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Research Brief:
Comparing School Facilities in High- and Low-Income Districts

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INTRODUCTION

School facilities are a key part of creating a safe, clean environment where students can learn. Recent research has found that high quality school facilities are directly related to student achievement. Yet, the school facilities in low-income school districts are of significantly lower quality than in other districts. Low-income school districts tend to have older school buildings, authorize fewer building improvements, and have fewer high-end facilities such as tracks, stadiums, and auditoriums. This implies that students in low-income school districts are at a significant disadvantage relative to students with higher quality school facilities.

MEASURING SCHOOL QUALITY

Research on school facilities has used many different measures of facility and infrastructure quality. While a financial investment in school facilities is quantifiable in terms of dollars spent, school facility quality represents a concept comprised of many factors including building age, whether the district regularly invests in maintenance, the planned lifespan of the building, and environmental characteristics. For example, "a 40-year-old building that was initially constructed to last 35 years will likely be in significantly worse condition than a similarly aged building designed to last 100 years," (Picus et al., 2005, p. 74). Drawing on this multidimensional nature of school quality, research in this area has historically used various measurable elements of school environments as proxies for quality including the amount of light in classrooms, wall colors, temperature, and ventilation in the building, among others (Picus et al., 2005; Schneider, 2002; Woolner et al., 2007).

While each of these characteristics captures an aspect of school facility quality, evaluating them can be highly subjective and difficult to interpret. As a result, research since 2010 on school facility quality has primarily focused on capital expenditures and their relationship with student achievement (Jackson, 2018). While capital expenditures represent a more crude measure of school facility quality as they are not direct measures of the facilities themselves, data on expenditures are both more readily available and more comparable than traditional dimensions of school facility quality.

HIGHER QUALITY SCHOOL FACILITIES IMPROVE STUDENT OUTCOMES

Recent research on school facility quality has identified a positive, causal relationship between expenditures on school buildings and student test scores and student attendance.[1] In Los Angeles, research published in 2020 found that spending four years in a new school building increased student test scores by 0.1 standard deviations in math and 0.05 standard deviations in reading (LaFortune & Schönholzer, 2022). These gains are similar to those observed by students who enroll in high quality charter schools for one year, and the authors of this study contend that it would be cost-effective for districts to invest more heavily in school facilities and infrastructure (Nielson & Zimmerman, 2014).

In addition to student outcomes, research also indicates that improved quality of school facilities also impacts teacher performance and retention. In fact, some scholars have argued that increased teacher retention is the mechanism through which facility investment improves student achievement (Bowers & Urick, 2011). For teachers in Washington, D.C., rating school facility quality one point higher on a four-

point scale was associated with an 11.7% higher probability of returning the following year (Buckley et al., 2005). Other research has similarly found that teachers in low-income schools rate their schools as lower quality than teachers in high-income schools, although this might not be the primary reason for teacher turnover (Geiger & Pivovarova, 2018; Loeb et al., 2005). Authors of these studies also argued that investing in school facilities could be at least as cost-effective for school districts as investing in teacher pay.

School Facilities in Low-Income Areas Are of Lower Quality

Students in Low-income schools are disproportionately less likely to have high quality school facilities. In Los Angeles, 41% of teachers in majority Black or Latine-majority[i] schools indicated that their classroom was too hot or too cold relative to 32.5% of all teachers, and 36% of teachers in Latine-majority schools indicated that there were cockroaches, rats, or mice in their schools relative to 27% of all classrooms (Loeb et al., 2005). In addition, in 2012, 39% of schools with 75% or more of their student body eligible for free-or-reduced-price lunch used portable classrooms compared with schools in which 25% or less of the student body was eligible (NCES, 2019). These statistics imply that students in low-income schools have substantially less access to high quality school facilities. In addition, researchers have observed that low-income districts schools also underinvest in school facilities (Filardo, 2006; Filardo, 2016). As a result, these disparities in school facility quality could widen between high and low-income districts over time.

SCHOOL FACILITY QUALITY VARIES ACROSS MICHIGAN DUE TO FUNDING DISPARITIES

Funding for school facilities in Michigan is tied to the way that education is financed in the state. Since 1994, the bulk of funding for public education in Michigan comes from the state in the form of a per-pupil foundation allowance. Under this scheme, the state legislature provides funding for districts based on the number of students served by the district, which districts can use for things like operating costs, salaries, and facilities. Districts can also levy local property taxes, but the use of these funds is significantly restricted, with local funds mostly going toward capital expenditures such as purchasing land and building/maintaining facilities. This system allows for significant variation in funding for school facilities based on 1) whether the district is a traditional public school district or a public school academy (PSA, commonly referred

[i] Latine, pronounced la-TIN-eh, is the Spanish language, non-gendered version of Latino

to as a charter school), 2) voters' willingness to levy taxes on themselves, and 3) the taxable value of property in a district.

PSAs do not have geographic boundaries, meaning that they cannot raise tax revenues and in turn must fund themselves entirely with state monies. In traditional public school districts, residents may be less willing to tax themselves to raise additional monies their local district could use toward facilities. And in districts where residents are willing to tax themselves to raise funds for the local district, there is significant variation in their capacity to raise funds.

For a given tax millage, districts with high property values can generate greater revenues for school facilities than districts with lower property values. This means that districts with lower property values would need to tax themselves at higher rates to generate the same revenue as districts with higher property values. With less access to facilities funding from local sources, low-income districts typically need to use more of their general funds to finance capital investments, which reduces the funding available for instructional expenditures.[2] This creates extreme inequities for low-income students (Arsen et al., 2005; Arsen & Davis, 2006).

Table 1 presents data on the taxable value and capital stock of Michigan's traditional public school districts, breaking them down into 5 quintiles based on their taxable value per-pupil. Here, taxable value refers to the state equalized value of all property within the district's boundaries.[3] Capital stock refers to the value of all buildings and add-ons to buildings owned by districts (MI Schools Definitions of Account Codes, 2023). An issue with interpreting these figures is that districts that are geographically large and/or have a larger population will tend to have a higher taxable value due to there being more property in the district, and higher capital stock since they need facilities for more students. To overcome this issue, Table 1 also presents taxable value and capital stock on a per-pupil basis, which allows for straightforward comparisons.

Table 1. Distribution of Capital Stock Across Michigan School Districts by Quintile of Taxable Value Per-Pupil, 2021-2022

Quintile	Number of Pupils	Taxable Value (in $M)	Taxable Value Per Pupil	Capital Stock (in $M)	Capital Stock Per-Pupil
1	249,283	$38,249	$153,436	$2,386	$9,571
2	236,775	$53,557	$226,192	$3,265	$13,788
3	287,258	$81,944	$285,262	$4,349	$15,141
4	310,890	$116,546	$374,880	$5,467	$17,587
5	113,016	$76,503	$676,924	$2,037	$18,020

Note: Table 1 represents traditional public school districts only as charters do not have geographic boundaries that contain taxable property. Districts are grouped into quintiles based on their taxable value per pupil, meaning that the first quintile represents the 20% of traditional public school districts in Michigan with the lowest per-pupil taxable value while the 5th quintile represents the 20% of districts with the highest per-pupil taxable value.

Source: This table represents an update of Table 2 from Arsen et al., 2005 using data from MI Department of Education Bulletin 1014 and financial data from MISchoolData.org. Taxable value per pupil is drawn from Bulletin 1014 reports, and this represents a proxy for the wealth in a school district. Capital stock is drawn from district-level financial reports, and this represents the total value of the school facilities in a district.

Table 1 reveals several funding disparities. As the taxable value in a district increases, students have access to more capital stock. This implies that students in districts with higher average home values have access to more valuable school facilities, which could be in the form of higher quality instructional facilities, more expensive sports facilities, or facilities for the arts. This is particularly salient for the fifth quintile of districts. Here, a relatively small number of students has access to nearly double the capital stock on a per-pupil basis relative to the first quintile. As Table 1 shows, each student in the fifth quintile had access to $18,020 in capital stock in 2022, nearly double the per-pupil capital stock available to students in the first quintile. This likely translates into much higher quality school facilities for students in the fifth quintile, which could be in the form of cleaner school environments and greater opportunities for students to engage in extracurricular activities.

ENDNOTES

[1] A substantial literature in economics has also found a positive relationship between school facility investment and local housing prices. See Cellini et al., 2010, Neilson & Zimmerman, 2014, and LaFortune and Schönholzer, 2022.

[2] To generate revenue for capital projects, districts can either issue debt through bonds for capital projects, or property taxes can directly fund short-term capital projects. See Conlin and Thompson, 2014 for a discussion of how districts can finance capital projects.

[3] In Michigan, this is comprised of the sum of homestead taxable value, which represents taxable value for permanent homes, and non-homestead taxable value, which represents taxable value for businesses, second homes, and rental properties (Homestead Property Tax Credit Information (n.d.); Allard, 2023).

REFERENCES

Allard, M. (2023, April 25). Warren Woods millage proposal set for May 2 ballot. *Warren Weekly*. https://www.candgnews.com/news/warren-woods-millage-proposal-set-for-may-2-ballot-2197

Arsen, D., Clay, T., Davis, T., Devaney, T., Fulcher-Dawson, R., & Plank, D. N. (2005). *Adequacy, Equity, and Capital Spending in Michigan Schools: The Unfinished Business of Proposal A*. Michigan State University. https://education.msu.edu/epc/forms/Arsen_et_al_2005_Adequacy_Equity_and_Capital_Spending_in_Michigan_Schools.pdf

Arsen, D., & Davis, T. (2006). Taj Mahals of Decaying Shacks: Patterns in Local School Capital Stock and Unmet Capital Need. *Peabody Journal of Education*, *81*(4), 1–22. https://doi.org/10.1207/s15327930pje8104_1

Bowers, A. J., & Urick, A. (2011). Does High School Facility Quality Affect Student Achievement? A Two-Level Hierarchical Linear Model. *Journal of Education Finance*, *37*(1), 72–94.

Buckley, J., Schneider, M., & Shang, Y. (2005). Fix It and They Might Stay: School Facility Quality and Teacher Retention in Washington, D.C. *Teachers College Record*, *107*(5), 1107–1125. https://doi.org/10.1111/j.1467-9620.2005.00506.x

Cellini, S. R., Ferreira, F., & Rothstein, J. (2010). The Value of School Facility Investments: Evidence from a Dynamic Regression Discontinuity Design. *The Quarterly Journal of Economics*, *125*(1). https://doi.org/10.1162/qjec.2010.125.1.215

Conlin, M., & Thompson, P. (2014). Michigan and Ohio K-12 Educational Financing Systems: Equality and Efficiency. *Education Finance and Policy*, *9*(4), 417–445. https://doi.org/10.1162/EDFP_a_00142

Filardo, M. (2016). *State of Our Schools: America's K-12 Facilities 2016*. 21st Century School Fund. https://files.eric.ed.gov/fulltext/ED581630.pdf

Filardo, M., Vincent, J. M., Sung, P., & Stein, T. (2006). *Growth and Disparity: A Decade of U.S. Public School Construction*. 21st Century School Fund. https://files.eric.ed.gov/fulltext/ED498100.pdf

Geiger, T., & Pivovarova, M. (2018). The effects of working conditions on teacher retention. *Teachers and Teaching*, *24*(6), 604–625. https://doi.org/10.1080/13540602.2018.1457524

Homestead Property Tax Credit Information. (n.d.). https://www.michigan.gov/taxes/property/ind-exempt-defer/homestead-property-tax-credit-information

Jackson, K. C. (2018). Does School Spending Matter? The New Literature on an Old Question. *NBER Working Paper No. 25368*. https://doi.org/10.3386/w25368

LaFortune, J., & Schönholzer, D. (2022). The Impact of School Facility Investments on Students and Homeowners: Evidence from Los Angeles. *American Economic Journal: Applied Economics*, *14*(3), 254–289. https://doi.org/10.1257/app.20200467

Loeb, S., Darling-Hammond, L., & Luczak, J. (2005). How Teaching Conditions Predict Teacher Turnover in California Schools. *Peabody Journal of Education*, *80*(3), 44–70. https://doi.org/10.1207/s15327930pje8003_4

MI Schools Definitions of Account Codes. (2023). https://www.michigan.gov/mde/-/media/Project/Websites/mde/OFM/State-Aid/Bulletin-1022/appendix.pdf

NCES. (2019). *NCES Digest of Education Statistics 2019, Table 217.10* [dataset]. https://nces.ed.gov/programs/digest/d19/tables/dt19_217.10.asp

Neilson, C. A., & Zimmerman, S. D. (2014). The effect of school construction on test scores, school enrollment and home prices. *Journal of Public Economics*, *120*, 18–31. https://doi.org/10.1016/j.jpubeco.2014.08.002

Picus, L. O., Marion, S. F., Calvo, N., & Glenn, W. J. (2005). Understanding the Relationship Between Student Achievement and the Quality of Educational Facilities: Evidence from Wyoming. *Peabody Journal of Education*, *80*(3), 71–95. https://doi.org/10.1207/s15327930pje8003_5

Schneider, M. (2002). *Do School Facilities Affect Academic Outcomes?* National Clearinghouse for Educational Facilities.

Woolner, P., Hall, E., Higgins, S., McCaughey, C., & Wall, K. (2007). A sound foundation? What we know about the impact of environments on learning and the implications for Building Schools for the Future. *Oxford Review of Education*, *33*(1), 47–70. https://doi.org/10.1080/03054980601094693