Research Report

2010 Arkansas School District Equity Analysis Report

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Prepared for
The Joint Adequacy Evaluation Oversight Subcommittee of the House and Senate Interim Committees on Education

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Table of Contents

Executive Summary

In order to gauge the equity of Arkansas's educational system, the Bureau of Legislative Research has calculated a variety of measures for determining the equity in both funding and expenditures per pupil on the part of Arkansas school districts. The core of this analysis consists of several nationally recognized statistical measures that have been selected on the basis of applicability to intra-state comparisons of districts. This report will first assess the equity of funding through the use of Horizontal Equity analysis, which looks directly at the equity of state funding across school districts. In addition, Fiscal Neutrality measures will be presented, which take into account local property wealth to determine if funding is equitable regardless of socioeconomic status. In the second section of the report, equity in district-level education expenditures is examined to determine if education expenditures on the part of districts vary with property wealth, poverty level, race, and district size.

Key Findings

- A comparison of each fiscal year's Horizontal Equity measures clearly show that there is a high level of equality in the distribution of state education funding regardless of the equity measure used.

- When looking at foundation funding combined with other sources of local funding, districts with higher property wealth are, in general, receiving more funding than districts with lower property values. However, when categorical funding is added into the analysis the categorical funds equalize the state-level funding across districts with varying property values.

- When comparing school district expenditures per pupil to the property wealth of the district, our analysis concludes that district spending per pupil is not strongly related to property wealth.

- School districts with a higher percentage of poverty (NSLA students) are spending more per pupil than a district with a lower percentage of poverty students consistent with the use of categorical NSLA funding.

- A school district's expenditures per pupil are weakly related to the percentage of non-white or minority students within a district, indicating that a district with more minority students will spend slightly more per student than a district with a lower minority population.

- When comparing smaller school districts to larger school districts, smaller school districts spend only slightly more per pupil than larger districts.

Section 1: State Funding Equity

The first set of equity measures presented pertain to how equitably Arkansas's public schools are financed from a state-level perspective. Two specific types of equity measures are used to assess the equity of the state-level funding for public schools, Horizontal Equity and Fiscal Neutrality.

Horizontal Equity

Horizontal Equity measures the degree to which districts receive equal shares of an object. In the case of the analysis presented below, Horizontal Equity measures the degree to which school districts in the state are funded equitably. This equity measure is based on the distribution of resources without regard to district socioeconomic characteristics (Ritter & Barnett, 2006). The measures used to capture the Horizontal Equity of state school funding are Measures of Central Tendency, the Coefficient of Variation, the Restricted Range, the Federal Range Ratio, the McLoone Index, and the Gini Coefficient. A brief description of each of the measures used in the Horizontal Equity analysis is presented below.

- **Measures of Central Tendency:** Two measures of central tendency will be presented, the Mean and the Median. The Mean represents the arithmetic average of all district unrestricted revenues per pupil. The Median value is the mid-point value of all the districts or the unrestricted revenues per pupil for the 50th percentile district.

- **Coefficient of Variation:** The coefficient of variation measures the degree of variability or dispersion of funding. This measure ranges in value from 0 to 1. A value of 0 indicates that the funding is distributed uniformly among all state school districts.

- **Restricted Range:** The restricted range consists of the values that are between the 5th and 95th percentile. This restricted range removes the outliers and provides another measure of the variation in funding amounts.

- **Federal Range Ratio:** The federal range ratio is the restricted range divided by the funding value at the district in the 5th percentile. A smaller value indicates a low degree of variability among the highest and lowest funded districts.

- **McLoone Index:** This measure analyzes districts at the lower range of the fund distribution to determine how much inequality exists between the middle 50% of districts and the lowest funded districts. The McLoone index ranges in value from 0 to 1, with 1 indicating a high degree of equality.

- **Gini Coefficient:** The Gini Coefficient is an economic measure of inequality. A 0.05 Gini coefficient or less indicates an equitable level of funding across school districts (Odden & Picus, 2008).

These measures capture only the equity of state-level funding and thus exclude federal funds. Included in this analysis are state foundation funds, URT revenues, local revenues beyond 25 mills, and other local funds, such as activity and food services funds. Desegregation funds are excluded from this analysis.

Table 1 below presents the findings of the Horizontal Equity analysis. The equity statistic is listed for each fiscal year. The "Equality" column summarizes the optimal value for each equity measure.

Table 1: Horizontal Equity of Unrestricted Revenues Per ADM

Equity Statistic	2007	2008	2009	Equality
Mean	$7,062.84	$7,297.86	$7,478.61	
Median	$6,906.14	$7,153.51	$7,296.18	
Restricted Range	$2,228.19	$2,109.00	$2,237.78	Smaller is better
Federal Range Ratio	0.35	0.32	0.34	Equality is 0
Coefficient of Variation	0.09	0.09	0.09	Equality is 0
Mcloone Index	0.95	0.95	0.95	Equality is 1
Gini Coefficient	0.05	0.05	0.05	Equality is 0

Note: The revenues used above exclude Desegregation funds

The results of the Horizontal Equity analysis indicate that Arkansas is continuing to fund schools in an equitable manner. The Mean per pupil revenues have increased by 5.9% from fiscal year 2007 to 2009. The Median per pupil revenues have increased 5.6% over the course of the last three fiscal years. The general measures of Horizontal Equity, the Restricted Range, Federal Range Ratio, Coefficient of Variation, McLoone Index, and the Gini Coefficient have not changed significantly from fiscal year 2007 to 2009.

A comparison of each year's Horizontal Equity measure with the ideal equity measure in the "Equality" column of **Table 1** clearly shows that there is a high level of equality in the distribution of state education funding per pupil regardless of the equity measure used.

Fiscal Neutrality

Fiscal Neutrality measures are used in school finance to determine the degree to which state funding is related to the property wealth of a school district. The property wealth measure used in the analysis below is the total assessed property value per pupil for each school district. There are two main measures of fiscal neutrality, the Wealth Neutrality Index and the Wealth Elasticity. Both of these measures are interrelated.

- **Wealth Neutrality Index:** The Wealth Neutrality Index measures the degree to which the property wealth of a school district relates to the level of state funding the district received. According to the principal of Fiscal Neutrality, property wealth and state funding should not be related (Ritter & Barnett, 2006).

- **Wealth Elasticity:** The Wealth Elasticity measures the responsiveness of the relationship between the funding received by a school district and the property values of the district. In other words, the Wealth Elasticity serves as a measure of how much a policy decision will impact the relationship.

In order to gain the best picture of the relationship between property wealth and state education funding, both of the above measures should be combined. If the Wealth Neutrality Index is high and the elasticity is low, there is an important relationship between the two variables, but the responsiveness to a policy change is less significant (Odden & Picus, 2008).

Table 2: Fiscal Neutrality of Unrestricted Revenues Per ADM

Statistic	2007	2008	2009
Wealth Neutrality Index	0.42	0.58	0.62
Wealth Elasticity	0.08	0.10	0.12

Note: The revenues used above exclude Desegregation funds

As can be seen in **Table 2** above, the Wealth Neutrality Index indicates the relationship between property wealth and district revenues has increased from 0.42 in fiscal year 2007 to 0.62 in 2009. The wealth elasticity, measuring the responsiveness of the change in revenues per change in property wealth, is also increasing over time. The conclusion is that when looking at foundation funding and other local funds, districts with higher property wealth are receiving more funding. It should be noted that categorical funding is not included in this calculation. **Table 3** below adds the categorical funding used to compensate for rural and socioeconomically disadvantaged districts. When these categorical funds are included the relationship becomes far less significant (0.23) and the responsiveness (Wealth Elasticity) becomes much greater. As can be seen, there is strong evidence to support the idea that categorical funding equalizes revenues into Arkansas school districts. These findings also indicate that a small change in the amount of categorical funding has a large impact on the equality of funding.

Table 3: Fiscal Neutrality of Unrestricted Revenues Per ADM including Categoricals

Statistic	2009
Wealth Neutrality Index	0.23
Wealth Elasticity	0.69

Note: The revenues used above exclude Desegregation funds

Section 2: School District Expenditure Equity

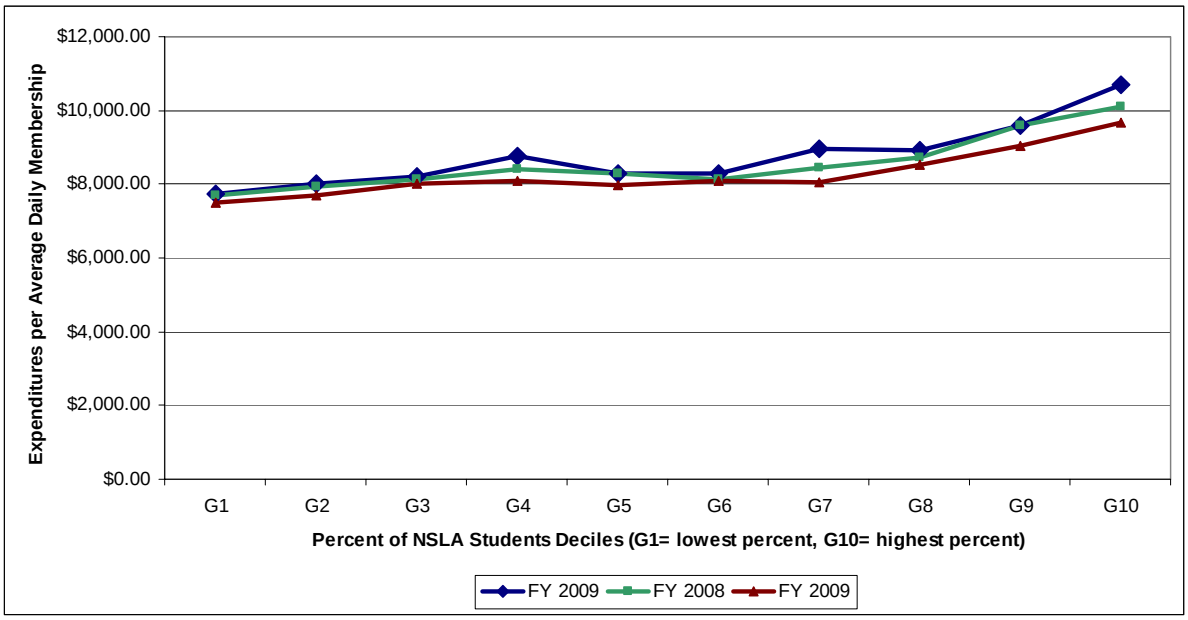
This section presents an analysis of the equity of education expenditures per pupil among state school districts for fiscal years 2007, 2008, and 2009. The expenses included in this analysis include all types of expenditures for each district. It should be noted that expenditures resulting from Desegregation funds have also been included in the analysis due to the inability to accurately separate expenses relating to Desegregation funding. For each graph presented below, the districts were sorted on the variable of interest then separated into ten decile groups. The equality of education expenses were then compared across deciles of state school districts based on district property wealth, NSLA student counts, minority student counts, and district size as measured by ADM. The results of this analysis are presented in graphical form below.

Chart 1: Total Expenditures per ADM by Property Wealth Deciles

Chart 1 above graphs school district expenditures against the ranked property wealth deciles. The results of this analysis conclude that there is not a discernable trend between property wealth and educational expenditures (r= 0.13 for FY 2009[*]). In other words, education spending per pupil is not strongly related to property wealth.

[*] The r value presented in this section of the report describes the Person Correlation or statistical relationship between two variables, in this case property wealth and expenditures per ADM. An r value of 0 indicates no relationship between the variables exists, whereas an r value of 1 or -1 indicates a perfect relationship exists.

Chart 2: Total Expenditures per ADM by Percent of NSLA Student Deciles



In order to understand the relationship between a district's student poverty level and per pupil expenditures the percentage of NSLA students were used as a proxy for the percentage of students living in poverty. The chart above highlights an upward trend in expenditures per pupil as the percentage of NSLA students increases. The upward trend is evident in all three fiscal years plotted. This trend implies that districts with a higher percentage of NSLA students are spending more per pupil than a district with a lower percentage of NSLA students. A moderately strong statistical relationship also exists for fiscal year 2009 (r= 0.63). This implies that districts receiving more NSLA categorical funds are actually spending more per student than districts receiving less NSLA funding.

Chart 3: Total Expenditures per ADM by Percent of Non-White Student Deciles

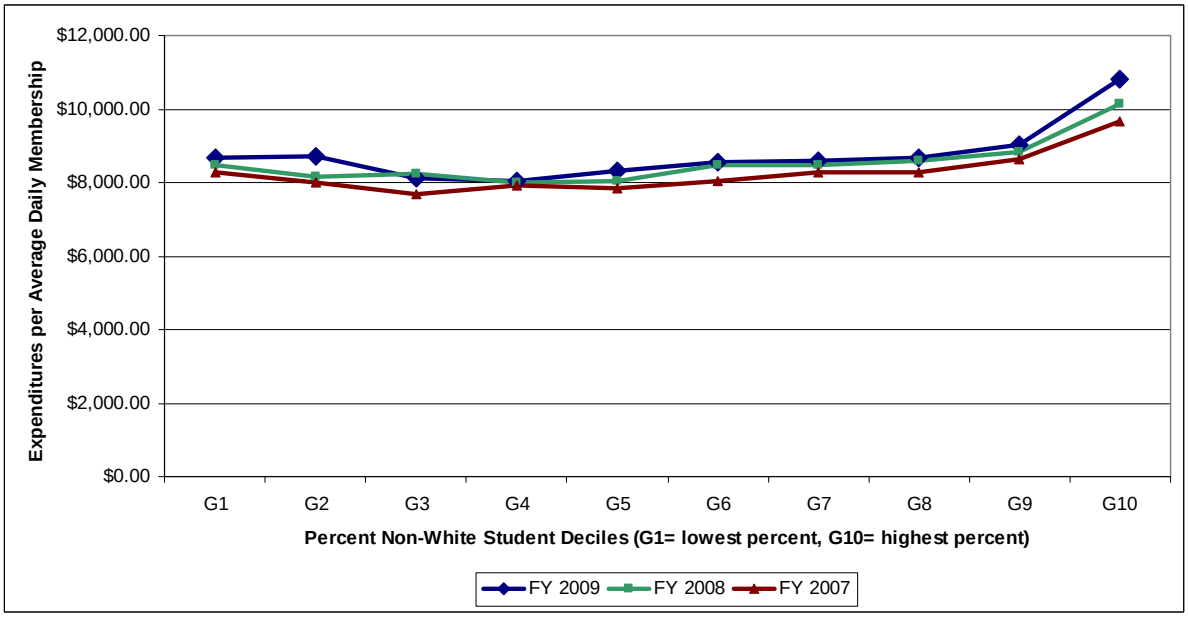
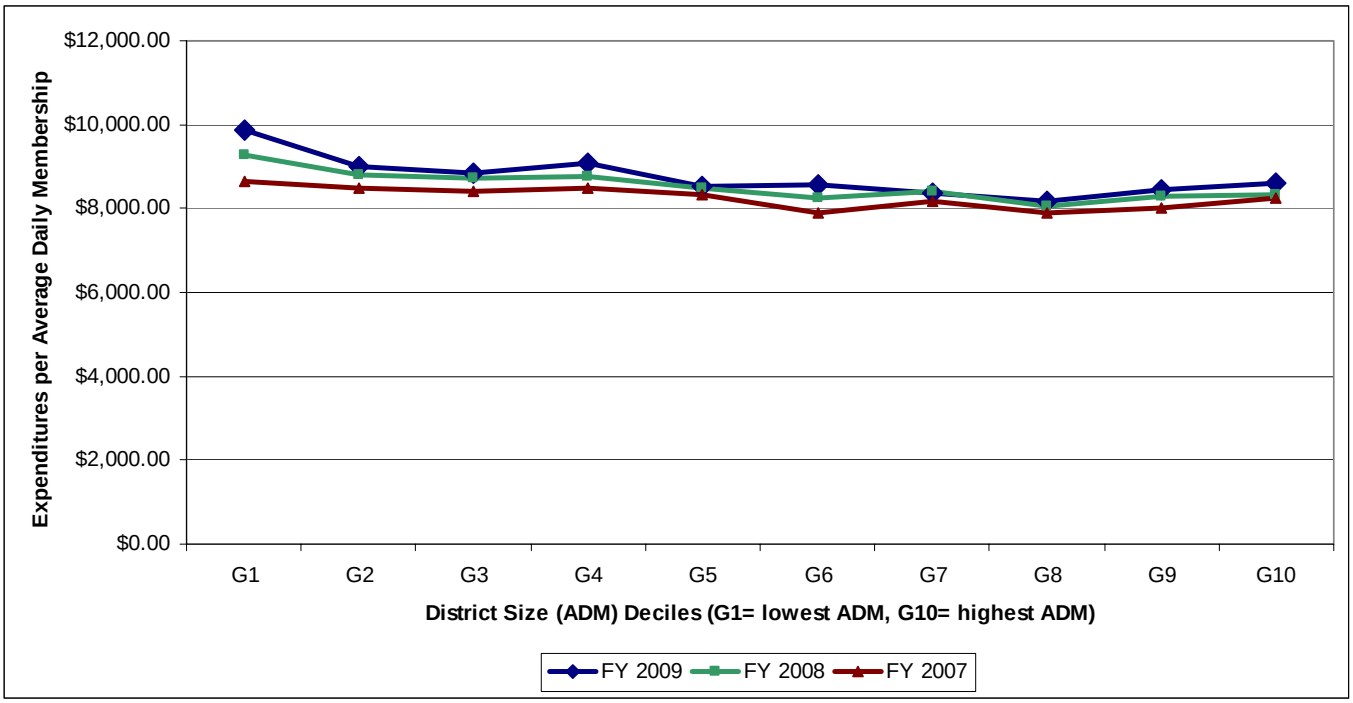


Chart 3 shows that, with the exception of decile group 10 (G10), a district's expenditures per pupil are only weakly related (r= 0.53) to the percentage of non-white or minority students a district contains. In other words, a district with more minority students will spend slightly more per student than a district with a lower minority population. The likely reason for the spike in the G9 and G10 deciles is the Desegregation funding for the Little Rock, North Little Rock, and Plaski County Special School Districts.

Chart 4: Total Expenditures per ADM by District Size Deciles



The chart above shows a relatively flat trend over the district size deciles, indicating the absence of a statistical correlation (r= 0.02). This means that smaller school districts, as measured in ADM, in general, do not spend more per pupil than larger districts.

Conclusion

In order to gauge the equity of Arkansas's educational system, a variety of measures for determining the equality in both funding and expenditures per pupil on the part of Arkansas school districts was analyzed. The report assessed the equity of funding through the use of Horizontal Equity analysis to compare equality across school districts. In addition, Financial Neutrality measures assessed the equality of funding among districts with varying local property wealth. The report also included an analysis of the equity of education expenditures to determine if education expenditures vary with property wealth, poverty level, race, and district size.

The result of this analysis indicated that there is a high degree of equity in funding among Arkansas's school districts and that categorical funds play an important role in equalizing the state's funding across districts with varying wealth. An examination of school district expenditures indicated that expenditures per pupil are not related to property wealth, but districts with more NSLA students are spending more per pupil than districts with a lower percentage of NSLA students. The expenditure analysis also indicated that school district expenditures are weakly related to the percentage of non-white students within a district and smaller school districts, in general, do not spend more per pupil than larger districts.

References

Odden, A. and Picus, L. (2008). School Finance: A Policy Perspective. (4th ed.). McGraw-Hill.

Ritter, G. and Barnett J. (2006). State of Arkansas School Funding Analysis: Comparing 2003-04 and 2004-05 Revenue and Expenditure in Arkansas Schools. North Hollywood, CA: Lawrence O. Picus and Associates.