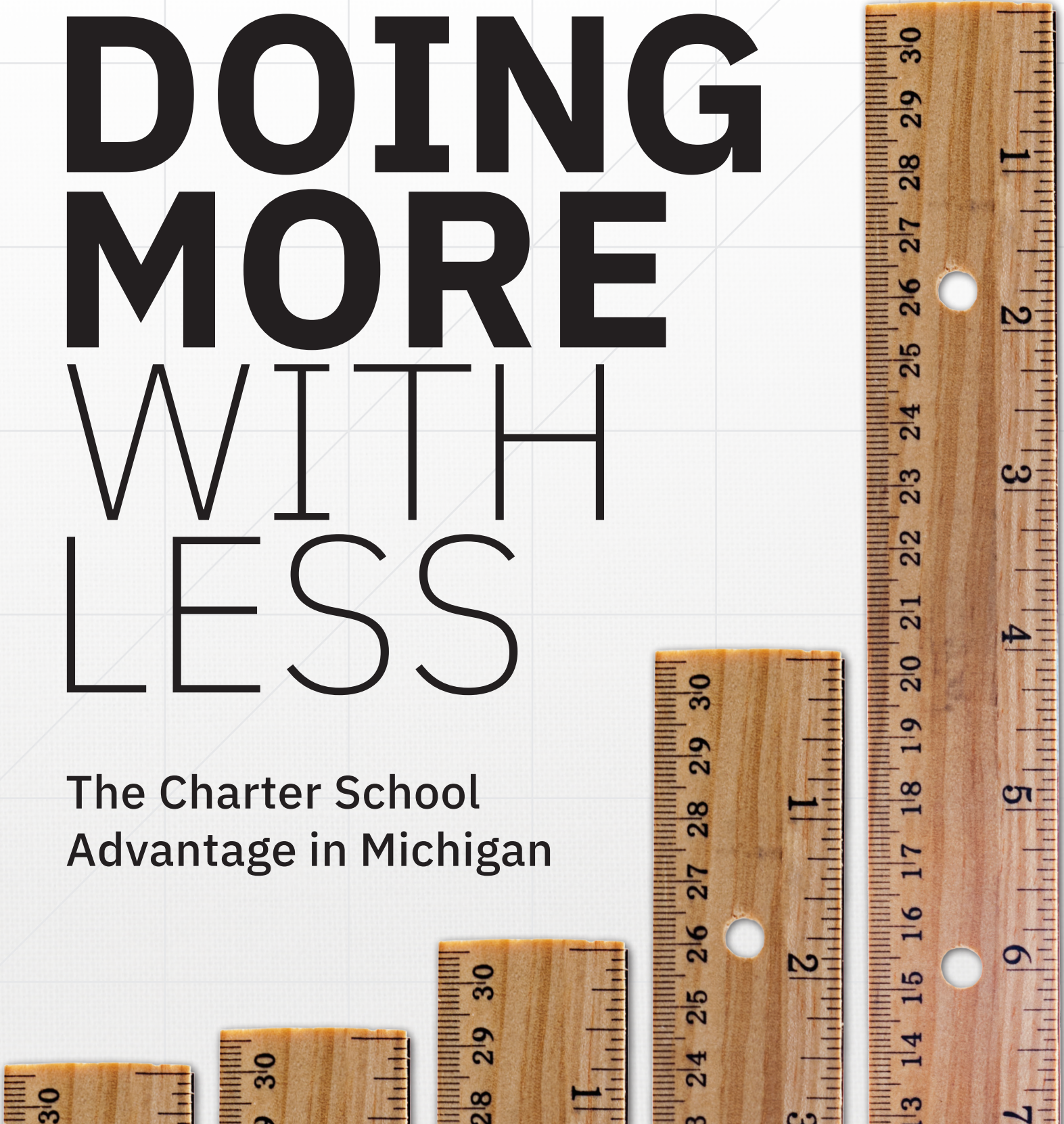Corey DeAngelis & Ben DeGrow

DOING MORE WITH LESS

The Charter School Advantage in Michigan

The Mackinac Center for Public Policy is a nonpartisan research and educational institute dedicated to improving the quality of life for all Michigan residents by promoting sound solutions to state and local policy questions. The Mackinac Center assists policymakers, scholars, businesspeople, the media and the public by providing objective analysis of Michigan issues. The goal of all Center reports, commentaries and educational programs is to equip Michigan residents and other decision makers to better evaluate policy options. The Mackinac Center for Public Policy is broadening the debate on issues that have for many years been dominated by the belief that government intervention should be the standard solution. Center publications and programs, in contrast, offer an integrated and comprehensive approach that considers:

All Institutions. The Center examines the important role of voluntary associations, communities, businesses and families, as well as government.

All People. Mackinac Center research recognizes the diversity of Michigan residents and treats them as individuals with unique backgrounds, circumstances and goals.

All Disciplines. Center research incorporates the best understanding of economics, science, law, psychology, history and morality, moving beyond mechanical cost-benefit analysis.

All Times. Center research evaluates long-term consequences, not simply short-term impact.

Committed to its independence, the Mackinac Center for Public Policy neither seeks nor accepts any government funding. The Center enjoys the support of foundations, individuals and businesses that share a concern for Michigan's future and recognize the important role of sound ideas. The Center is a nonprofit, tax-exempt organization under Section 501(c)(3) of the Internal Revenue Code. For more information on programs and publications of the Mackinac Center for Public Policy, please contact:

Mackinac Center for Public Policy 140 West Main Street   P.O. Box 568   Midland, Michigan 48640
989-631-0900   Fax: 989-631-0964   Mackinac.org   mcpp@mackinac.org

The Mackinac Center for Public Policy

Doing More With Less:
The Charter School Advantage in Michigan

By Corey DeAngelis and Ben DeGrow

MACKINAC CENTER
FOR PUBLIC POLICY

Guarantee of Quality Scholarship

The Mackinac Center for Public Policy is committed to delivering the highest quality and most reliable research on Michigan issues. The Center guarantees that all original factual data are true and correct and that information attributed to other sources is accurately represented.

The Center encourages rigorous critique of its research. If the accuracy of any material fact or reference to an independent source is questioned and brought to the Center's attention with supporting evidence, the Center will respond in writing. If an error exists, it will be noted in a correction that will accompany all subsequent distribution of the publication. This constitutes the complete and final remedy under this guarantee.

Contents

Executive Summary

The appointment of Betsy DeVos as education secretary of the United States has led to much debate across the nation about public charter schools. Opponents of charter schools typically argue that these schools fail if their average standardized test scores do not exceed those of traditional, district-run schools. These types of comparisons, however, often do not take taxpayer inputs into account. Taking these inputs into consideration, public charter schools ought to be deemed successful if they are able to produce similar outcomes at a lower cost to taxpayers.

In this study, we examine charter school funding inequities in 92 cities across Secretary DeVos's home state of Michigan. In addition, we calculate the cost effectiveness and return on investment of public charter schools in 71 Michigan cities. Similar to the findings of the existing literature on the topic, we find that public charter schools receive substantially less funding per pupil than traditional public schools.

We reveal that charters in Michigan are more cost effective and produce a larger return on investment for taxpayers. These results persist even after controlling for student demographic factors that research suggests impacts both a school's funding levels and its average student test scores. These factors include the portion of students receiving special education services or who are English language learners, the average socioeconomic background of students in a school as well as the race and gender composition of a school's students.

Three key findings are:

- On average, Michigan charter schools receive about $2,782, or 20 percent, less per pupil than traditional public schools.

- Based in part on this funding disparity, the average public charter school studied is 32 percent more cost effective than the average traditional public school located in the same city.

- As measured by expected lifetime earnings of each student, the average charter school generates about $2.63 more return on investment for each dollar it spends — 36 percent higher than the average traditional public school.

Introduction

The 2016 United States presidential election and subsequent appointment of Betsy DeVos as the secretary of education has brought considerable attention to the concept of school choice. Indeed, a Google Trends analysis of web searches of the term "school choice" illustrates that public interest reached its highest level at the onset of 2017, as shown in Graphic 1 below.[1]

Graphic 1: Google Trends Worldwide Public Interest in "School Choice"
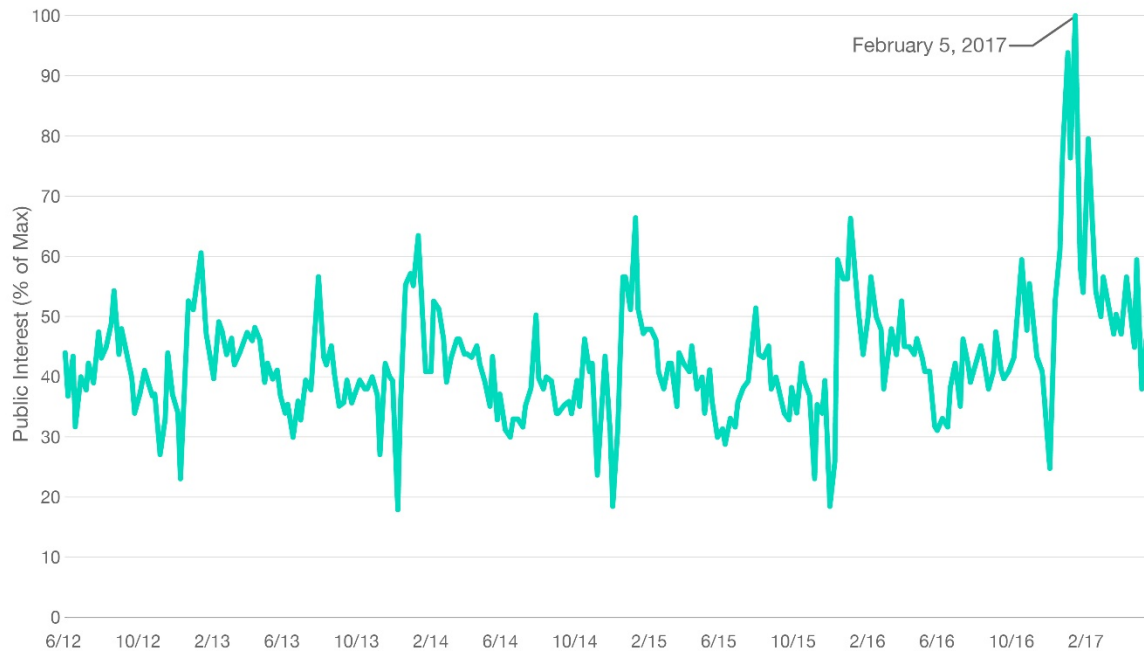
Source: Google Trends   mackinac.org   MACKINAC CENTER
                                                                        FOR PUBLIC POLICY

School choice programs allow families to opt out of their residentially assigned traditional public schools and enroll their children in different public schools of their own choosing. Charter schools are one of the most popular forms of public school choice in the United States. Charter schools are open and free to attend for all children within a state and may not discriminate when enrolling students. If oversubscribed, charters are typically required to use a random lottery to determine which students are granted admission — they may not give preferential admission to any student based on race or ability.[2] Since the first public charter school law passed in Minnesota in 1991, enrollment in charters has grown to over 2.9 million students located in 44 states and the nation's capital.[3]

Michigan passed charter school legislation in 1993, making it one of the nation's early adopters. Charter schools are independently governed, state-funded public schools of choice. According to the Michigan Department of Education, there were 376 Michigan charter schools operating

during the 2016-17 school year.[*] Charter schools served more than 152,000 students, approximately 10 percent of public school students in Michigan.[4] More than two-thirds of the state's charters are authorized by one of eight different public universities, with the rest authorized by community colleges, local school districts or intermediate school districts.[†] Authorizers provide accountability and oversight through the terms of a performance contract with a charter school's governing board.

Charter schools are located all across the state of Michigan, but tend to be concentrated in urban areas such as Detroit. As a result, the students served by these schools have a different demographic makeup on average than the typical traditional public school. In 2017, half of Michigan charter school students were African-American and 70 percent qualified as low-income. By contrast, only 14 percent of TPS students were African-American and only 43 percent were low-income.[5]

The Center for Research on Education Outcomes at Stanford University finds that over 94 percent of Michigan charter schools perform on par with or better than TPS, measured by annual growth in math and reading test scores.[6] Of course, there is significant variation in the effectiveness of public charter schools across geographic locations, student populations and individual educational institutions. An overall review of the literature by Julian Betts and Emily Tang finds that public charter schools only slightly outperform TPS on boosting student math achievement. The overall effects are not statistically different from zero for reading.[7] Critics of charter schools often claim that this is evidence of their failure.

However, such claims do not consider the relative costs of educating children. Funding for Michigan charter schools depends on the same foundation allowance most traditional school districts receive, $7,631 per pupil in 2018. The foundation allowance represents the state's minimum per-pupil funding guarantee, but does not include numerous other sources of local, state and federal revenue available to public schools. Michigan charter schools lack authority to collect local tax dollars to finance facilities and infrastructure projects and typically have to pay for these costs out of their general operating budgets. Other disparities between charters and district-run schools arise out of extra program-specific tax dollars received through state "categorical grants" or federal appropriations. Altogether, the average Michigan charter school takes in significantly fewer dollars per student than the average TPS.

A series of reports by Ball State University and the School Choice Demonstration Project at the University of Arkansas estimate these funding discrepancies and efficiency differences. Year after year, these reports find that charter school funding inequity persists at the state and city level, with charters receiving considerably less revenue than TPS on average.[8] Moreover, the University of

---

[*]   Author's calculations based on data from Michigan's "Educational Entity Master" database. This is a count of the number of distinct charter school buildings in use — some of these buildings may be managed by the same charter school board. This figure also includes virtual or online charter schools.

[†]   In all, 44 different entities authorized at least one charter school contract, including 16 local school districts, 15 intermediate school districts, four community colleges and the state's Education Achievement Authority "school turnaround" district. The EAA shut down at the end of the 2016-17 school year and all its schools were placed under the control of the reconstituted Detroit Public Schools Community District.

Arkansas team estimates the productivity of public schools and finds that charters deliver a greater return on investment than TPS in every state they examined.[9]

We build on this existing literature by detailing the relative funding and productivity of public charter schools in the state of Michigan. First, we estimate the equity of public funding for children who choose to enroll in public charters versus TPS in 92 cities across Michigan. In addition, we estimate the cost effectiveness and taxpayer return on investment for educating students in public charters and TPS in a subset of 71 cities throughout the state.

Data and Methods

Financial Data

We use Michigan public school funding data from the 2014-15 school year. In particular, we use the Mackinac Center's "Michigan School District Revenue and Expenditure Report" and aggregate charter and conventional district funding to the city level in order to compare per-pupil funding differences.[10] Each charter school is recognized and directly funded as its own district, known statutorily as a "public school academy."[11] Because charters are recognized and funded as distinct entities from conventional districts, their funding levels can best be compared at the city level.

Funding data were available for public schools in 495 different cities in Michigan in 2014-15. Charter schools operate in 92 of these cities.* As a result, we limit our funding analysis to those 92 cities. These cities enrolled about 770,340 full-time equivalent students in public charter schools and TPS in 2016, representing about 55 percent of Michigan's total public school enrollment.

We first examine differences in overall, per-pupil revenue by adding up all revenue sources and dividing by the number of enrolled students for each charter school and school district. Once we calculate per-pupil revenue from all public sources, we find the average difference between funding for charters and for districts operating in the same city. We then calculate the percentage of cities where charter schools average less funding compared to the nearby district schools and the percentage of children in each city enrolled in these lower-funded charters. We continue the analysis by examining differences for local, state and federal funding streams.

Academic Performance Data

We use school-level data from the Mackinac Center's Michigan Public School Context and Performance database to assess school-level student achievement.[12] This dataset contains "context and performance" scores for each school based on an analysis of average standardized test scores adjusted according to the average poverty level for students enrolled in the school. Specifically, this CAP analysis adjusts state standardized test scores based on the rate of students taking the tests that qualify for the federal free lunch program, determined by their household

---

* We excluded the city of Baldwin from this analysis, even though there is a charter school located there. The traditional district in Baldwin receives a unique and substantial amount of state revenue for ancillary programs it oversees and this significantly skewed the comparisons between the traditional district schools and the city's charter school.

income. Research consistently shows a statistically significant negative correlation between free lunch rates and raw achievement scores on standardized tests.

The CAP analysis uses linear regression in order to predict how each school should perform on standardized assessments given their students' socioeconomic backgrounds.[*] By comparing a school's actual achievement to its expected achievement based on student poverty rates, CAP scores present a more accurate comparison of school-level impacts on academic outcomes.[†] The CAP score is standardized to have a mean of 100 points and a standard deviation of 15 points; a score above 100 means that the school performed better than expected based on their poverty rate and a score below 100 means just the opposite — the school performed worse than expected given their poverty rate.[‡]

CAP scores are based on academic performance data that is comprised of average standardized tests scores from multiple consecutive years. These include, for the schools serving high school students, scale scores from the Michigan Merit Examination from 2010 to 2015.[§] For schools serving elementary and middle school students, CAP scores are derived from multiple consecutive annual average scale scores from the Michigan Educational Assessment Program tests from 2012 to 2014.[**]

We calculated two overall CAP score averages at the city level: one for public charter schools and one for TPS. We only had sufficient data to calculate these average CAP scores in 71 different Michigan cities.[††]

---

[*]   The different assessments that form the basis of CAP scores, based on the operative school year and grades tested, are the Michigan Merit Examination, the Michigan Educational Assessment Program and the Michigan Student Test of Educational Progress.

[†]   Since our analysis does not represent a true experiment, selection-bias is not completely controlled for. CAP scores are created by running a regression based on the rate of students eligible for free lunches due to low family income. However, to provide a needed robustness check, we do control for many factors typically associated with student success in this current analysis, including the following observable effects in the data: gender, English language learners, special education, income disadvantage and minority status.

[‡]   For fuller explanations of data and methods used to calculate CAP scores, see Audrey Spalding and Ben DeGrow, "The Michigan Context and Performance Report Card: Public Elementary and Middle Schools, 2015" (Mackinac Center for Public Policy, 2016), 2–4, https://perma.cc/Y3MB-NCDT; Ben DeGrow and Ronald Klingler, "The Michigan Context and Performance Report Card: High Schools, 2016" (2017): 1–3, https://perma.cc/FS3Q-ZHQU.

[§]   Technically, we used CAP scores from two different reports, one that included MME scores from 2010 to 2013 and one report that was based on MME scores from 2012 to 2015. If a high school did not have a score from the report covering 2012 to 2015, we used the CAP score for the report covering 2010 to 2013.

[**]   In 2015, the state of Michigan changed its assessment program to the M-STEP, replacing the MEAP and MME. Among other things, the M-STEP replaced separate reading and writing subject tests with a combined English language arts score. Accounting for that combination, a regression analysis found that a school's 2014 MME subject test score was a reliable predictor of its performance on the 2015 M-STEP subject test, so there's little reason to believe that recent or future M-STEP results will dramatically change a school's CAP scores. See Ben DeGrow and Ronald Klingler, "The Michigan Context and Performance Report Card: High Schools, 2016" (2017): 33, https://perma.cc/FS3Q-ZHQU.

[††]   In 21 of the cities studied, no charter schools had qualified academic achievement data. This occurred for a variety of reasons. Most of the omitted schools either had not been open long enough to report enough years of standardized test scores or they are designated as alternative education programs.

Cost Effectiveness Analysis

In order to determine the relative productivity of public charter schools and TPS, we follow the methodology from the University of Arkansas charter school productivity study and first calculate the cost effectiveness of public charter schools and TPS using the following formula:[13]

$$Cost\ Effectiveness = \frac{CAP\ points}{Per\ Pupil\ Expenditure}$$

The total cost of the investment is more straightforward. It is the average amount of public expenditures invested on students in TPS and public charter schools for each city multiplied by the average number of years spent in school.* We rely on data contained in the Mackinac Center's "Michigan School District Revenue and Expenditure Report," the same database used for the analysis of funding disparities between charters and TPS. We use 13 years because the public is investing in each child's education from kindergarten through 12th grade. The calculations for TPS and public charter school students in each city appear below:

$$Cost\ of\ Investment = Per\ Pupil\ Expenditure * 13$$

We take the average amount of CAP points achieved by students in public charter schools and then divide by the total cost of investment for 13 years of education. This gives us the average amount of CAP points achieved by a student in a public charter school for each $1,000 invested, or spent, over the course of their schooling career. We compare the average cost effectiveness of public charter schools to TPS for 71 cities in Michigan. The result is 142 unique observations of cost effectiveness — CAP score achieved per $1,000 dollars expended — based on city and school type.

Return on Investment Analysis

We also calculate a return on investment by examining resource inputs and long-term outcomes across the two sectors in each city. In order to calculate ROI, we use the following formula:

$$Return\ on\ Investment = \frac{Income\ Returns\ to\ Investment}{Cost\ of\ Investment}$$

The income return to investment is the net present value of additional lifetime earnings accrued through an improved educational experience.† Stanford University economist Eric Hanushek estimated that a one standard deviation increase in academic achievement scores leads to a 13 percent increase in lifetime earnings.[14] In addition, only 70 percent of gains in learning persist each year. If we multiply these two estimates together, we find the learning gains relative to the average worker in the state of Michigan. For example, if a child attends a charter school that produces one standard deviation of higher academic achievement scores each year, and learning fadeout does

---

* We use funding from the most recent year since it is the best estimate of current investment, while multi-year CAP score averages provide the best proxy of general school quality. We use expenditures in this section of the analysis because we are calculating society's return on the spending decisions made by the schools in each sector.

† Net present value is the current dollar value of expected financial returns after adjusting for the time value of money.

not occur, that child is estimated to experience a 13 percent increase in lifetime earnings relative to the average child in Michigan. However, we adjust for the fact that about 70 percent of learning gains persist each year by multiplying each year's learning gains by 0.7.

We use the average income of all employees in the state of Michigan as the closest approximation of what the average child is expected to earn. By comparing test scores relative to the average worker's income in the state, we estimate the returns to the schooling investment in terms of yearly income. We use data from the United States Bureau of Labor Statistics to find state-level average annual earnings per employee in Michigan and assume that current students will work between the ages of 25 and 70, or 46 years.[15] When calculating the net present value of lifetime earnings, we assume 1 percent yearly growth in average salaries and a 3 percent annual discount rate.[*] The net present value of the average lifetime income in the state of Michigan, using a discount rate of 3 percent and a yearly salary growth rate of 1 percent, is $1,178,223.

Cost Effectiveness and ROI Comparison: Detroit Example

Let us examine the city of Detroit as an example, where the annual TPS expenditure is $16,004 per student. The city-level CAP score average for TPS students in Detroit is 92.86. Thus, the average cost effectiveness for TPS in Detroit can be calculated as:

$$\frac{92.86 \; CAP \; points}{\$16.004} = 5.8 \; CAP \; points \; per \; \$1,000$$

In other words, every $1,000 spent per pupil by a Detroit TPS translates to about 5.8 CAP points, on average.

The average CAP score of 92.86 means that students in Detroit TPS performed 0.476 standard deviations lower than predicted based on how other schools in Michigan performed after controlling for their students' average poverty rate:

$$-0.476 \; SD = \frac{92.86 \; (actual \; CAP \; score) - 100 \; (expected \; score)}{15 \; points \; per \; SD}$$

Using both Hanushek's estimates of earning gains based on measurable increases in academic achievement and the net present value determined above, the average lifetime earnings for TPS students in Detroit is:

$$\$1,178,223 \; * \; [1 + (-0.476) * (0.13) * (0.70)]^{13} \; = \; \$662,549$$

The city-level ROI for 13 years in a Detroit TPS then equates to:

$$\frac{\$662,549}{(\$16,004 * 13)} = \$3.18 \; per \; dollar \; spent$$

---

[*] The discount rate is used to estimate inflationary value changes and interest accrued over time.

In other words, each dollar invested in educating a child in a Detroit TPS results in $3.18 in lifetime earnings for each student, on average. The same calculation can be done for Detroit public charter schools in order to compare the return on investment across sectors.

The average annual per-pupil expenditure in public charters in Detroit is $10,519. The city-level CAP score average for these schools is 99.31. Thus, the average cost effectiveness for charters in Detroit can be calculated as:

$$\frac{99.31 \; CAP \; points}{\$10.519} = 9.44 \; CAP \; points \; per \; \$1,000$$

The CAP score of 99.31 means that students in Detroit charters performed 0.046 standard deviations lower than predicted based on how other schools in Michigan performed after controlling for their students' average poverty rate:

$$-0.046 \; SD = \frac{99.31 \; (actual \; CAP \; score) - 100 \; (expected \; CAP \; score)}{15 \; points \; per \; SD}$$

Using Hanushek's estimates, the average lifetime earnings for public charter students in Detroit is:

$$\$1,178,223 \; * \; [1 + (-0.046) * (0.13) * (0.70)]^{13} \; = \; \$1,115,692$$

The city-level ROI for 13 years in a Detroit public charter school is:

$$\frac{\$1,115,692}{(\$10,519 * 13)} = \$8.16 \; per \; dollar \; spent$$

Each dollar spent by a Detroit charter school produces $4.98 ($8.16-$3.18) more in lifetime earnings for the typical student than each dollar spent by a Detroit TPS. This equates to a 157 percent higher return on investment for charter schools in Detroit compared to their TPS counterparts. If these estimates of the correlation between test scores and lifetime earnings are accurate, attending a Detroit charter school leads to substantial extra financial benefits for students, on average. We do identical calculations for the other 70 cities across the state of Michigan where data are available.

Overall Results

Funding Inequity

As other studies have shown, funding inequities largely favor traditional public schools in Michigan.[16] The first row of the table in Graphic 2 illustrates overall results for per-pupil revenue inequities. In the 92 cities studied, the average result was a $2,080 overall revenue disparity favoring district schools, meaning charter schools, on average, receive $2,080 less per pupil compared to TPS. Weighting city-level outcomes by the total number of public school students in each city reveals that children in Michigan charter schools received about $2,782, or about 20 percent, less in total funds than did students in TPS. Eighty-eight percent of cities examined revealed a public charter school funding disadvantage, while 95 percent of all students included in this analysis were located in a city where a public charter funding disadvantage existed. This considerable funding inequity is especially alarming given that charters in Michigan serve a substantially higher share of children from low-income families.[17]

As shown in the table below, the main driver for the per-pupil funding discrepancies is money collected at the local level. Charter schools have no authority to assess their own property tax levies. This excludes them from collecting "nonhomestead" tax dollars as part of their state formula funding, extra voter-approved millages to finance facilities and infrastructure, or the regional enhancement millage approved at the intermediate school district level.

On average, public charter schools received $3,094 less per pupil in local funding and 99.9 percent of charter students attended schools in a city where charters received less local funding than TPS. Only 3 percent of the cities had local funding disparities favoring public charter schools.*

With no access to local taxpayer funds, public charter schools typically rely heavily on state funding to finance their foundation allowances. It's not surprising then that we find that charter schools on average received $569 per pupil more state funding than TPS in Michigan. A similar analysis of just federal revenue shows that TPS receive slightly more than charters, on average — $249 per student.† The table below in Graphic 2 provides more detail.

---

* In the cities that bucked the local funding trend (Fennville, Troy and Beverly Hills), a total of three charter schools served a combined 160.83 full-time equivalent students. All three reported a significant amount of "other" nonproperty tax local revenue received in 2014-15. In at least two of the three schools – Early Career Academy (opened 2014) and Nexus Academy of Royal Oak (opened 2013) – that "other" revenue was reported as cash subsidy or in-kind revenue from the partner management organization. For more information, see "Office of Audits – Financial Statements" (Michigan Department of Education), https://goo.gl/SB5ekZ.

† Sault Ste. Marie stands as an outlier on both total and federal per pupil revenue disparity. The city's only charter school, Joseph K. Lumsden Bahweting Anishnabe Academy, receives significant extra funding from the U.S. Department of Interior because of its dual status as a Bureau of Indian Affairs school. See "About Us" (Joseph K. Lumsden Bahweting Anishnabe School, 2018), https://perma.cc/7539-HYCV.

**Graphic 2: Per-Pupil Revenue Disparities for Charters Schools
Compared to Traditional Public Schools by Funding Source, 2014-15**
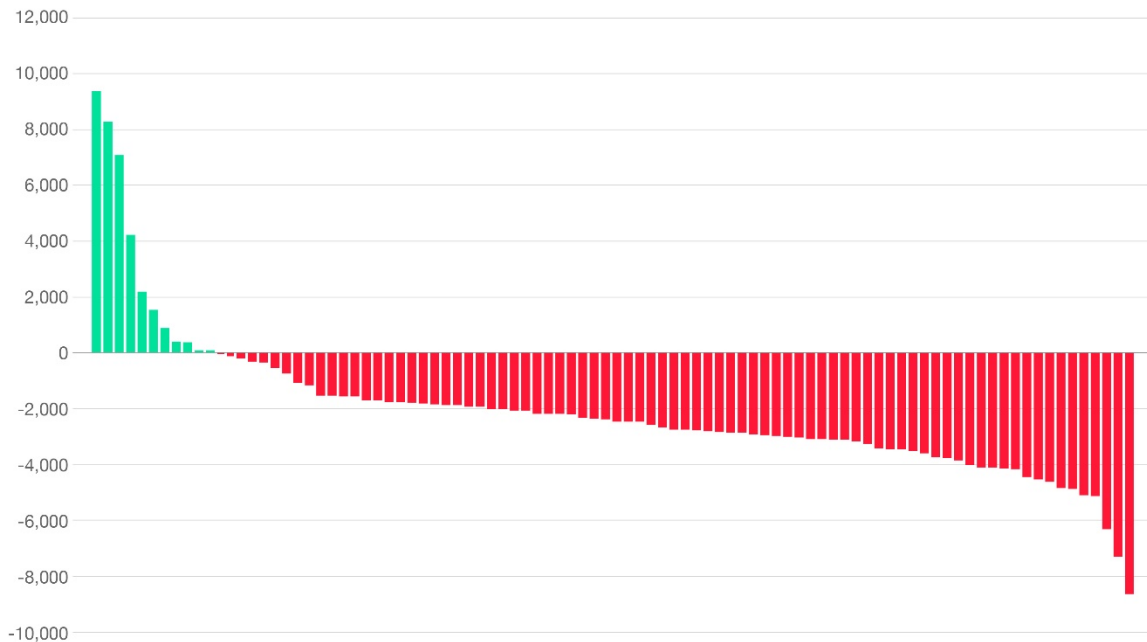
Funding Level	Average by City	Average Weighted for Student Count	Cities with Charter Disadvantage	Students in Charter Disadvantaged Cities
Overall	-$2,080	-$2,782	88%	95%
Local	-$3,321	-$3,094	97%	97%
State	$1,028	$569	18%	28%
Federal	$225	-$249	52%	53%

Source: National Public Education Finance Survey

The bar graphs below display the results from all 92 cities included in this analysis of funding disparities between charter schools and TPS. Total per-pupil revenues are shown in the first graphic and subsequent graphs show the local, state or federal per-pupil revenues individually.

The bars on the left side of the graph, indicating positive values, represent charter schools whose per-pupil funding exceeds that of their nearby TPS. Bars on the right side of the graph, indicating negative values, represent charter schools whose per-pupil funding is less than their nearby average TPS. These graphs provide a quick glimpse of the range of funding disparities that exist between public charter schools and TPS within the same cities.

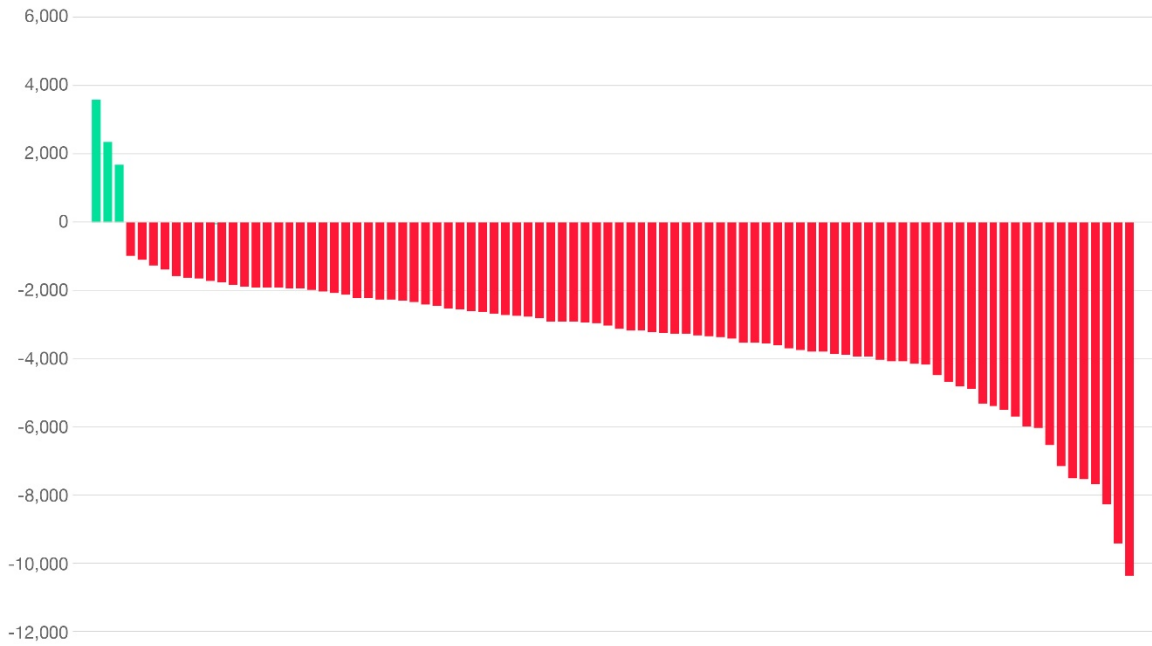**Graphic 3: Total Per-Pupil Revenue Disparity for Charter Schools in Michigan Cities**

Source: National Public Education Finance Survey data　　　　mackinac.org　　　MACKINAC CENTER
FOR PUBLIC POLICY

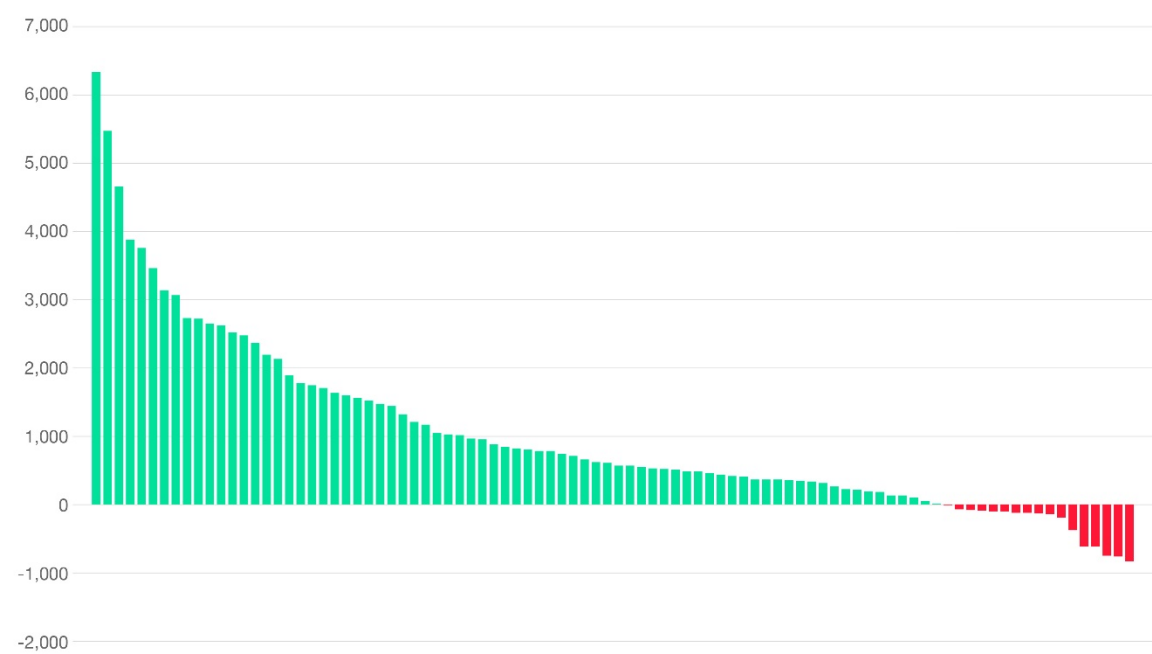**Graphic 4: Local Per-Pupil Revenue Disparity for Charter Schools in Michigan Cities**

Source: National Public Education Finance Survey data   mackinac.org

Graphic 5: State Per-Pupil Revenue Disparity for Charter Schools in Michigan Cities
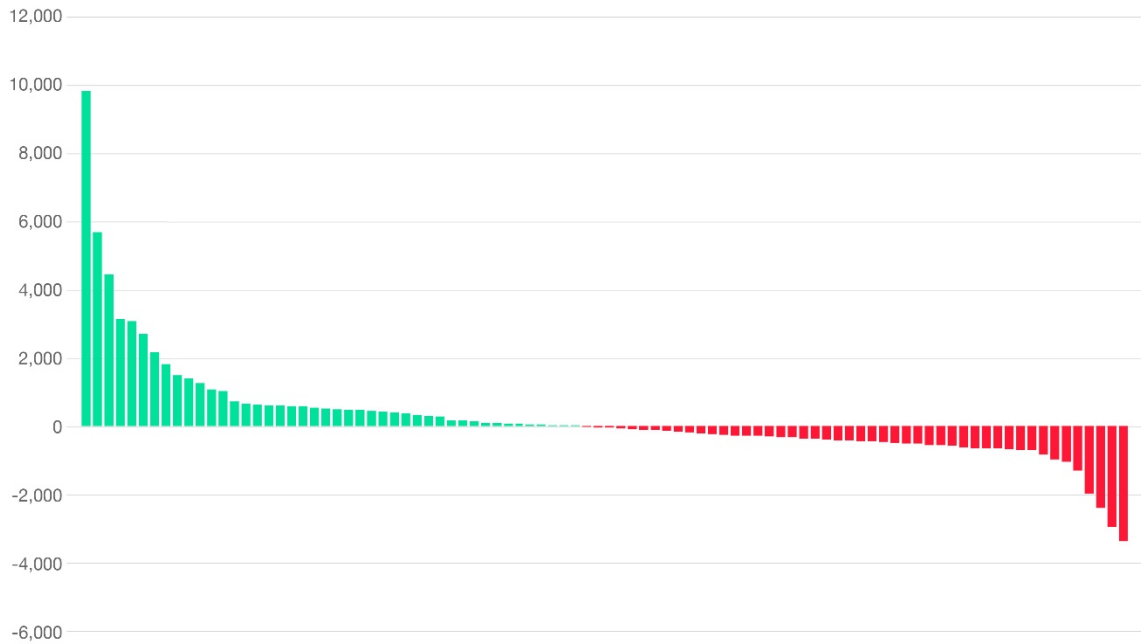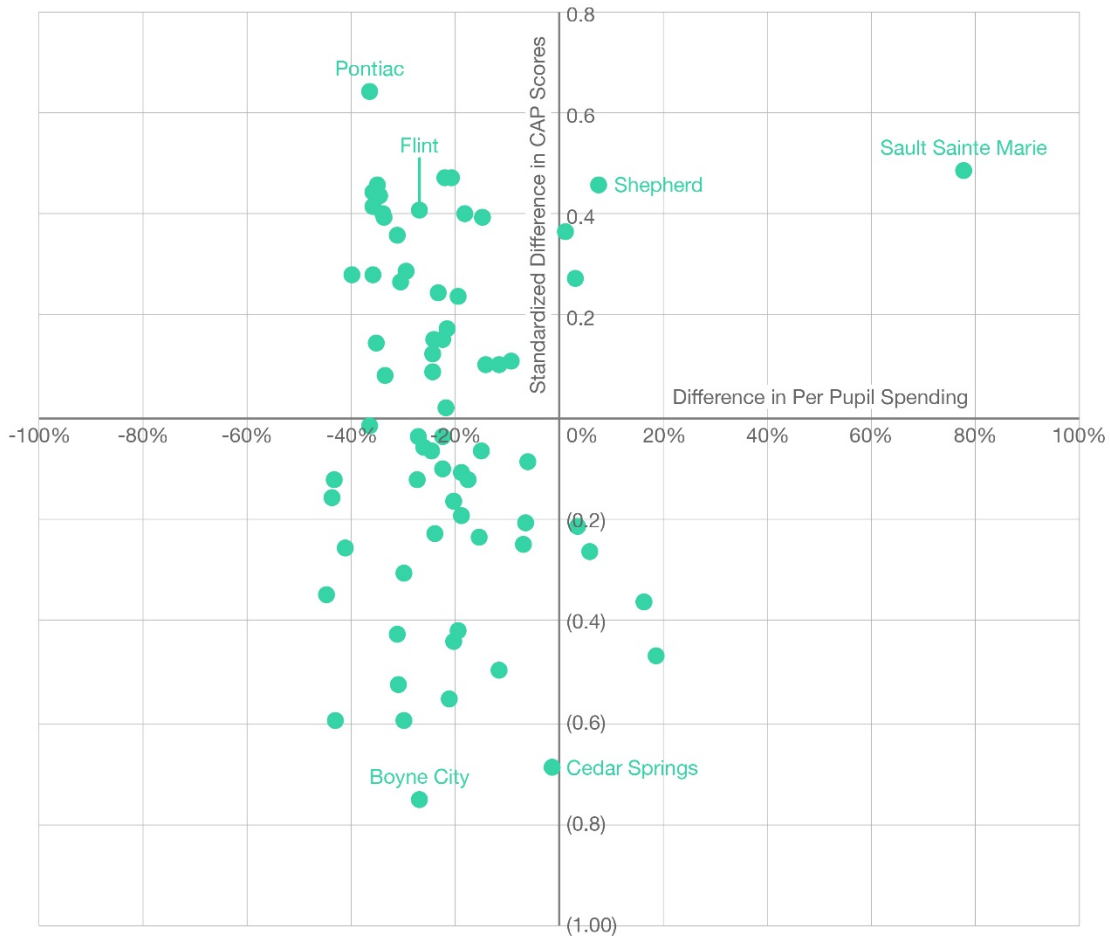

Source: National Public Education Finance Survey data   mackinac.org

Graphic 6: Federal Per-Pupil Revenue Disparity for Charter Schools in Michigan Cities

Source: National Public Education Finance Survey data   mackinac.org   MACKINAC CENTER
FOR PUBLIC POLICY

Cost Effectiveness and ROI

Graphic 7 below illustrates the city-level differences in per-pupil spending and standardized differences in CAP scores. Charter schools in almost all Michigan cities receive less funding per student on average, but about half of the cities have public charter schools outperforming TPS based on CAP scores. The overall average CAP scores for TPS — 99.80 — and charters — 99.60 — are virtually identical, which may lead some to believe that charters add no value. However, this comparison does not take into account relative spending efforts.

The graphic below illustrates this. Charter schools located in cities in the top left quadrant of the graph outperform TPS on student academic achievement while receiving less funding per child. Charter schools located in cities in the bottom left quadrant perform worse than TPS in the same cities; however, they also receive less public funding per student. We consider these funding differences by calculating an ROI for public charters and TPS in each city, as described above.

Graphic 7: Michigan Charter School Spending and Performance Compared to Nearby TPS

Source: National Public Education Finance Survey data   mackinac.org

Overall, we find that public charters outperform TPS in the same city on average on both cost effectiveness and ROI. As shown in the table in Graphic 8, the average student in a public charter school accrues 10.51 CAP points per $1,000 spent on them, whereas the average TPS student gains only 7.97 points. This difference translates to a 32 percent cost effectiveness advantage for public charter school students.

The average ROI favors public charter schools as well. For every dollar spent, charter schools deliver an average of almost $2 more, or an additional 24 percent, in lifetime earnings for students. Weighting ROI results by the total number of public charter and traditional public school students served, the difference expands to $2.63 more per dollar invested, or around a 36 percent higher ROI for public charter schools in Michigan.[*]

---

[*]   We weight by the total number of public school students so that each student contributes equally to the overall results. In other words, unweighted results are straight averages that treat each city equally, regardless of size, while weighted results take into account differences in the number of public school students across cities.

Graphic 8: Average Cost Effectiveness and ROI of Charter and Traditional Public Schools in Michigan

Measure	Charter	TPS	Difference	Percent Difference
Average CAP score per $1,000 spent per pupil	10.82	8.44	2.38	28%
Weighted average CAP points per $1,000 spent per pupil	10.51	7.97	2.54	32%
Average lifetime earnings per $1 spent per student	$9.82	$7.89	$1.93	24%
Weighted average lifetime earnings per $1 spent per student	$10.01	$7.38	$2.63	36%

Note: All differences are statistically significant at the p < 0.001 level.

Graphic 9 indicates that 90 percent of the examined cities reveal a cost effectiveness advantage for public charter schools and 96 percent of all students included in this analysis attend school in these cities. The city of Leslie produces the largest cost effectiveness gap favoring public charters, while the city of Sault Ste. Marie demonstrates the largest cost effectiveness gap favoring TPS. Further, 68 percent of the examined cities show public charter school ROI advantages and 80 percent of students are located in these cities. The city of Flint exhibits the largest ROI gap favoring public charters and Cedar Springs displays the largest ROI gap favoring TPS.

Graphic 9: City-Level Summary Statistics of Cost Effectiveness and ROI of Charter Schools

Measure	Cost Effectiveness	ROI
Percent of cities with charter advantage	90%	68%
Percent of students in cities with charter advantage	96%	80%
Highest charter advantage in a city	6.36 (CAP points)	$8.32
Highest charter disadvantage in a city	-3.65 (CAP points)	-$6.14

Regression Analysis Controlling for Student Demographics

One could make the argument that children whose parents enroll them in public charters are fundamentally different from those whose parents enroll them in their local TPS. Those differences, they argue, could explain the funding inequities and the different returns on investments across sectors. Perhaps the children of parents choosing charter schools would end up with larger lifetime earnings on average no matter which type of school they were enrolled in. Further, TPS enroll more special needs children than charters, on average, and this may explain the bulk of the funding disparities and may negatively impact their average standardized test

scores for TPS.[*] This is a plausible theory and we conducted a linear regression analysis that controls for average student demographics, including special education status, at the city level. The regression equation used is:

$$Y_i = \beta_0 + \boldsymbol{\beta_1 Charter_i} + \beta_2 Female_i + \beta_3 ELL_i + \beta_4 SPED_i \\ + \beta_5 Disadvantaged_i + \beta_6 Minority_i + \varepsilon_i$$

Where Y is the outcome of interest for a given city and sector, i. The outcomes we examine are per-pupil expenditures, cost effectiveness and ROI for each city. The coefficient of interest, $\boldsymbol{\beta_1}$, shows the average differences in charter school funding, cost effectiveness and ROI relative to TPS after controlling for these student demographic factors.

We gather city-level controls for each sector using the 2014-15 "Student Count" data file from the MIschooldata.org website.[18] We control for the percent of female students, percent of English language learners, percent of students requiring special services, percent of economically disadvantaged students and the percent of minority students in each city and sector.

Results of Regression Analysis

Our overall regression results, shown in Graphic 10, confirm that the city-level differences in funding, cost effectiveness and ROI persist after holding student characteristics constant.[†] On average, charter schools spend $2,611 less per student, even after controlling for student demographic differences. Charter schools are more cost effective and provide taxpayers with a higher return on investment.

On average, the charter school advantage in CAP points for each $1,000 spent does not change in any significant way when regressed against demographic factors.[‡] Each dollar spent on children in Michigan charter schools provides a return on investment to taxpayers that is about $1.46 higher than the return generated by students in TPS. In other words, each dollar spent on children who persist for 13 years in public charter schools produces $1.46 more in lifetime earnings for each student than each dollar spent on children in TPS. These results are all statistically significant at the 99 percent level of confidence.

---

[*] It is important to note that the Michigan Department of Education allows schools to use a wide variety of appropriate tools, supports and accommodations to administer the state's standardized assessments to students with recognized learning disabilities. For more information, see: "M-STEP, MI-Access, SAT, ACT WorkKeys and WIDA Student Supports and Accommodations Table" (Michigan Department of Education, Feb. 13, 2017), https://perma.cc/5PMN-7M43.

[†] This methodology does not employ city-level fixed effects because of the small sample size. Nonetheless, all three results remain statistically significant at the p < 0.05 level when city-level fixed effects are used.

[‡] Using the regression, children in charter schools gain about 2.35 more CAP points for each $1,000 spent on them than those in TPS. That compares to an unadjusted (but weighted) advantage of 2.54 CAP points for every $1,000 spent.

Graphic 10: Expenditures and ROI for Students Enrolled in Charter Schools for Entire Academic Career, or 13 Years

	(1) Per Pupil Expenditures ($)	(2) Cost Effectiveness (CAP Points)	(3) Return on Investment ($)
Charter (13 years)	-2610.755***	2.351***	1.456**
	(0.000)	(0.000)	(0.002)
Special Education (%)	96.893*	-0.089**	-0.212**
	(0.011)	(0.005)	(0.007)
Economically Disadvantaged (%)	-15.046	0.004	0.008
	(0.072)	(0.538)	(0.568)
English Language Learners (%)	33.691*	-0.017	0.027
	(0.041)	(0.140)	(0.305)
Minority (%)	32.910***	-0.024***	-0.015
	(0.000)	(0.000)	(0.176)
Female (%)	-32.903	0.030	0.040
	(0.310)	(0.476)	(0.711)
Constant	11776.360***	8.910***	8.734
	(0.000)	(0.000)	(0.138)
Cities	71	71	71
Observations	139	139	139
R-Squared	0.5407	0.6107	0.2260

Notes: P-values in parentheses, * p < 0.05, ** p < 0.01, *** p < 0.001

Graphic 11 below shows results for children that attend a public charter school for half of their K-12 educational experience, or for 6.5 years. On average, children experiencing 6.5 years in public charter schools have $1,470 less spent on them per year than students spending 13 years in TPS. We estimate that each dollar spent on students that persist in public charter schools for 6.5 years produces around $0.51 more in lifetime earnings than for each dollar spent on students in TPS; however, this particular finding is not statistically significant.

Graphic 11: Expenditures and ROI for Students Enrolled in Charter Schools for Half Their Academic Career, or 6.5 Years

	(1) Per Pupil Expenditures ($)	(2) Cost Effectiveness (CAP Points)	(3) Return on Investment ($)
Charter (Half-Time)	-1470.350***	1.019***	0.513
	(0.000)	(0.000)	(0.201)
Special Education (%)	32.018	-0.038	-0.105
	(0.271)	(0.065)	(0.077)
Economically Disadvantaged (%)	-1.712**	0.015*	0.002
	(0.008)	(0.017)	(0.887)
English Language Learners (%)	31.346	-0.015	0.041
	(0.063)	(0.185)	(0.109)
Minority (%)	32.565***	-0.023***	-0.021*
	(0.000)	(0.000)	(0.037)
Female (%)	-17.034	0.014	0.024
	(0.552)	(0.503)	(0.681)
Constant	11970.980***	8.633***	8.524*
	(0.000)	(0.000)	(0.012)
Cities	71	71	71
Observations	139	139	139
R-Squared	0.4121	0.4209	0.1458

Notes: P-values in parentheses, * p < 0.05, ** p < 0.01, *** p < 0.001

The control variables behave as expected concerning statistical significance. School sectors with less advantaged student populations receive more in funding overall. School sectors with more children requiring special services have lower cost effectiveness and ROI.

The following two tables show summary statistics for the regression analysis. Graphic 12 shows descriptive statistics for the demographic variables used in the regression analysis, while Graphic 13 displays the descriptive statistics broken out for both charter schools and TPS.

Graphic 12: Descriptive Statistics of Variables Used in Regression Analysis

Variable	N	Mean	Std. Dev.	Min	Max
ROI ($)	142	8.86	2.87	2.00	15.89
Cost Effectiveness	142	9.63	1.83	5.37	15.15
Expenditures ($)	142	10743.14	2171.80	6194.01	19733.45
Charter	142	0.5	0.50	0.00	1.00
CAP Score	142	99.70	4.03	87.49	109.58
Female (%)	139	49.30	3.17	38.41	70.09
ELL (%)	139	6.10	9.10	0.15	42.00
SPED (%)	139	12.02	3.83	1.60	25.74
Disadvantaged (%)	139	53.30	23.48	7.73	95.10
Enrollment	142	4639.27	7423.23	66.99	49392.34
Minority (%)	139	40.50	30.20	3.83	99.88

Graphic 13: Descriptive Statistics of Variables Used in Regression Analysis by Sector

Variable	TPS	Charter
ROI ($)	7.89	9.82***
Cost Effectiveness	8.44	10.82***
Expenditures ($)	12039.72***	9446.56
CAP Score	99.80	99.60
Female (%)	48.31	50.24***
ELL (%)	5.89	6.30
SPED (%)	13.08**	11.01
Disadvantaged (%)	51.87	54.68
Enrollment	7603.14***	1675.39
Minority (%)	35.91	44.90

Note: * = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$.

Policy Implications and Conclusion

Our analysis indicates that students across the state of Michigan receive substantially less funding simply for opting out of their residentially assigned traditional public school to attend a charter school. On average, Michigan students get $2,782 less public funding on their behalf annually when they opt to attend a public charter school. Yet, we find that charters across the state are more cost effective than TPS and produce a greater return on investment for taxpayers. In particular, children in charters gain substantially more academic output for each $1,000 invested in them than those in TPS, and charter schools produce 36 percent higher return on investment for each tax dollar spent.

This analysis does not definitively demonstrate that charters would maintain a large productivity advantage with additional dollars collected and spent. However, if public charter school funding equity improves, it seems likely that the state of Michigan would experience enhanced long-term outcomes for children considering that charters schools are more cost effective and deliver a higher return on investment compared to their TPS peers.

Endnotes

1 Google Trends, https://goo.gl/V8yiac.

2 "What Is a Charter School?" (National Charter School Resource Center), https://perma.cc/8B9K-KTAN.

3 "A Growing Movement: America's Largest Charter School Communities" (National Alliance for Public Charter Schools, 2015), https://perma.cc/88KT-83CU.

4 "Pupil Membership History" (Michigan Senate Fiscal Agency, Jan. 11, 2018), https://perma.cc/5J39-8Z4L.

5 Author's calculations based on data provided publicly by the Center for Educational Performance and Information.

6 "Charter School Performance in Michigan" (Stanford University: Center for Research on Education Outcomes, Jan. 11, 2013), https://perma.cc/FDP2-RJW8.

7 Julian R. Betts and Y. Emily Tang, "The Effect of Charter Schools on Student Achievement:a Meta-Analysis of the Literature," (Center for Reinventing Public Education, August 2014), https://perma.cc/B5UX-KUN2.

8 Meagan Batdorff et al., "Charter School Funding: Inequity's Next Frontier" (Thomas B. Fordham Institute, August 2005), https://perma.cc/9GEH-M723; Meagan Batdorff, Larry Maloney and Jay May, "Charter School Funding: Inequity Persists" (Ball State University, May 2010), https://perma.cc/7RQ4-VM43; Meagan Batdorff et al., "Charter School Funding: Inequity Expands" (University of Arkansas, April 2014), https://perma.cc/8PNF-FRKB; Patrick J. Wolf et al., "Charter School Funding: Inequity in the City" (University of Arkansas, May 2017), https://perma.cc/Y52T-JPPJ.

9 Patrick J. Wolf et al., "The Productivity of Public Charter Schools" (University of Arkansas, July 2014), https://perma.cc/KGL2-XYK2.

10 Data is acquired from the Michigan Department of Education as part of the National Public Education Finance Survey. Report is available online here: http://www.mackinac.org/depts/epi/fiscal.aspx.

11 MCL § 380.501.

12 "Michigan Public High School Context and Performance Database" (Mackinac Center for Public Policy, 2016), https://www.mackinac.org/depts/epi/performance.aspx.

13 Patrick J. Wolf et al., "The Productivity of Public Charter Schools" (University of Arkansas, July 2014), https://perma.cc/KGL2-XYK2.

14 Eric A. Hanushek, "The Economic Value of Higher Teacher Quality," *Economics of Education Review* 30 (2011): 466–479, https://perma.cc/T6DM-DTZM.

15 "Occupational Employment Statistics" (Bureau of Labor Statistics, March 31, 2017), https://perma.cc/DQZ5-8T6W.

16 Patrick J. Wolf et al., "Charter School Funding: Inequity in the City" (University of Arkansas, May 2017), https://perma.cc/Y52T-JPPJ; Meagan Batdorff, Larry Maloney and Jay May, "Charter School Funding: Inequity Persists" (Ball State University, May 2010), https://perma.cc/7RQ4-VM43; Meagan Batdorff et al., "Charter School Funding: Inequity Expands" (University of Arkansas, April 2014), https://perma.cc/8PNF-FRKB.

17 Ben DeGrow, "More to Charter Special Ed Gap than Meets the Eye" (Mackinac Center for Public Policy, Sept. 20, 2016), https://perma.cc/953K-TPZP.

18 This file is available here: https://goo.gl/QKfZQZ

MACKINAC CENTER
FOR PUBLIC POLICY

The Mackinac Center for Public Policy is dedicated to improving the understanding of economic and political principles among citizens, public officials, policymakers and opinion leaders. The Center has emerged as one of the largest and most prolific of the more than 50 state-based free-market "think tanks" in America. Additional information about the Mackinac Center and its publications can be found at www.mackinac.org.

Additional copies of this report are available for order from the Mackinac Center.

For more information, call 989-631-0900, or see our website, www.mackinac.org.

Corey DeAngelis is a policy analyst at the Cato Center for Educational Freedom. He is also a distinguished doctoral fellow and Ph.D. candidate in education policy at the University of Arkansas in Fayetteville, and a policy advisor for the Heartland Institute. His research focuses on the effects of educational choice programs on student achievement and nonacademic outcomes such as criminal activity, political and economic freedom, schooling supply and fiscal impacts.

Ben DeGrow is the Mackinac Center's education policy director. DeGrow joined the Center in 2015 after a long stint at Colorado's Independence Institute, where he provided expert analysis on school choice, school finance, collective bargaining and education employment policies. He authored numerous policy reports and opinion-editorials for various newspapers and other publications, and regularly appeared on radio and television and before legislative committees.