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Analysis of School District Funding and Educational Outcome

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ANALYSIS OF SCHOOL DISTRICT FUNDING AND EDUCATIONAL OUTCOME

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EXECUTIVE SUMMARY

According to the Pennsylvania School Boards Association, about 58% of funds received by K-12 school districts throughout the state come from local taxes, while only 38% came from the state (Pennsylvania Department of Education [PDE] n.d.). This study aims to investigate what impact if any, Pennsylvania state funding has on educational outcomes in K-12 districts. The three main educational outcomes this study focuses on are Graduation Rates, Test Scores and Post-Secondary rates. In addition to state funding, other socio-economic and socio-demographic factors (number of housing units, households with single parents with children, median age, households with no internet access, rural/urban dwellers , % of parents that are homeowners, race, poverty rate, households with married couples with children) were considered to determine their impact on educational outcomes. All the data used in this study were provided by the Center for rural Pennsylvania. The data includes all rural and urban counties in Pennsylvania with the exception of Allegheny, Montgomery, Beaver and Schuylkill counties. Linear regression analyses were utilized to examine which selected condition of socio-economic and socio demographic variables best predicted certain educational outcomes. Results indicated statistically significant decrease in educational outcomes (Test Scores and Post-Secondary rates) as state funding increased.

INTRODUCTION

Pennsylvania K-12 District Funding

The mission of the Department of Education is to ensure that every learner has access to a world-class education system that academically prepares children and adults to succeed as productive citizens. Further, the Department seeks to establish a culture that is committed to improving opportunities throughout the commonwealth by ensuring that technical support, resources, and optimal learning environments are available for all students, whether children or adults. (Pennsylvania Department of Education [PDE] n.d.). To achieve this mission, the Pennsylvania Department of education provides guidance and administers the state and federal education subsidies to 677 local education agencies (LEAs) across Pennsylvania. This includes 500 school districts, 163 charter schools and 14 cyber charter schools. PDE also provides guidance for nonpublic school services. Over the years, the Pennsylvania Department of Education funds which make up (36.8% of total K-12 expenditures) have been used to provide student instruction and support services as well as non-instructional operations and facilities improvements, acquisitions and construction.

Basic Education Funding

Pennsylvania's Basic Education Funding (BEF) appropriation provides flexible funding for the commonwealth's 500 school districts. BEF rightly receives a lot of attention and focus because it is PA's largest education subsidy, totaling $6.26 billion in 2019/20 (Figure 1). By comparison, the next two largest education subsidies in 2019/20 were the state's share of the cost of the school employees' retirement system ($2.6 billion) and special education funding ($1.2 billion) (House appropriations Committee n.d.).

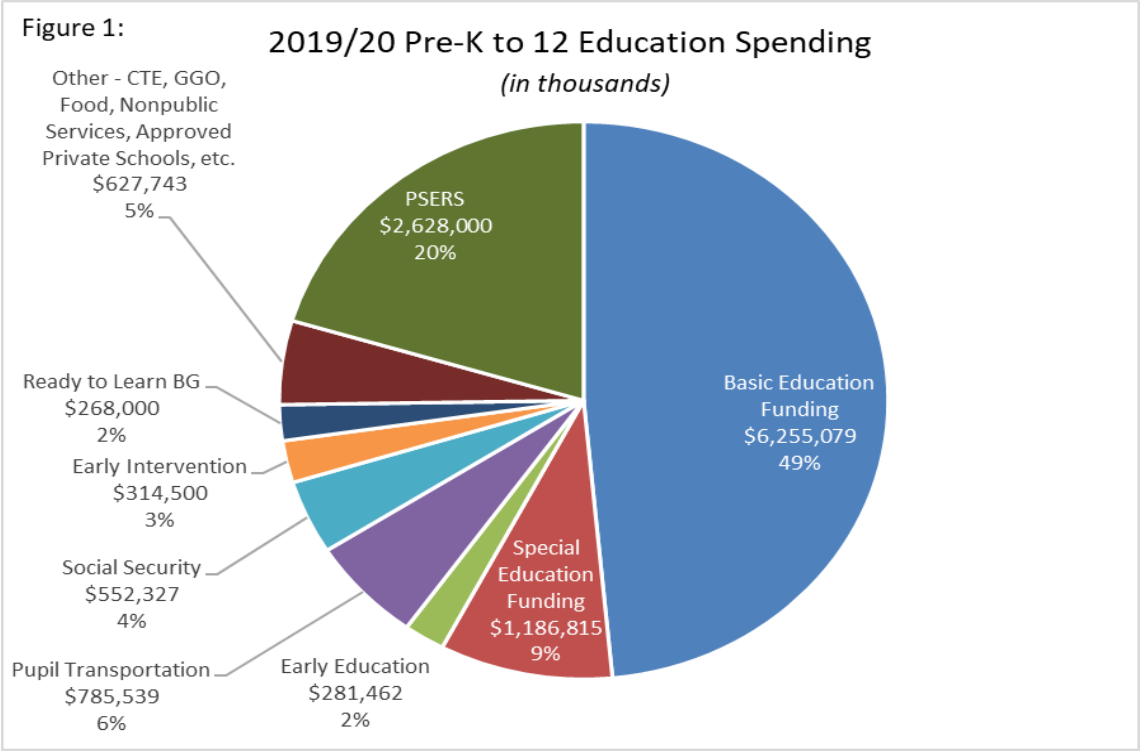

Fig 1: 2019/20 Pre-K to 12 Education Spending

Funding Formula

While getting funds from the Basic Education Funding is a welcome improvement by K-12 district schools, ensuring that all 500 commonwealth school district get a fair share of the pie requires a lot more intervention. Pennsylvania's lack of a consistent and predictable formula made school districts' jobs of forecasting their budgets very difficult. For example, in the four years between 2011/12 and 2014/15, the state allocated new BEF dollars using four different formulas. Additionally, these makeshift formulas locked-in prior years' distributions, creating one of the most inequitable education funding systems in the country (House appropriations Committee n.d.).

These disparities were what necessitated a new formula in 2015, in accordance with Act 51 of 2014. The new fair funding formula was based upon the tenets of accountability, transparency, predictability, and equity.

The fair funding formula does not allocate a specific dollar amount to each school district. Instead, it determines each district's fair share of the amount of funding available to distribute from the state. The fair funding formula is student-based, meaning a district's share of state funding is tied to its share of the student population (measured as average daily membership or ADM). However, each school district is not given the same amount of state funding per student; that would be unfair and would ignore the vast differences in local resources available to districts as well as the research-supported evidence that some students require more resources than others to succeed. The end result is that each school district receives the same amount of formula-driven state funding per weighted and adjusted ADM (figure 2).

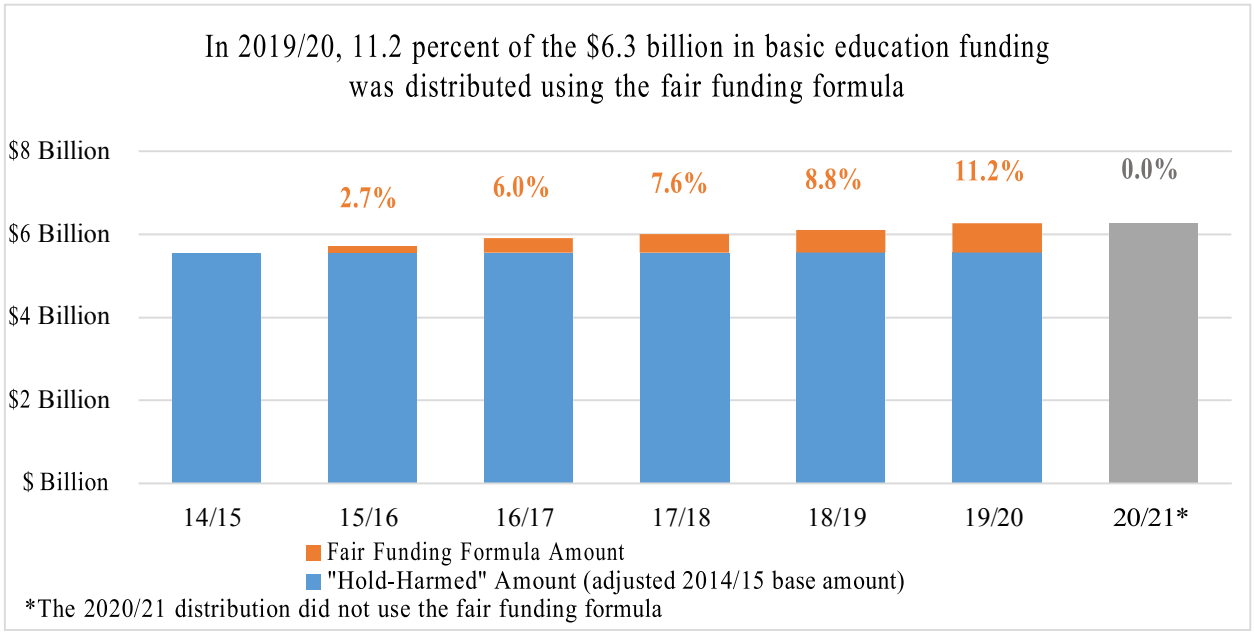

Fig 2 : 2019/20 fair funding formula

Funding Inequality in Pennsylvania

Despite the creation of a fair funding formula in 2015 for the State of Pennsylvania, there is still a large disparity between high and low income communities in Pennsylvania. This disparity comes from the high percentage of education funds coming from local taxes rather than state-allocated funds. According to the Pennsylvania School Boards Association, about 58% of funds received by school districts throughout the state came from local taxes during the 2017-18 school year, while only 38% came from the state. While there always have been inequalities among the United States' public schools, the gap in spending between public schools in the poorest and most-affluent communities in Pennsylvania has the widest gap (figure 3). School districts with the highest poverty rates here receive one-third fewer state and local tax dollars, per pupil, than the most affluent districts. This creates a situation of overreliance on local funding where huge disparities exist in the ability to raise funds.

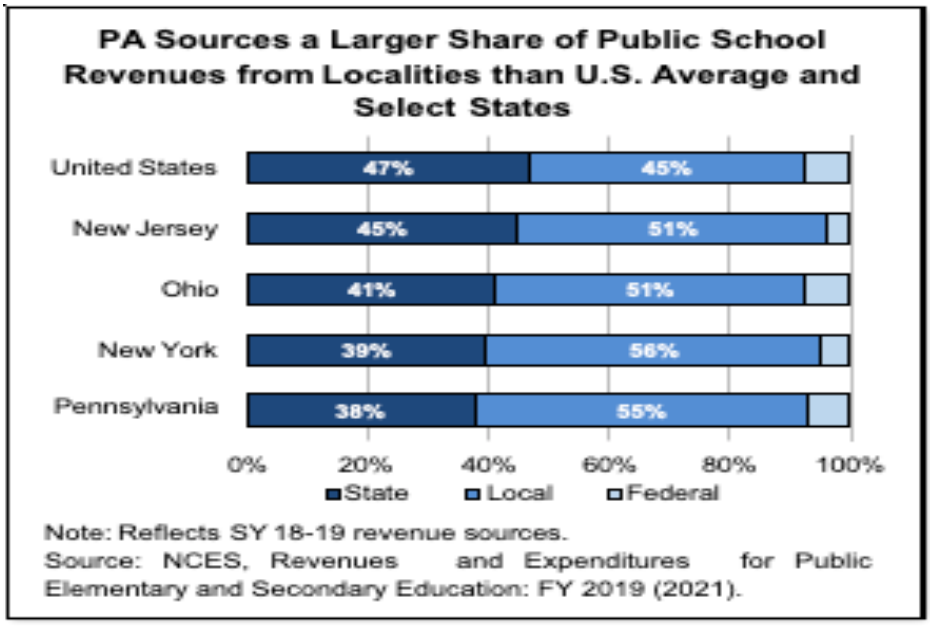

Fig 3: Comparison of Revenue allocation across U.S. States.

Educational Outcomes

Educational outcome has been measured in many different ways over the decades and some of the factors that influence educational outcomes have been studied.

Graduation rate: The graduation rate of a school is determined by what percentage of the student body graduates on time as opposed to students who were expelled or did not meet the requirements to graduate. However, many factors influence the school's graduation rate. Socioeconomic factors like being raised by single parents or married parents, financial status, age of the parents, family's educational status and how much the family values education, children's attendance and their engagement in the school. An ideal way to calculate how engaged a child is in school tends to be based on their attendance during the first few weeks of the school year. According to a study conducted by John Hopkins University in 2015, children who miss more than 10% of their instructive time during school seldom graduate on time or at all.

Test scores: Test scores is another strong determinant of educational outcome. Children with a Grade Point Average below 2.0 are less likely to graduate than children who have a Grade Point Average greater than or equal to 2.5. Other factors that determine a school's graduation rate would be the scores of a school's standardized tests. Psychological, socio-economic and socio-demographic factors also influence standardized test scores. Some of these factors in a child's psychology include a child's attention span, long term memory motivation.

Post-secondary rates: The third and final variable that we will be using to measure educational outcomes are post-secondary education rates. These include how many students from each school choose to pursue higher education or trade school post-high school and are thriving. We

chose this to be one of the essential variables because while the entire point of a school is to have its students gain their diplomas, they should also be willing to expand their education and pursue education even after they leave their high school days so that they may lead a prosperous life. Post-secondary education rates are the best way to calculate the results of that possibility.

GOALS AND OBJECTIVES

Goal 1

Explore the impact socio-demographic and economic factors have on education outcome in rural and urban school districts.

Objectives

- Highlight the difference in affluence between school districts in terms of economic measure descriptors.
- Determine if race plays any role in the educational outcomes.
- Examine the differences between rural and urban school districts in terms of race, affluence and educational outcomes.

Goal 2

Determine what role funding plays in educational outcomes.

Objective

- Explore the distribution of state funding in rural and urban areas.
- Examine how the distribution of state funding has changed over the years and what (if any) impacts it has on educational outcomes.

Goal 3

Investigate the impact Pennsylvania State funding has on educational outcomes.

Objectives

To determine the role state funding has on educational outcomes such as:

- Test scores.
- Graduation rate.
- Post-secondary enrollment.

Goal 4

Identify relevant policy changes that may lead to better educational outcomes.

Objectives

- Examine what policies are currently in effect for state education funding and how they impact educational outcomes.
- Determine how recommending new policies can improve educational outcomes.

METHODOLOGY

All the data used in this study were provided by the Center for rural Pennsylvania. The data includes all rural and urban counties in Pennsylvania with the exception of Allegheny, Montgomery, Beaver and Schuylkill counties. The study used linear regression to explore the effect of selected independent variables (number of housing units, fund change, households with single parents with children, median age, households with no internet access, rural/urban % homeowners, white alone, poverty rate, households with married couples with children and

revenues from state source) on selected dependent variables (graduation rate, test scores and post-secondary rate).

Dependent Variables	**Independent variables**
Graduation rate	Number of housing units
Test Scores	Fund change
Post-Secondary Rate	Households with single parents with children
	Median Age
	Households with no internet access
	Rural/Urban %
	Homeowners
	White Alone (Non-Hispanic)
	Poverty Rate
	Households with Married Couples with children
	Revenues from state source

Fig 4: List of all dependent and independent variables

From the initial model, the independent variable fund-change had the only statistically significant impact on the educational outcomes – test scores and post-secondary rate. The outcome model was re-run four more times to test whether state funding plays a more significant role for education outcomes in:

Rural school districts

Urban school districts

School districts with a poverty rate at or below statewide rate of 12.4%

School districts with a poverty rate above the statewide rate of 12.4%

RESULTS

Data Analysis Using Linear Regression Analyses

The results in the following sections present an evaluation of which condition of independent variables played a significant role in educational outcomes (test scores and post-secondary rates) in the State of Pennsylvania.

TEST SCORES

The first criterion variable of statistically significance using linear regression analysis was test scores. Linear regression results indicated that state funding had an effect on test scores $\beta = -.20$, $t(481) = -5.47$, $p<.05$, $R^2 = .75$

INITIAL MODEL

ANOVA		
Model	**F**	**Sig**
Regression	123.022	<.001

Fig 5: Anova Table

Coefficients		
Model	**t**	**Sig.**
Fund change	-5.466	<.001

Fig 6: Coefficient Table

Test scores deceased as funding increased. (This is a normal reaction because schools with low test scores get more funding). Most researchers would agree that it is not surprising that the lower the test scores, the higher the state funding.

The outcome model was re-run four more times to test whether state funding plays a more significant role for education outcomes in:

- Rural school districts
- Urban school districts
- School districts with a poverty rate at or below statewide rate of 12.4%
- School districts with a poverty rate above the statewide rate of 12.4%

SUB-GROUP MODEL – URBAN ONLY

From the first sub-group model (rural/urban), the linear regression results indicated that state funding had an effect on test scores in urban school districts only $\beta = -.18$, $t(248) = -5.25$, $p<.05$, $R^2 = .83$

ANOVA		
Model	**F**	**Sig**
Regression	117.884	<.001

Fig 7: Anova Table

Coefficients		
Model	**t**	**Sig.**
Fund change	-5.247	<.001

Fig 8: Coefficient Table

Test scores deceased as funding increased. Urban schools in the United States are generally viewed as having greater challenges than their suburban and rural counterparts. Most notably, they often have lower academic achievement (Ravitch, D. 2013).

SUB-GROUP MODEL – LOW POVERTY

From the second sub-group model (low poverty/high poverty), the linear regression results indicated that state funding had a statistically significant effect on test scores in low poverty school districts only $\beta = -.07$, $t(143) = -1.03$, $p<.05$, $R^2 = .72$

ANOVA		
Model	**F**	**Sig**
Regression	33.271	<.001

Fig 9: Anova Table

Coefficients		
Model	**t**	**Sig.**
Fund change	-3.544	<.001

Fig 10: Coefficient Table

Test scores deceased as funding increased. Children living in low poverty regions are more likely to have parents that don't take time to help out with their school work, either because they don't understand, or don't have the time (National Center for Educational Statistics).

POST SECONDARY RATE

The second criterion variable of statistically significance using linear regression analysis was post-secondary rate. Linear regression results indicated that state funding had an effect on test scores $\beta = .19$, $t(481) = 3.42$, $p<.05$, $R^2 = .43$

INITIAL MODEL

ANOVA		
Model	**F**	**Sig**
Regression	32.324	<.001

Fig 11: Anova Table

Coefficients

Model	**t**	**Sig.**
Fund change	3.420	<.001

Fig 12: Coeffieient Table

Post-secondary activities increased as funding increased. An increase in funding might result in more access to after school programs that encourage the children to strive for more later in life. (National Center for Educational Statistics).

SUB-GROUP MODEL – URBAN ONLY

From the first sub-group model (rural/urban), the linear regression results indicated that state funding had an effect on post-secondary rates in urban school districts only $\beta = .18$, $t(222) = 1.48$, $p<.05$, $R^2 = .20$

ANOVA		
Model	**F**	**Sig**
Regression	22.697	<.001

Fig 13: Anova Table

Coefficients		
Model	**t**	**Sig.**
Fund change	2.259	0.025

Fig 14: Coefficient Table

Post-secondary activities increased as funding increased. The proximity of Urban schools to big cities may be responsible for influencing post-secondary behavior.

SUB-GROUP MODEL – LOW POVERTY

From the second sub-group model (low poverty/high poverty), the linear regression results indicated that state funding had a statistically significant effect on post-secondary rate in low poverty school districts only $\beta = .21$, $t(327) = 2.14$, $p<.05$, $R^2 = .47$

ANOVA		
Model	**F**	**Sig**
Regression	28.622	<.001

Fig 15: Anova Table

Coefficients		
Model	**t**	**Sig.**
Fund change	2.137	0.033

Fig 16: Coefficient Table

Post-secondary activities increased as funding increased. Since, on average, urban public schools are more likely to serve low income students, the proximity to larger city may be responsible for influencing post-secondary behavior.

CONCLUSION

The most clear-cut finding of this study is that dollars definitely do make a difference. Pennsylvania's current funding formula allocates resources based on each district's level of tax effort and its tax capacity. The state compares each district's local property tax rate to the state median, adjusting for the level of need of the student population that the district serves. Districts with a higher tax effort and with lower tax capacity than the state medians will receive more in state aid, on the assumption that the remainder of education expenditures will be covered by local tax dollars. At first glance, this seems like a fair solution, but when local tax dollars are included, so many K-12 districts are grossly underfunded.

But there are other socio-economic and socio-demographic factors at play. A 1966 report by James Coleman and coauthors of the John Hopkins University concluded that "it is a known factor that socioeconomic factors bear a strong relation to academic achievement. When these factors are statistically controlled however, it appears that differences between schools' accounts for only a small fraction of differences in pupil achievement" (Coleman et al 1966).
In 2016, Stephen Morgan, Bloomberg Distinguished Professor of Sociology concluded said that "the conclusion that family background is far more important than people realized has remained a solid empirical finding for 50 years". (Morgan 2016).

While funding plays a huge role in educational outcomes, the effects of socio-economic and socio demographic factors cannot be denied. Students benefit from having access to good education (in a well-funded school) and having access to the right environment.

RECOMMENDATIONS

Economists from the University of California at Berkeley and Queens College argued that increased school funding can lead to better learning outcomes if funding is predictable, recurring, sustained, and targeted, and that a greater investment in K-12 education would also yield less spending on things like welfare and prisons. This and many other positions (including the ongoing Pennsylvania equity lawsuit) support the widely held belief that the current Pennsylvania Policy on Education Funding needs a review and update.

Figure 17: What Equity really means

Our Recommendations are:

- Variations in the funding and spending formula remains an issue. A fair, transparent and accurate funding formula that identifies the needs of the students and direct the funds where needed is desirable. Money does matter when spent well, equitably and properly. The government must control and track how money gets spent in schools. Government may also need to encourage greater parental involvement, quality training for teachers and even greater commitment on the part of students.

- The government must do well to change the systemic imbalance in our education system. Inner city schools should not differ from the schools in suburb in curriculum and teaching. What America needs rather are schools where children of different social backgrounds can intermingle, learn and grow together.
- Ensure that students, especially struggling students or disadvantaged students, get personal tutorials tailored to their specific needs. Not all students learn the same. some may be faster in learning; others may be more hands-on. Equal opportunity is not just the law, it also means equity. Some students may need just a little extra nudging and assistance to measure up. Promoting equity will ensure both availability of resources and accountability on the part of educators.
- Develop a rich, rigorous curriculum across the board for all students irrespective of their background.
- Promote and encourage research-based practices that will teach effectively to approved standards.
- Deemphasize test scores as a measure of effectiveness. Set realistic performance targets but not by using test scores.

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