

- In Kansas, the PJ approach produced a base cost of $5,811, while the SSD approach produced a base cost of $4,547 for 2000.
- In Maryland, the base cost produced by the PJ approach was $6,612, while the SSD approach produced a figure of $5,969 for 2000.

An adequacy cost study, specific to Colorado, was commissioned and performed by the Augenblick, Palaich and Associates, Inc.[45], initially in a 2003 report for the Colorado School Finance Project (CSFP) entitled "Calculation of the Cost of an Adequate Education in Colorado Using the Professional Judgment and the Successful School District Approaches". This report has been updated and refined in October 2006 to reflect changes in accountability requirements.[46] The APA 2006 adequacy cost update now reflects changes in the law and additional regulations after the implementation of No Child Left Behind (NCLB) and the Colorado Commission on Higher Education (CCHE) guidelines.[47]

[45] Formerly Augenblick & Myers, Inc.

[46] Augenblick, Palaich and Associates, Inc. (APA) has a long and well-known tenure as education specialists. APA has been retained by many states department of education and/or educational organizations across the country and has authored scores of well-respected studies, most recently relating to the cost of adequately educating a student population.

[47] The details of the procedures followed and assumptions employed in their analyses are well-documented in both the initial 2003 study and the 2006 update and will not be reiterated in this report. Our extensive review of the literature and studies by other education specialists for states across the country indicate the approaches, methodology, and procedures followed by APA are consistent within the standards in the education field. See Appendix B for citations of the literature and studies.

APA's adequacy cost analysis is summarized below for all enrollment levels identified.

Estimating Colorado School District Costs to Meet State and Federal Education Accountability Requirements

Augenblick, Palaich, and Associates, Inc., October 2006

Enroll-ment	PJ Base (AY04-05)	SSD Base (AY04-05)	Mild SpEd Weight	Moderate SpEd Weight	Severe SpEd Weight	At-Risk Weight	ELL Weight
50	$20,849	$16,804	0.23	0.75	3.67	0.20	0.50
100	19,666	15,851	0.23	0.75	3.67	0.20	0.50
250	16,117	12,991	0.30	0.88	3.95	0.23	0.50
500	11,639	9,381	0.43	1.09	4.24	0.26	0.50
750	10,851	8,746	0.51	1.21	4.41	0.28	0.50
1,000	10,064	8,111	0.57	1.29	4.53	0.30	0.50
2,500	8,146	6,566	0.75	1.56	4.91	0.35	0.50
5,000	7,292	5,878	0.89	1.77	5.20	0.39	0.50
7,500	7,237	5,833	0.94	1.80	5.23	0.42	0.50
10,000	7,252	5,845	0.94	1.80	5.23	0.44	0.50
20,000	7,310	5,892	0.94	1.80	5.23	0.50	0.50
50,000	7,484	6,032	0.94	1.80	5.23	0.58	0.50

The base costs plus specific weights identified in the chart above employ both the professional judgment and the successful school district approaches. Base costs represent the estimated expenditures for students without special education, at-risk, or ELL needs or without any spending for transportation, food service, or capital nor any cost of living differential across school district. The additional weights estimated by APA are applied to these base costs for the incremental monies needed for each student with special needs.

Comparing the 2006 APA adequacy study cost estimates for academic year 2004-05 with the actual funding for base costs provided in the Public School Finance Act of 1994 (as amended) to school districts with similar enrollment levels in the same academic year 2004-05 is presented in the chart below:

Comparison of Adequacy Cost Estimates and Actual Funding Formula Dollars[48]

For Academic Year 2004-05

Enrollment	PJ Base (AY04-05)	SSD Base (AY04-05)	Actual Funding Formula Dollars (AY04-05)	School District
50	$20,849	$16,804	11,781	Plainview RE-2
100	19,666	15,851	12,169	Agate 300
250	16,117	12,991	8,443	La Veta RE-2
500	11,639	9,381	6,875	Byers 32J
750	10,851	8,746	6,367	Hurfano RE-1
1,000	10,064	8,111	5,627	Branson Reorg. 82
2,500	8,146	6,566	6,192	Weld County RE-8
5,000	7,292	5,878	5,811	Delta County 50(J)
7,500	7,237	5,833	5,639	Pueblo County Rural 70
10,000	7,252	5,845	6,217	Westminster 50
20,000	7,310	5,892	5,638	Mesa County Valley 51
50,000	7,484	6,032	6,017	Cherry Creek 5

Moreover, the most recent adequacy cost estimates for Colorado measured by APA on a statewide measure were $2.8 billion greater than was funded for academic year 2007-08 (estimated to be between $3,000 to $4,000 per pupil).

[48] Of note, the actual per pupil funding formula for Colorado also includes monies for the at-risk student and cost of living school district differentials that are not included in the PJ and SSD measures. Thus, the gap between the PJ and SSD approach and actual would be greater than identified on the above chart.

If the adequacy concept measures the amount of education funding needed to meet the school performance expectations and to determine if schools have the necessary resources to meet student needs, a comparison of these PJ and SSD adequacy cost estimates to actual spending suggests:

- Actual funding for Colorado public education in academic year 2004-05 was substantially below the base costs for all levels of school district enrollment using either the PJ or SSD approach with the exception of an average of 10,000 students. For this enrollment category (10,000 students), the actual expenditures fell between the cost estimates for the SSD and PJ approaches.

- Furthermore, the gap between the actual state average ($6,661) and the comparable cost estimate using PJ and SSD measures indicates the state does not provide the resources believed necessary to meet student performance expectations. Given state budget issues, this gap is likely to continue to increase.

- These adequacy cost measures do not yet incorporate the planned implementation of CAP4K, which is creating new standards, assessments, and accountability systems. The investment to sustain this educational commitment (and anticipated to enable Colorado students to compete globally in the 21st century) is likely to increase (not decrease) adequacy costs.

A comparison of the Colorado adequacy cost studies to similar studies for other states where the analysis was performed by different professionals in the education field was reviewed with a representative sample of their outcomes described in the table below. A casual review of this table (recognizing the differences in time frames for the data) confirms the costs of an adequate education, as estimated by other professionals for other states at various times over the past decade, are greater than the provisions presently available to Colorado students from state and local revenues.

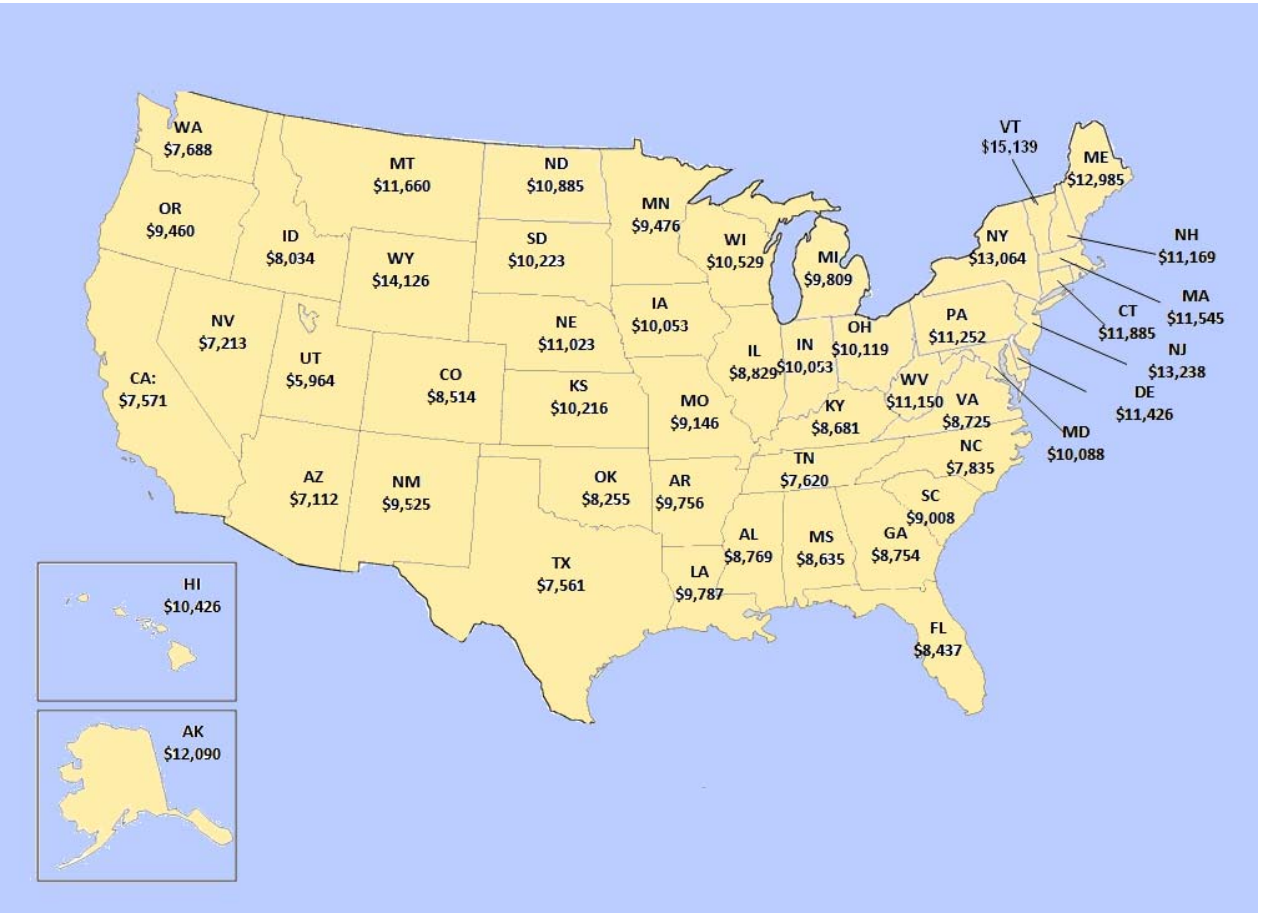
Adequacy Cost Studies

State	Performed By:	Sponsored By:	Year of Study Data	Analytical Method	Estimated Basic Cost
WY	Management, Analysis & Planning, Inc.	Legislature	1997	Professional Judgment (School Level)	E: $6,165; M: $6,403; H: $6,781
IL	Internal	Illinois State Board of Education	1998	Professional Judgment	K-3: $6,604; 4-6: $5,022; JH/MS: $5,132; HS: $5,393
OR	Internal (reviewed by Management, Analysis & Planning, Inc.)	Legislature	1997/ 2000	Professional Judgment (QEM)	$5,762 (in 2002)
KY	Lawrence O. Picus & Associates	State Board of Education	2003	Evidence Based	$6,130 to $8,303 (Very Large Districts)
MD	MAP	Maryland Education Coalition	2001	Professional Judgment	$7,461 to $9,313
WI	Institute for Wisconsin's Future		2002	Professional Judgment	$8,500
WA	Ranier Institute		2003	Professional Judgment (Quality Education Model)	E: $8,393; M: $7,830; H: $7,753
WI	Reschovsky & Imazek	Ind. Research	1997/ 2001	Cost Function	$6,372
MO	Augenblick & Myers, Inc.	Missouri Education Coalition for Adequacy		Professional Judgment	$7,832
NH	Augenblick & Myers, Inc.	Legislature	1998	Successful Schools	E: $4,681; S: 5,449

Finally, if the cost of an adequate education is simply measured as a comparative statistic to other states across the United States, the map below compares per pupil spending for Colorado to all states from the EducationWeek Quality Counts 2009 publication.[49]

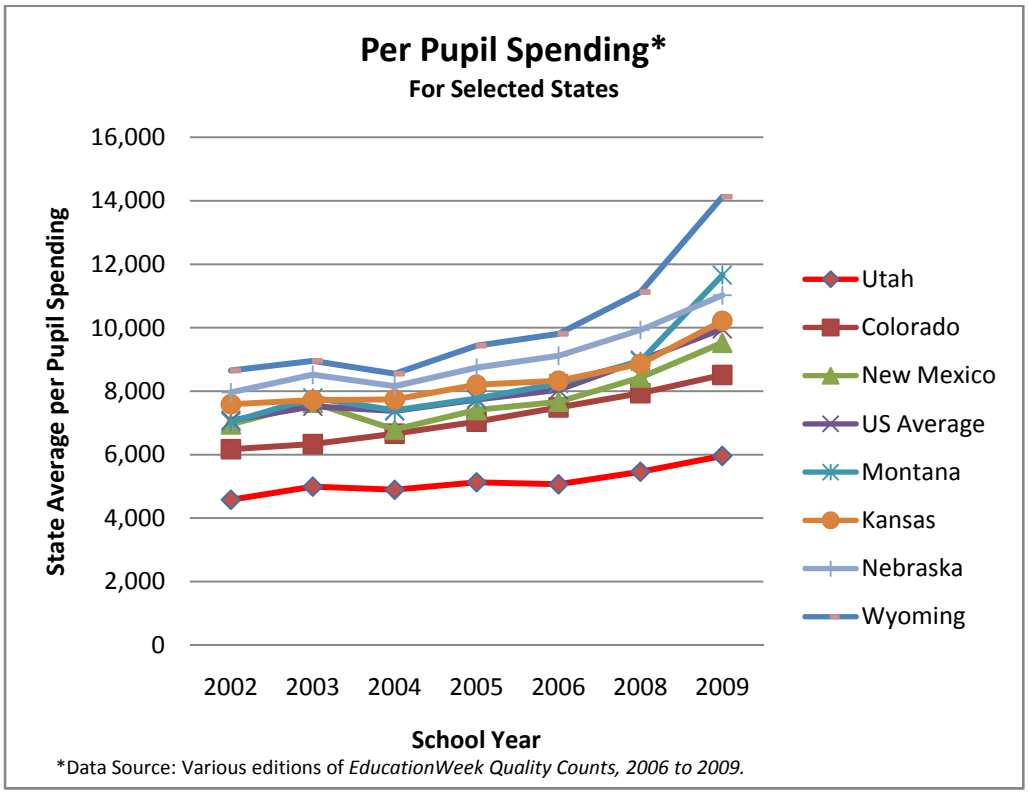
Per Pupil Spending

By State



Source: EducationWeek Quality Counts 2009

[49] Obviously, caution must be exercised when using such comparators given differences in the diversity of students, state demographics, cost of delivery and state standards, etc.



*Data Source: Various editions of *EducationWeek Quality Counts, 2006 to 2009.*

Chapter VIII
Consolidation Issues

There is a popular belief among policymakers that consolidation of school districts saves tax dollars, increases educational opportunities for students, and improves the delivery of education services. The number and size of school districts and the "optimum" size of schools and/or school districts has been highly debated and studied for decades.

State and local officials are rightfully vigilant in their inquiries regarding consolidation as it is their responsibility to prevent and correct inefficiencies in the administration of public services and to increase educational opportunities given the availability of public resources. Moreover, in light of changing state demographics and declining enrollments in many school districts plus state budget concerns, the possibility of consolidation and whether it can bring about cost savings and/or improvement to student performance should be reviewed and carefully considered by school officials and policymakers.

One rationale put forth by proponents of consolidation is that scale economies can be achieved when smaller school districts merge either with each other or with larger school districts, and that such mergers will reduce production costs by spreading fixed costs over a larger operation. These cost efficiencies are generally considered to be related to:

> *Indivisibilities*---Services provided to each student by certain education professionals that do not diminish in quality as the number of students increase (at least through some reasonable range of enrollment). Examples typically forwarded include general administration, school

board costs, and support personnel such as librarians, school nurses, curriculum development staff, etc.

Price benefits—Larger districts are in a better position to negotiate lower prices for securing supplies and equipment.

Increased dimension—Larger units can generally produce output at a lower average cost, particularly with respect to facility operations, communication systems, science and computer laboratories, etc.

Other proponents of consolidation believe larger school districts have greater opportunity to improve academic quality by employing more specialized labor for advanced math, science, foreign language programs, or for special education instructors, etc. as well as increased opportunities for extracurricular activities. Also, the increased availability of professional development programs and/or collaborative programs are forwarded as additional support for school district consolidation.

Clearly, the concept of economies of scale is well-founded and is particularly relevant in the manufacturing and production of identical "widgets" using identical inputs. (In the context of economics, "widget" is a term used to indicate a hypothetical homogeneous product.) However, caution must be taken when applying these basic economic principles to the production of "non-homogeneous" goods that require differing input resources (i.e., student performance outcomes from a student population with diverse talents requiring different educational services, etc.). The concept of economies of scale must be applied properly within the context of the good or service (e.g. student performance) to be produced.

To determine the most cost efficient avenue for producing the maximum performance by Colorado students all factors, including student characteristics, community demographics, the geography or topography or population density of the state must

be considered. In addition none of these factors are identical, complicating the analysis. (All of these factors/attributes were addressed and incorporated into the regression model discussed in a previous chapter of this report). In Colorado, the mountains and the expansive and sparsely populated plains are also particularly limiting factors for consolidation options. Additionally, NOT incorporated into the empirical analysis is the "best" organizational size which is dependent upon the civic, cultural and/or governance issues of the school district community. Clearly these non-quantifiable factors are critical to student performance outcomes and a successful school environment.

Below is a summary representative of the findings from studies and experiences of other states that have engaged in school district consolidation. The findings are quite mixed:

- A study of Georgia school districts by Boex, Martinez and Vasquez found limited or no economies of scale depending on the grade level considered for consolidation. This 1998 study concluded some potential savings from scale economies are likely (ignoring non-cost factors) when a small school district merges with a neighboring school district that is much larger.

- A Trostel & Reilly 2005 study of Maine found potential cost savings from the consolidation of some of the 327 school districts within the state.

- In a much earlier study, Duncombe, Miner and Ruggiero (1994) found only 17 of New York State's 785 school districts to be strong candidates for consolidation, but in the same study showed no reduction in total expenditures per pupil in the first few years after consolidation.

- A subsequent study by Duncombe and Yinger in 2005 found some economies of scale in operating and capital spending in the consolidation of small school districts in New York although they did not address any of the cultural community or non-monetary considerations in their analysis.

- An extensive survey by Streigel, Foldey and Holman in 1991 comparing pre-consolidation financial data with corresponding post-consolidation data found administration was the only category with statistically significant savings and that the overall financial impact of the district consolidation was variable.[50]

- A 2007 study by Coulson using Michigan data empirically tested the notion that consolidation of smaller school districts will save taxpayers money. using multiple regression to analyze the relationship between district size and per pupil expenditures. The author estimated potential savings from consolidation of small school districts was substantially smaller than the potential savings from breaking up excessively large school districts. The author further noted the realities of implementation and political complications likely render little or no real savings from consolidation or break-ups of larger school districts.

[50] Although this study was conducted nearly 20 years ago, it is one of the few studies evaluating pre and post consolidation financial data.

Our conclusions regarding the literature reviewed are:

- Many of the studies are either not highly empirical or are so specific to the geography and population distribution of the subject state that they are not applicable to Colorado.

- Of particular relevance to Colorado is the distinction between costs related to scale of operation and costs related to location and the geography of operation.

- There are very few studies that evaluate the cost impacts of consolidation, such as a pre and post-consolidation evaluation of finances and, hence, limited quantitative information exists regarding the accrual of benefits and costs from consolidation.

- Many of the reports on consolidation are more appropriately characterized as position papers or "white papers", a term used to describe a particular organization's legitimate views on the topic by employing descriptive and qualitative gains/losses but not necessarily any quantitative empirical analysis.

The potential cost savings and increased academic opportunities are very legitimate reasons to consider consolidation. The literature reviewed above and the empirical analysis outlined in the previous chapters of this report do not identify obvious cost savings or increased academic opportunities from across the board or formula driven consolidation of school districts. At best, on a case-by-case school district basis, the data reviewed identifies some very limited opportunities for cost savings or increased academic opportunities from the consolidation of school districts.

There are, however, alternatives to consolidation which include collaborations with other school districts. In Colorado, smaller school districts are afforded some of the benefits associated with size by collaborating through the Boards of Cooperative Educational Services (BOCES). Created through statute in 1965, there are now 21 BOCES in Colorado, most of which are general purpose in nature and provide a broad range of services and programs. Examples of services related to academic quality and opportunity that are provided through BOCES include gifted and talented education, special education, therapies (speech, physical and occupational), school psychologists/social workers, programming for at-risk students, curriculum and staff development, career and technical education, alternative licensure programs, etc. BOCES are also in a position to negotiate lower prices on supplies and equipment. In addition, the BOCES reduce duplication of programs, personnel and services and, therefore, create cost savings for the smaller school districts. Finally, the BOCES also provide risk management and insurance services, technology services/ support, data management and utilization, management of federal programs and grants, standards and assessment support, etc.

While there is no universal agreement on an ideal size for schools or districts (nor should there be), and large scale consolidation is not supported by our research, there are perhaps isolated circumstances throughout the state where consolidation would provide some cost savings.

- Naturally, there are differing costs and/or savings depending upon whether the consolidation is between districts or between schools.

- At the school district level, on a case-by-case basis benefits from consolidation may exist when school districts are geographically close and there is substantial student movement between the districts (i.e., incoming or outgoing), especially if one of the districts is experiencing declining enrollment.

- At the school level, it is important to note that the economic and civic impacts to a community of closing a school are often difficult to assess and may outweigh any potential gains from consolidation. (There has been relatively little quantitative research on this topic.) Naturally, a great deal of planning and thought is required before implementing with consolidation that results in the closing of schools that are important to a community's economic and social well-being.

Finally, it should be noted that even in the world of "widgets", economies of scale may not last forever. As an organization grows, inefficiencies are generated as operations become more difficult to organize and manage. Decreasing economies of scale are certainly likely in the educational world as overly large districts may not operate efficiently due to the additional layers of administration required to manage the district. There is less literature on this topic relative to its counterpart (consolidation) although the available research does indicate that splitting a large district may be costly even if the district has some inefficiencies because of its size.

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Recommendations

- To date, student performance is not affected by school district enrollment size, geographic setting, or enrollment trend (declining or non-declining). However, this result does not reflect whether or not school districts are meeting current or long-term expectations. In fact, given the present funding levels, student performance does not meet federal and state mandates.
    - Our study found one of the key factors that impacts student performance is instructional expenditures per pupil. Yet, if enrollments continue to decline, instructional expenditures per pupil may ultimately have to be decreased (given the fixed nature of a number of the other expenditures of a school district).
    - Meeting current and new performance standards (e.g., CAP4K) may become increasingly difficult if per pupil instructional expenditures are decreased.
    - Student performance should be considered when funding levels are determined.
- Also, our study found that there are costs associated with declining enrollment school districts. It is broadly accepted that the state has an obligation to provide education services to all students irrespective of geography. It is more expensive per pupil to educate smaller enrollment sized school districts. (This phenomenon is recognized in the size factor in the funding formula). To date, declining school districts have been able to adjust costs to meet the

decreases in funding; however, a number of costs for school districts are "fixed" and reducing costs further becomes increasingly more difficult. If the declines in enrollments continue, it may be necessary to consider other options such as modifying the funding formula, increased cooperation across school districts and/or consolidation, where feasible.

- A review of the revenue sources shows that the state share is a smaller percent of total revenue for non-declining mid-sized school districts (enrollments between 500 and 4,000). This finding may need further exploration to determine the causes and whether some modification to the funding formula would be appropriate.

- Education choice has become increasingly popular and, in conjunction with demographic changes, results in declining enrollments for a number of school districts. As illustrated in this study, education choice may be shifting students away from declining districts towards non-declining school districts (e.g., declining districts have a higher percent of outgoing students and a lower percent of charter students). As such, it is important to recognize that choice options impact school districts differently.

- There is a cost to the state and the local taxing districts for shifting the authorization of a charter school from a school district to the CSI with no increase in choice options. This is because these students are no longer considered part of the school districts and, as such, the district has an incentive to take advantage of the enrollment averaging. However, full per pupil funding is also provided to the CSI for those students.

- This "double counting" associated with shifting authorization can be substantial as illustrated in an example in this study and provides no additional education choice options. That is, the students are still attending the same school as they did prior to the authorization shift.

- As such, a review of the funding formula should be performed to determine whether this funding provision is necessary and appropriate.

- As discussed in this study, there is no formula driven opportunities for consolidation and decisions for this are best made on a case-by-case basis. However, given the increasing popularity of choice (open enrollment as well as charter schools), consolidation is one option to consider. Benefits from consolidation may exist when school districts are geographically close and there is substantial student movement between the districts (i.e., incoming or outgoing), especially if one of the districts is experiencing declining enrollment.

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About the Researchers

Pacey Economics Group, located in Boulder, Colorado, has over 25 years of providing consulting services and analyses on an array of economic and business issues. As a small boutique firm, we have focused on providing economic analyses for state agencies and private or publicly held companies plus offering economic reports or opinions and expert witness testimony in legal matters.

Patricia L. Pacey, Ph.D. – Dr. Pacey is President of Pacey Economics Group and Principal Investigator on the study. She received her Ph.D. in economics and B.A. in mathematics from the University of Florida and held positions with the University of Colorado and the Congressional Budget Office before forming her own firm, Pacey Economics Group. Dr. Pacey is frequently called upon to assess economic issues in litigation matters, to conduct studies for government agencies and corporations, and is presently a member of the Colorado Commission on Higher Education.

Mark S. McNulty, Ph.D. – Dr. McNulty is the Managing Director at Pacey Economics Group and Principal Investigator on the study. He has a joint Ph.D. in economics and statistics from Iowa State University, was a tenured faculty with Kansas State University for 13 years before accepting a technical researcher position with Los Alamos National Laboratory. He was then employed with the University of Wyoming before joining Pacey Economics Group. He has expertise with a wide range of economic and statistical methodologies.

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Gretchen Dahlberg, B.A., Paul Park, B.A., and Jeff Nehls, B.A. – Ms. Dahlberg, Mr. Park, and Mr. Nehls are Analysts at Pacey Economics Group and supporting researchers on the study. They all hold B.A. degrees in economics, Ms. Dahlberg and Mr. Park from the University of Colorado, Boulder and Mr. Nehls from the University of Puget Sound. Prior to full-time employment at Pacey Economics Group, they had all worked for the firm for several years as interns/summer associates. Their work includes high level support analyses and research requiring critical thinking in addition to strong analytical and computer skills.

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Appendix C – Technical Details for Econometric Model

The following provides additional detail regarding the performance regression analysis. With data on 177 districts (Vilas is excluded) in each of six years, there are 1,062 maximum observations. However, there are only four years of math CSAP scores for grades 3 and 4 (it first administered in those grades in the 2004-05 academic year) giving 708 maximum observations. Graduation and completion data is available only for the academic years 2006-07 and 2007-08 giving 354 maximum observations. The actual number of observations used in each regression (given in the results tables that follow) is slightly less than the maximum identified here because of missing values.

Variables expressed as percents enter the regression in that form. Variables expressed as levels (e.g. instructional expenditures per pupil) enter the regression in logarithmic form. With this specification, the regression coefficients have interpretations as elasticities. Elasticities are unitless values that give the percent change in the performance measure that result from a one percent change in the explanatory variable.

The regression methodology used in this analysis accounts for the pooled cross-sectional time-series nature of the data using a random-effects model. Twenty separate regression models were fit using explanatory variables described above, each differing by the performance measure used:

- graduate rate
- completion rate
- percent proficient or advanced in the reading CSAP for each grade 3 through 10
- percent proficient or advanced in the reading CSAP for grades 3 through 10 aggregated
- percent proficient or advanced in the math CSAP for each grade 3 through 10
- percent proficient or advanced in the math CSAP for grades 3 through 10 aggregated

The regression results for all twenty models are presented in the following tables. In the results tables, the symbol NS indicates that the variable is not significant; that is, there is no statistical evidence that the variable helps explain the performance measure. For significant coefficients, the symbols * and ** indicate that the variable is significant at the 0.05, and 0.01 level, respectively.

In general the models fit well with a substantial number of significant variables and with those variables generally having the anticipated relationship (i.e., positive or negative) with the performance measure. The R-squares (which measure the fraction of the variation in the performance measure explained by the model) ranged from 0.31 to 0.66.

An important note about the CSAP scores in this report. For assessment purposes, CDE reports every score of tests reported by the school district; however, for accountability purposes, CDE only reports the scores for test takers who have scores for ***all*** tests in a subject area as they deem the others to be non-reliable. As our focus was on measuring performance in a reliable manner, we used the accountability data. As such, CSAP scores in our report will vary from those CDE reports in the assessment section of their website. This appears to be more of an issue in the earlier years of our dataset rather than in the later years and is more noticeable in CSAP percentages for proficient/advanced for smaller school districts with lower total pupil counts.

Student Performance Regression Results

Explanatory Variable	Performance Measure										
	Reading CSAP - Proficient or Advanced									Graduation Rate	Completion Rate
	All Grades	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9	Grade 10		
Declining Enrollment District	NS[1]	NS	NS	0.03*	NS	NS	NS	NS	NS	NS	NS
Instructional Expenditures Per Pupil	0.07**	NS	NS	NS	NS	0.11*	NS	NS	NS	NS	NS
Total Funded Enrollment	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Charter Enrollment (%)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Online Enrollment (%)	-0.14*	NS	NS	-0.24**	NS	NS	-0.22**	NS	NS	-0.60**	-0.48**
Incoming Enrollment (%)	NS	NS	NS	NS	NS	NS	0.09*	NS	NS	NS	NS
Outgoing Enrollment (%)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
At Risk (%)	-0.20**	NS	-0.16**	NS	-0.18**	-0.24**	-0.12**	-0.10**	NS	NS	NS
IEP (%)	-0.44**	-0.42**	-0.37**	-0.47**	-0.44**	-0.35**	-0.51**	-0.58**	-0.57**	NS	NS
Fluent English Proficiency (%)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Limited English Proficiency (%)	-0.12*	-0.23**	-0.36**	-0.21**	NS	NS	-0.28**	-0.33**	-0.43**	NS	NS
Not English Proficient (%)	-0.42**	-0.68**	-0.46*	-0.53**	-0.84**	-0.29*	-0.65**	-0.81**	-0.52**	-1.79**	-2.10**
Gifted (%, program)	NS	NS	NS	NS	NS	NS	0.11*	NS	0.12*	NS	NS
Asian (%)	NS	NS	NS	NS	0.41*	NS	0.64**	NS	NS	1.91**	1.30**
Black (%)	-0.34**	NS	-0.37**	0.31**	-0.45**	-0.37**	NS	NS	NS	NS	NS
Hispanic (%)	-0.21**	-0.14**	-0.13**	-0.21**	-0.21**	-0.19**	-0.22**	-0.25**	-0.24**	NS	NS
Native American (%)	-0.40**	-0.34**	NS	-0.28**	-0.31**	-0.31**	-0.21*	-0.30**	-0.24*	NS	NS
Females (%)	-0.14**	NS	NS	NS	NS	0.17**	0.06*	0.15**	0.16**	NS	NS
Average Teacher Salary	0.18**	NS	0.37**	0.37**	0.32**	0.17**	NS	NS	0.15*	NS	NS
Teacher Experience	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Teachers with MA Degree or Higher (%)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pupil-Teacher Ratio	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Number of Non-CSAP Offerings	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.12**	0.09**
Density	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Population with Income > $75,000 (%)	NS	NS	NS	0.20**	NS	NS	0.15*	NS	0.17*	NS	0.20*
Population with College Education (%)	0.07*	NS	NS	0.10**	0.09*	0.09**	NS	0.08*	0.08*	NS	NS
Urban Setting	0.08**	NS	0.10**	0.07**	0.08**	0.08**	NS	NS	NS	NS	NS
City Setting	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Town Setting	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Rural Setting	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Intercept	-1.45**	NS	-3.85**	-3.15**	-2.70**	-2.18**	NS	NS	NS	NS	1.47*
Number of Observations	1052	1031	1038	1039	1035	1036	1036	1034	1030	353	353
R-Square	0.66	0.31	0.37	0.5	0.49	0.49	0.53	0.55	0.48	0.53	0.58

[1]NS indicates not significant at the 0.05 level; * and ** indicate significance at the 0.05 and 0.01 levels, respectively.

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Student Performance Regression Results Cont'd

	Performance Measure								
	Math CSAP - Proficient or Advanced								
Explanatory Variable	**All Grades**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**	**Grade 7**	**Grade 8**	**Grade 9**	**Grade 10**
Declining Enrollment District	NS[1]	NS	NS	NS	NS	NS	NS	NS	NS
Instructional Expenditures Per Pupil	0.29**	0.19**	NS	0.10*	0.11*	NS	0.19**	0.18**	0.14**
Total Funded Enrollment	NS	NS	NS	NS	NS	NS	NS	NS	NS
Charter Enrollment (%)	NS	NS	NS	NS	NS	NS	NS	NS	NS
Online Enrollment (%)	-0.24**	NS	-0.20*	-0.36**	NS	-0.41**	-0.20*	-0.18*	NS
Incoming Enrollment (%)	0.10*	NS	NS	0.11*	0.15*	0.16**	NS	NS	NS
Outgoing Enrollment (%)	0.12**	NS	NS	NS	NS	NS	NS	NS	NS
At Risk (%)	-0.07*	-0.18**	-0.18**	NS	-0.26**	-0.17**	-0.09*	-0.10**	NS
IEP (%)	-0.52**	-0.32**	-0.48**	-0.54**	-0.51**	-0.24**	-0.45**	-0.29**	-0.23**
Fluent English Proficiency (%)	NS	NS	NS	NS	NS	NS	NS	NS	NS
Limited English Proficiency (%)	NS	-0.31**	-0.37**	-0.19*	NS	NS	NS	-0.21*	-0.26**
Not English Proficient (%)	NS	-0.68**	-0.46*	NS	-0.57*	NS	NS	NS	NS
Gifted (%, program)	NS	NS	NS	NS	NS	NS	NS	0.11*	NS
Asian (%)	1.19**	NS	-0.57*	NS	0.53*	NS	NS	0.78**	NS
Black (%)	-0.59**	NS	NS	-0.20*	NS	-0.31*	NS	NS	-0.44**
Hispanic (%)	-0.20**	-0.10*	NS	-0.30**	-0.09*	-0.21**	-0.18**	-0.15**	-0.15**
Native American (%)	-0.41**	NS	-0.36*	-0.46**	NS	-0.38**	-0.36**	NS	NS
Females (%)	NS	-0.09*	NS	NS	NS	0.13**	-0.09*	0.07*	NS
Average Teacher Salary	0.36**	NS	0.27**	0.48**	0.31**	0.32**	NS	NS	0.21**
Teacher Experience	NS	NS	NS	NS	NS	0.06*	0.07*	NS	NS
Teachers with MA Degree or Higher (%)	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pupil-Teacher Ratio	0.11**	NS	NS	NS	NS	NS	NS	0.10*	NS
Number of Non-CSAP Offerings	NS	NS	NS	NS	NS	NS	NS	NS	NS
Density	NS	NS	NS	NS	NS	NS	NS	-0.02*	NS
Population with Income > $75,000 (%)	NS	NS	NS	NS	NS	NS	0.34**	0.25**	0.24**
Population with College Education (%)	NS	NS	NS	0.09*	NS	0.10*	0.10*	0.10*	NS
Urban Setting	0.15**	NS	NS	0.11**	0.10**	0.10**	0.09**	NS	0.07*
City Setting	0.09**	NS	NS	NS	NS	NS	NS	NS	NS
Town Setting	0.11**	NS	NS	NS	NS	NS	NS	NS	NS
Rural Setting	0.09*	NS	NS	NS	NS	NS	NS	NS	NS
Intercept	-6.09**	NS	-2.64**	-5.19**	-3.63**	-3.40**	-2.49**	-2.68**	-3.07**
Number of Observations	1048	692	693	1038	1036	1035	1036	1032	1031
R-Square	0.52	0.32	0.41	0.46	0.39	0.42	0.4	0.41	0.33

[1]NS indicates not significant at the 0.05 level; * and ** indicate significance at the 0.05 and 0.01 levels, respectively.

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Appendix D – Variable List

Data Type	Number of Variables	Source of Data	URL	Description of Data
NPEFS (National Public Education Finance Survey)	92	CDE		Expenditure data: instructional salaries, transportation, etc.
NPEFS (National Public Education Finance Survey), non-charter schools only	68	CDE		Expenditure data: instructional salaries, transportation, etc., for non-charter schools only
Population and Income	7	U.S. Census	http://www.census.gov/did/www/saipe/	Population and income data using Small Area Models
Cost of Living	8	Colardo School District Cost of Living Studies		Cost of living indices for housing, transportation, etc. for the years 2001 and 2007; home values for 2007
Course Offerings	3	CDE		Number of non-CSAP courses (e.g., drama, music) offered in the district; the min, max, and average across schools
Categorical Expenditures	3	CDE		Expenditures on ELPA, Special Education, and Vocational programs
Square Miles	1	US Census	http://www2.census.gov/cgi-bin/shapefiles2009/state-files?state=08	District square miles (computing using Tiger shape files)
Buildings	8	CDE		Number of buildings, gross square feet, etc., for 2009
Teacher	18	CDE	http://www.cde.state.co.us/index_stats.htm	Teacher average daily rate, experience, pupil-teacher ratios, etc.
Non-Resident Students	2	CDE	http://www.cde.state.co.us/index_stats.htm	Number of incoming and outgoing students (aggregated from detailed tables)

Data Type	Number of Variables	Source of Data	URL	Description of Data
Population and Income	42	US Census/National Center for Educational Statistics	http://nces.ed.gov/datatools/index.asp?DataToolSectionID=5	Income and population distributions for 1999
Program Membership	19	CDE	http://www.cde.state.co.us/index_stats.htm	Number of students in gifted, special education, etc.
District Setting	1	CDE	http://www.cde.state.co.us/index_stats.htm	District setting (e.g., urban, rural)
Student Membership	15	CDE	http://www.cde.state.co.us/index_stats.htm	Number of students in pk, 1st grade, etc.
Starting Salaries	1	School Districts		Starting salary data from survey, very incomplete
Charter Enrollment	1	CDE	http://www.cde.state.co.us/choice/index.htm	Number of charter students
Homeschool Enrollment	1	CDE	http://www.cde.state.co.us/choice/index.htm	Number of homeschool students
Non-Public Enrollment	1	CDE	http://www.cde.state.co.us/choice/index.htm	Number of non-pubic students
Mill Levy	15	CDE	http://www.cde.state.co.us/index_finance.htm	Net assessed valuation, program mills, etc.
Graduates	5	CDE	http://www.cde.state.co.us/index_stats.htm	Graduation and completion rates for 2006 and 2007
Summary Finances	16	CDE		Final summary financial data; funded pupil count, per pupil funding, etc.
Revenues and Expenditures	191	CDE	http://www.cde.state.co.us/index_finance.htm	Revenue and expenditure data; property tax revenue, state share, instructional salaries, etc.
Finance Worksheets	170	CDE		Worksheets used to compute funding; enrollments, risk factors,
CSAP	654	CDE		Individual characteristics and CSAP scores

Appendix E

Schematic of Colorado Public School Finance