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Public School Funding and Postsecondary Outcomes in Illinois: What is Reasonable to Expect from Illinois' School Funding Reforms?

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> *"Equality of educational opportunity has been accepted as a normative goal of educational policy in the United States since colonial time. It has proven to be as elusive, however, as the proverbial pot of gold at the end of the rainbow. By virtually any standard, there has been a great deal of progress toward achieving equality of educational opportunity in the United States since 1790, but few will argue that it has been accomplished."*
> (Rossmiller, 1987, p. 562).

Introduction

For over forty years, Illinois' school funding policies remained mostly unchanged. Over this time, these policies led to large disparities in per-pupil revenues between the wealthiest and poorest districts. As an attempt to address the disparities in per-pupil revenues, state lawmakers signed a revised school-funding policy in 2017. The revised school funding formula incorporates an evidence-based model that allocates 99% of new state appropriations, which exceed FY2017 levels, to those districts that are the least adequately funded that also serve a disproportionately high share of the state's low-income student population (Martire, Otter, & Hertz, 2017). There is a need to examine how the previous funding system may have affected student outcomes in light of Illinois' recent school funding reforms and to better understand what we may expect for schools and students given this new system.

Literature Review

School Funding

School funding is a product of the public school governance structure. Unlike most industrialized countries, public education systems in the United States remain decentralized (Gamoran, 2001), allowing local management (Greene, Huerta, & Richards, 2007). A by-product of decentralization is that in all states (excluding Hawaii) public schools rely on a combination of local property taxes, state education distributions, and a small proportion of federal financial support.[1] Because communities vary widely in their property tax wealth and many state funding systems do not sufficiently account for these variations, this decentralized funding structure has led to "considerable regional disparities" in public school funding levels (Greene et al., 2007) and has created a stratified system of education in which the schools that need the most financial support typically receive the least (Lewis & Nakagawa, 1995).

Regional disparities in public school funding have been a persistent issue for Illinois' schools, and legislation passed in 2017 as Senate Bill 1947 (SB1947) attempts to alleviate those inequalities. Based on funding data collected in 2009, Illinois public schools received approximately 60% of their revenue from local sources, 28% from the state, and the remaining 12% from the federal government under the previous funding structure (Fritts, 2012). For comparison, between 2003-04 and 2013-14, national averages indicate that public schools received between 44% and 46% from local sources and between 46% and 47% of their revenue from state sources (McFarland et al., 2017). Fritts (2012) noted that "Illinois ranked lowest among states in

[1] See http://www.schoolfundingfairness.org

the percentage of revenues from state sources" (p. 1). The General State Aid (GSA) grant program that funded Illinois schools "represent[ed] 66% of all state general funds expenditures on PreK-12 education in Illinois and consist[ed] of two funding streams" (Education Funding Advisory Board, 2016, p. 2). The first stream was the Formula Grant, which placed districts into three formula categories (Foundation Level, Alternative, or Flat Grant) based on their ability to meet the minimum per-pupil funding level through local resources. If a district was unable to meet the minimum per-pupil funding level using local resources, it was the state's responsibility to provide all or a portion of the difference. From FY2010 to FY2016, the state prorated the Foundation level, providing up to a percentage of the state minimum[2] which, according to the Illinois School Funding Reform Commission (ISFRC), along with delayed transportation payments, "caused significant distress to school districts, especially rural districts" (ISFRC, 2017). The second stream was distributed through the Poverty Grant, which allocated funds to districts based on their levels of low-income students. On average over the past five years (FY2013-17), the Formula Grant represented approximately 62% of allocated GSA funds and the Poverty Grant accounted for the remaining 38% (ISBE, 2016).

Like other states, Illinois has faced shortcomings in its attempts to provide equitable educational opportunities within a decentralized system that grants local control to each of its 869 districts. Verstegen and Driscoll (2008) suggested that Illinois' previous school finance systems were "obsolete and antiquated; they have failed to achieve equity or to incorporate adequacy" (p. 332). Baker, Farrie, Luhm, and Sciarra (2017)[3] noted that Illinois had a funding fairness ratio of 0.84 in 2007 and 0.77 in 2014, indicating both that wealthier districts received more funding per student than poorer districts, and that the funding formula that existed at the time did not improve fairness. For reference, the national average is 1.00 in each year, suggesting that, on average, funding is flat between wealthier and poorer districts. For additional comparisons, funding fairness ratios for Iowa, Minnesota, and Wisconsin were 1.01, 1.34, and 0.98 for 2007 and 0.95, 1.33, and 1.06 for 2015 (Baker et al., 2017).

School Funding and Student Outcomes

Expenditures towards public elementary and secondary education have steadily increased since 1966 (Snyder, de Brey, & Dillow, 2016), but gaps in educational outcomes between marginalized and non-marginalized populations remain (McFarland et al., 2017). Numerous scholars have examined the relationship between school funding and educational outcomes (see Hanushek, 1989, 1994; Hedges, Laine, & Greenwald, 1994), with the most notable being the 1966 Equality of Educational Opportunity Report, commonly known as the Coleman Report (Coleman et al., 1966). Initially, this research produced mixed results regarding whether funding levels mattered in educational outcomes. An updated analysis of the data used in the Coleman Report suggests that school resources impact student achievement more so than family background, specifically finding that school mean family resources and average teacher salary, both proxies for school funding, were positively related to student achievement (Borman & Dowling, 2010).

Research by Hanushek (1989) and Hedges et al. (1994) highlight the contrasting results of scholars who have examined the relationships between school funding and educational outcomes. Both Hanushek (1989) and Hedges et al. (1994) conducted meta-analyses that examined prior studies addressing the impacts of differential school funding on educational outcomes. Hanushek (1989) reaffirmed the strong, positive correlation between school funding and educational outcomes but concluded that "the strength

[2] The proration ranged from 87.1% to 99.9% of the Foundation Level. Between FY2013 and FY2015, the proration was less than 90% (ISBE, 2016).

[3] The data for the Is School funding Fair? A National Report Card reports are lagged by three years. As such the data reported in 2017 uses up to and includes 2014 information. Trend data in each report is limited to five years. The 2007 data for each state can be found at http://www.schoolfundingfairness.org/is-school-funding-fair/interactive-data.

of the relationship disappears when one controls for differences in family background" (p. 49). In a follow-up, Hedges et al. (1994) concluded that there was "strong support for at least some positive effects of resource inputs and little support for the existence of negative effects," and, moreover, that "the question of whether more resources are needed to produce real improvement in our nation's schools can no longer be ignored" (p. 13). In response to Hedges et al. (1994), Hanushek (1994) surmised that funding levels matter but "throwing money at schools is not a second-best approach but may be a 20th best approach" to school reform (p. 8). More recent work, however, has moved beyond the question of "Does money matter?" to the question of "How much money matters in education?" (see Baker, 2016; Baker & Welner, 2011).

Additional research has found that school funding, as measured by total per-pupil expenditures, is related to the ability of schools to improve educational quality (Card & Krueger, 1992). A number of studies suggest that an increase in funding is positively related to an increase in mathematics achievement (Payne & Biddle, 1999), while lower levels of funding were associated with greater within-school mathematics achievement gaps (Wenglinsky, 1998), suggesting that higher per-pupil spending levels might reduce these gaps. Condron and Roscigno (2003) found similar results using school-level data, concluding that an increase in per-pupil expenditures resulted in improved student proficiency in reading, mathematics, science, and citizenship. In evaluating a targeted school funding program in North Carolina that gave extra money to districts with high proportions of economically disadvantaged students, Henry, Fortner, and Thompson (2010) concluded that students attending a targeted school scored 0.13 standard deviations higher on statewide standardized exams than students attending schools that did not receive extra funds. Henry et al. (2010) also noted a reduction in the achievement gap between academically disadvantaged students in the pilot districts and similar students in other districts.

Regarding postsecondary outcomes, the socioeconomic composition of high schools has been shown to be a predictor of both college enrollment (Engberg & Wolniak, 2010) and persistence (Niu & Tienda, 2013). Engberg and Wolniak (2010) used nationally representative data, the Educational Longitudinal Study of 2002, to examine the effects of the average socioeconomic status (SES) for families of students attending the school, defined as the high school's SES, on the likelihood of both two- and four-year postsecondary enrollment. Employing multilevel modeling and accounting for multiple student- and school-level variables, they found that students from high SES high schools were considerably more likely to enroll in two- and four-year institutions than students from average SES high schools. Niu and Tienda (2013) also utilized multivariate analyses controlling for both student- and school-level variables, and found similar results pertaining to the relationship between the economic composition of schools and student postsecondary persistence. Using longitudinal data from Texas, the researchers concluded that students from affluent high schools were twice as likely to graduate from a four-year institution relative to similar students that attended economically average high schools. Both of these studies suggest that the socioeconomic composition of high schools relates to postsecondary outcomes of students, where the measure of a school's socioeconomic composition can be considered an indicator of the school's per-pupil funding (Condron & Roscigno, 2003).

Purpose

This study examines the relationships between school funding and students' college preparation, postsecondary enrollment, and postsecondary degree attainment, adding to the literature on how money matters in education. I address how past school funding levels among Illinois public high schools may have been associated with students' postsecondary outcomes. The following research questions guide this study:

- To what extent did public high school funding[4] relate to educational achievement, as measured by ACT (American College Testing) composite and subject test scores, of Illinois public high school students?;
- To what extent did public high school funding relate to the likelihood of enrollment in a four-year postsecondary institution for Illinois students?; and
- To what extent did public high school funding relate to the likelihood of graduation from a four-year postsecondary institution for Illinois students that enrolled in a four-year postsecondary institution at any time?

These questions may help inform a better understanding of the likely impacts of the state's recent school funding policy reforms. Illinois' new school funding policy still relies heavily on local property wealth. However, new state appropriations to K-12 education will be based on an evidence-based model that will try to make per-pupil revenue more equitable. The evidence-based model relies on one core calculation, the Adequacy Target. The Adequacy Target is a dollar amount of resources, unique to each district, that represents the estimated minimum level of school funding that a district will need to implement 27 statutorily defined evidence-based practices.[5]

The revenue to fund each district's unique Adequacy Target will come from three sources: (i) the "Base Funding Minimum," representing all grant funding the district received from the state in the prior year; (ii) the "The Local Capacity Target" of the district, which is the estimated amount of the Adequacy Target that the district should cover based on its local property wealth; and (iii) new state funding over and above the prior year's Base Funding Minimum. By design, this new funding matrix is intended to shift more of the obligation to the state and away from resources based on local property tax-based resources. It is also important to note here that the Adequacy Target relies solely on the calculation of the 27 research-based elements, and that the Local Capacity Target is purely a distributional factor and has no impact on the Adequacy Target itself.

Thus, the Adequacy Target is adjustable based on both total student enrollment and the enrollment of students from low-income households, with special needs, and who are English language learners. Compared to the previous formula, the Adequacy Target (adjustable and evidence-based) replaces the Foundation Level (neither adjustable nor evidence-based). Furthermore, the estimated Local Capacity Target may provide tax relief for residents of low-wealth, high-taxed districts. As noted by Martire et al. (2017), "low property wealth districts, which often have high property tax rates, are not expected to contribute as much towards the cost of covering their respective Adequacy Targets as are higher wealth districts" (p. 5).

Taken together, the evidence suggests that increasing school funding, specifically for schools with higher populations of low-income students as directed by Illinois' new funding policy, should positively affect both educational achievement (test scores) and educational attainment (postsecondary enrollment and degree attainment).

[4] Average per-pupil revenue measured at the district level.

[5] The Illinois State Board of Education interprets these 27 inputs as 34 discrete elements. In addition, a small number of the inputs are based on average state costs and cover items like school supplies and technology upgrades.

Data

For my analyses of these relationships, I draw on cohort data from the Illinois public high school junior class of 2002. In 2001, as part of the required Prairie State Achievement Examination (PSAE), Illinois mandated that all high school juniors take the ACT examination. The junior class of 2002 was the second cohort to sit for the exam, providing a near census of the class unlike examination data prior to 2001 (Lichtenberger & Dietrich, 2012). Many scholars (with the exceptions of Henry et al., 2010, and Jackson, Johnson, & Persico, 2015) have examined the impact of school funding on student outcomes by aggregating data at the school or district level. However, student-specific outcomes can be more nuanced, and are often masked with aggregated data (Monk, 1992). Therefore, I examine the relationship between school funding and student outcomes (achievement and attainment) using nested longitudinal student-level data for the Illinois public high school junior class of 2002. Although the dataset includes student information from both private and public schools, the sample is restricted to the 63,732[6] students attending public high schools that have non-missing data for the variables used.

The data were accessed through shared data agreements with the Illinois Board of Higher Education (IBHE) and ACT, and compiled by the Illinois Education Research Council (IERC). Additional higher education enrollment data from the National Student Clearinghouse (NSC) were merged by the IERC with IBHE and ACT data to create a comprehensive statewide longitudinal dataset that tracked the Illinois high school junior class of 2002 from high school through the spring 2010 semester, or seven years beyond high school graduation (Lichtenberger & Dietrich, 2014). See Appendix A for a complete list of all variables and response categories used in this study, as well as aggregated and racially disaggregated summaries of the independent and dependent variables.

This study also uses student data obtained from the optional ACT Student Interest Profiler survey administered during the examination. The ACT student survey contains self-reported demographic information, course-taking information, and information related to the student's post-high school academic plans. Data from the NSC contain enrollment and degree attainment information on the postsecondary institutions attended, if any, and institutional characteristics. Finally, the study uses data associated with each student's high school. The high school data are from the 2001-02 academic year ISBE state report card and consist of information regarding the school's enrollment, district funding and expenditure levels, standardized test (PSAE) scores (% proficient and advanced in math and reading) and ranges, and school-level teacher characteristics.

Student Outcomes

To mitigate problems associated with using aggregated or single outcomes to assess the effects of school funding on educational outcomes (Figlio, 2004), I used multiple measures and types of student-level outcomes. To address the research questions, I analyzed six student outcomes. As measures of academic achievement and college readiness, I used ACT composite scores and math subject test scores, separately. The ACT is a nationally, norm-referenced exam used in postsecondary admissions decisions, and the ACT composite score is predictive of a student's first-year postsecondary GPA (Noble & Sawyer, 2002).[7] Additionally, ACT math subject test scores are predictive of early interest in STEM[8] degree

[6] The population of the Illinois public high school junior class of 2002 includes 94,216 cases. The sample represents 68% of the population.

[7] Noble and Sawyer (2002) compared the predictability of ACT composite score and high school GPA on first-year GPA. The evidence that high school GPA is more predictive than ACT scores is not questioned here. The ACT scores used here are for comparisons and not validating the use of ACT scores in postsecondary admissions.

[8] Science, technology, engineering, and mathematics

programs (Lichtenberger & George-Jackson, 2013). To measure academic attainment, I used NSC data indicating any postsecondary enrollment (either two- or four-year), four-year postsecondary enrollment, any postsecondary credential attainment (either two- or four-year), and four-year postsecondary degree attainment. These six outcomes – ACT composite, ACT math, any postsecondary enrollment, four-year postsecondary enrollment, any credential attainment, and four-year credential attainment – each signify points in the pathway to postsecondary degree attainment (Haveman & Smeeding, 2006), and thus understanding structural factors that influence these outcomes is warranted.

Independent and Control Variables

As part of the ACT Student Interest Profile survey, students were asked a number of questions related to their demographics, family background, and academic achievements and expectations. I used student responses to questions on demographics and academic backgrounds, along with school-level data from ISBE, NCES, and IERC as independent and control variables in this study. Variable selection was guided by the conceptual framework in Figure 1, which is a modified version of the model used by Palardy (2013).

School Funding. Public high school funding is operationalized by using the average per-pupil revenue for each district. District-level state and local revenue data from the Illinois state report card was combined and then divided by the district enrollment to calculate the average per-pupil revenue available for each student in the district. The use of district-level revenue assumes that the within-district per-pupil revenue allocation is based on school enrollment and enrollment demographics (e.g. school poverty level). Furthermore, only state and local sources were used to isolate the effect of the state's funding policy.

Student Demographics. The ACT asked students to identify their gender and race/ethnicity as African-American, American Indian/Alaskan Native, Latino, Asian/Pacific Islander, or non-Hispanic White. Students were also asked to categorize their parent's annual income in one of ten income range groups from less than $18,000 to more than $100,000. Because the ten categories were not proportionally spaced, the ten categories were reduced to four ranges, less than $30,000, $30,000 to $50,000, $50,000 to $80,000, and $80,000 and above. Parent income is treated as a categorical variable, with the lowest range treated as the comparison group. This method was used by Taylor (2015) in analyzing the same data.

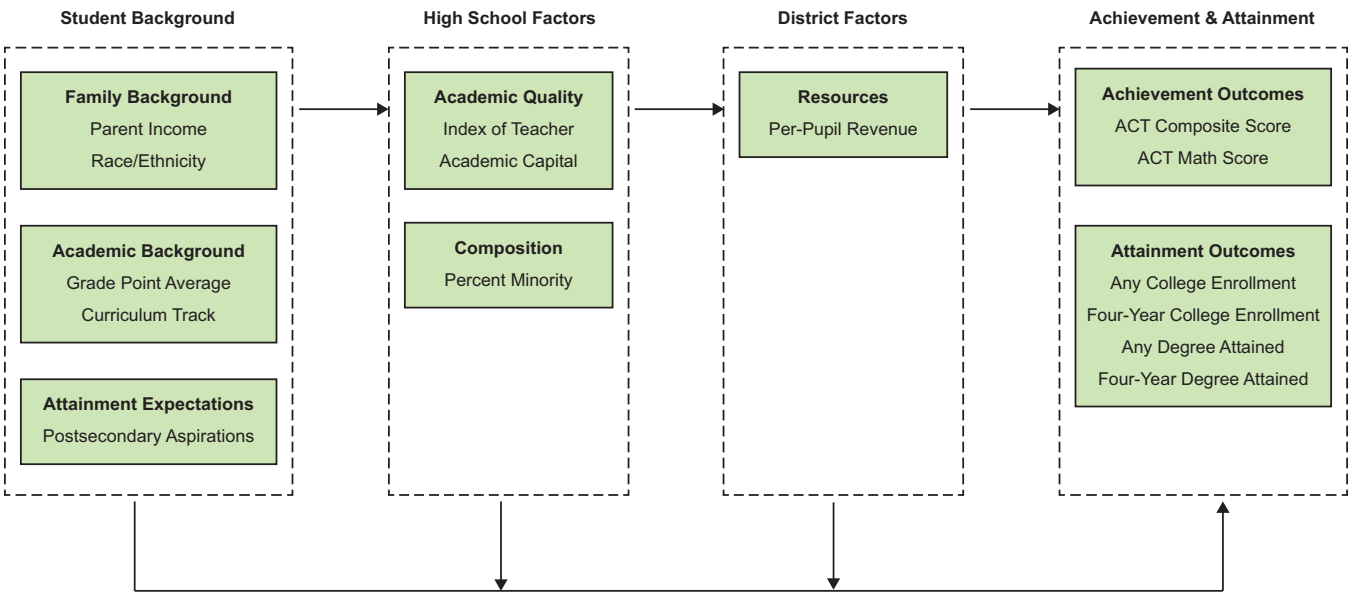

Figure 1. Conceptual framework of how per-pupil revenue relates to academic achievement and attainment.

Of note, the accuracy of the parent-income data is a limitation to the study. Analyzing similar ACT data, Anderson and Holt (2017) concluded that there are likely to be discrepancies between self-reported parental income and actual income, specifically noting that only 24% of students chose the correct income range. The authors did note that over half of the student responses were within one income range category compared to actual income. This provides additional reasoning to reduce the variable from ten categories to four.

Student Academics. Students were also asked to identify their overall high-school GPA on a 7-item response scale from 0.5-0.9 (D- to D) to 3.5-4.0 (A- to A). Although categorical by survey design, GPA is treated as continuous for analyses, which is consistent with the suggestions of Rhemtulla, Brosseau-Liard, and Savalei (2012). The survey also asked respondents to report the type of coursework they were taking in high school, with options including college preparatory, general, or career and technical. The general and career & technical education categories were grouped and were the reference group for analyses. Students were asked about their expected highest postsecondary degree, which I coded as four-year degree or higher and less than four-year degree. Less than a four-year degree was the reference group.

School Characteristics. The percentage of minority students was calculated for each school using data from the Common Core of Data. I also used a school-level measure of average teacher qualifications within each school: the Index of Teacher Academic Capital (ITAC; White, Presley, & DeAngelis, 2008). The ITAC is a weighted combination of five school level attributes that research suggests are related to student achievement, including teacher ACT English and composite scores, Basic Skills Test pass rates, emergency certification rates, and teacher undergraduate college competitiveness (White et al., 2008).

Methods

The structure of these data nests students within schools and schools within districts. To account for this, I use hierarchical linear modeling and hierarchical logistic regression modeling. The nested structure of the data lends itself well to the use of multilevel modeling techniques and the analyses follow the examples of previous literature relating school factors to longitudinal student outcomes (Engberg & Wolniak, 2010). A three-level hierarchical linear model was used to address the research questions. Because financial data were limited to the district level, the student data are clustered within schools which are clustered within districts. Similar to prior school funding research (Flaherty, 2013; Mensah, Schoderbek, & Saha, 2013), the funding measure of interest is at the district level.

My first set of analyses addresses the predictive relationship between per-pupil revenue and the six outcome variables. The second set of analyses focuses on how the relationship between per-pupil revenue and the six outcome variables changes when the student demographic variables are introduced to the hierarchical models. The third analysis introduces the student variables (GPA, curriculum type, and postsecondary expectations), and the final models add school-level variables to each of the analyses.

Limitations

There are several limitations to this study. First, the school finance data are district level and not school level, and lack specificity regarding how schools allocate their funds. Specific data on the allocation of revenue within schools could help address the concerns of aggregation bias found in prior school funding research (see Hanushek, Rivkin, & Taylor, 1996). Additionally, the data are cross-sectional which limits the ability to understand the long-term impacts of funding disparities (see Jackson et al., 2015). The data do not account for all of students' prior educational inputs in high school or any educational preparation before high school, nor does it account for the possibility of students changing high schools between their junior and senior years. The sample of the data, restricted to the 2002 junior class of Illinois public high school students, limits the generalizability of the findings to Illinois. Also, drop-out information for students in the cohort, both before 2002 and, more importantly after, is unavailable. Finally, parental education and occupation was not available.

Results

District Per-Pupil Revenue and Student Outcomes

Tables are presented in two sets based on model complexity, with higher numbered tables representing more complex models. The first set are the ACT models and the second set are the postsecondary outcome models. The outcome variables for the ACT models are continuous and the outcome variables are dichotomous for the postsecondary outcomes. The coefficients for the ACT models represent the predicted change of the ACT scores. The coefficients for the postsecondary outcome models represent the predicted increase or decrease in the likelihood of the outcome happening relative. Independent continuous variables are standardized and categorical variables are dichotomous, unless otherwise noted.

Analysis of the relationship between funding and student outcomes with no control variables reveals that district per-pupil revenue is positively and statistically significantly related to each of the six outcomes (Table 1). For the ACT composite and math scores, a one standard deviation change in the per-pupil revenue is related to 0.83 and 0.97 point increases, respectively. A standard deviation increase in per-pupil revenue predicts an increase in the odds of enrolling in any institution by 25% and enrolling in a four-year institution by 39%. Finally, a standard deviation increase in per-pupil revenue predicts an increase in the odds of receiving any degree by 35%, which is similar to the 38% increase in the probability of receiving a four-year degree.

Accounting for Student Demographics

After controlling for student demographics (see Table 2), the relationships between per-pupil revenue and each outcome remained positive and statistically significant with a slightly weaker relationships between per-pupil revenue and the outcomes. Parent income strongly predicts increases in ACT composite and math scores. Students with parent incomes of over $80,000 are predicted to have ACT composite and math scores more than three points higher than students with parent incomes of less than $30,000. Female students have, on average, higher ACT composite scores but lower ACT math scores compared to male students. Relative to students identifying as White, students identifying as Asian tend to have higher ACT composite and math scores, and students identifying as Black, Latino, or American Indian/Alaskan Native have ACT composite and math scores that are over two points lower on average.

Table 1.
Predicted Relationships between School Funding & Outcomes without Covariates

	Predicted Effect of School Funding on ACT Outcomes		Predicted Likelihood of Postsecondary Outcomes Relative to Per-Pupil Revenue			
	ACT Composite	ACT Math	Any Enrollment	Four-Year Enrollment	Any Degree	Four-Year Degree
Variable	β	β	O. R.	O. R.	O. R.	O. R.
District Per Pupil Revenue	0.83***	0.97***	1.25***	1.39***	1.35***	1.38***
Constant	20.50***	20.42***	1.80***	0.89***	0.46***	0.42***

** p< .05; **p <.01; ***p <.001*

Table 2.
Predicted Relationships between School Funding & Outcomes Student Demographic Covariates

		Predicted Effect of School Funding on ACT Outcomes		Predicted Likelihood of Postsecondary Outcomes Relative to Per-Pupil Revenue			
		ACT Composite	ACT Math	Any Enrollment	Four-Year Enrollment	Any Degree	Four-Year Degree
Variable		β	β	O. R.	O. R.	O. R.	O. R.
District	Per Pupil Revenue	0.56***	0.66***	1.14***	1.27***	1.25***	1.29***
Student	Female	-0.76***	-1.70***	1.11***	1.01	1.18***	1.13***
	Male	—	—	—	—	—	—
	American Indian/ Alaskan Native	-3.09***	-2.68***	0.44***	0.42***	0.26***	0.27***
	Black	-3.25***	-3.14***	0.86***	0.92*	0.58***	0.57***
	Latino	-2.57***	-2.27***	0.59***	0.55***	0.46***	0.45***
	Asian	0.31***	1.53***	1.31***	1.43***	1.42***	1.42***
	White	—	—	—	—	—	—
	$30k - $50k	1.20***	1.04***	1.45***	1.47***	1.62***	1.65***
	$50k - $80k	2.25***	2.14***	2.02***	2.18***	2.47***	2.58***
	Over $80k	3.36***	3.32***	2.57***	3.31***	3.81***	2.58***
	Under $40k	—	—	—	—	—	—
Constant		19.21***	19.62***	1.00	0.46***	0.20***	0.18***

** p< .05; **p <.01; ***p <.001*

Increases in parental income were also related to increased odds of achieving any of the four postsecondary outcomes. Compared to students with parent incomes of less than $30,000, students with parent incomes of over $80,000 were over twice as likely to have any postsecondary enrollment, over three times as likely to enroll in a four-year institution, just under four times as likely to obtain any degree, and over four times as likely to obtain at least a four-year degree. For female students relative to male students, the odds of enrollment was about 35% higher for both outcomes and the odds of degree attainment was over 50% higher for both outcomes. Compared to White students, Asian students had higher relative odds of any enrollment, four-year enrollment, any degree attainment, and four-year degree attainment. The opposite was the case for students identifying as Black, Latino, or Native American/Alaskan Native. Black, Latino, and Native American/Alaskan Native students had lower relative odds of both enrollment and degree attainment outcomes compared to White students.

Accounting for Student Academics

The next set of models (see Table 3) included control variables related to students' academic backgrounds. Compared to the models in Table 2, after controlling for student academics, the effect of per-pupil revenue was slightly lower but still statistically significant for all six outcomes. This suggests that the student academic variables accounted for some of the relevant variance in the relationship between per-pupil revenue and the outcomes.

The analyses revealed that the type of high school curriculum (college preparatory or not), a student's GPA, and their postsecondary expectations were all positively related to some postsecondary outcomes. A standard deviation increase in a student's indicated GPA predicts an increase of over two points for both the ACT composite and math scores, an increase in the odds of any enrollment by 66% and of four-year enrollment by 122%, and an increase in the odds of any degree attainment by 173% and four-year degree attainment by nearly 200%. Expectation of a bachelor's degree or higher predicts over a one-point increase in ACT composite score and nearly a one-point increase in ACT math score. Additionally, relative to students without expectations of obtaining a bachelor's degree, students with bachelor's degree expectations were predicted to be 1.97 times more likely to have any enrollment, 2.66 times more likely enroll in a four-year institution, 2.32 times more likely to earn any degree, and 2.71 times more likely to earn a four-year degree. Finally, students that enrolled in a college-prep curriculum were predicted to be 1.43 times more likely to have any enrollment, 1.69 times more likely to enroll in a four-year institution, 1.57 times more likely to obtain a degree, and 1.63 times more likely to obtain a four-year degree.

Accounting for School Factors

The next set of models (see Table 4) accounted for school attributes in addition to student academics. For these models, I added two school-level variables, the percentage of minority students and the average quality of teachers, measured by the ITAC. Relative to the previous models, the predicted effect of per-pupil revenue was lower but still positive and statistically significant. The coefficients of the student-level variables changed slightly after controlling for these school-level variables.

The results show that a standard deviation increase in the percentage of minority students predicts a 0.16 point decrease in ACT composite scores and a 9.89% decrease in the odds of each of the postsecondary outcomes except for four-year enrollment. Further, a standard deviation increase in the school ITAC score predicts a 0.51 point increase in ACT composite and a 0.49 point increase in ACT math. Regarding the postsecondary outcomes, a standard deviation increase in the school ITAC score predicts an increase in the odds of any enrollment by 9%, four-year enrollment by 14%, any degree attainment by 17%, and four-year degree attainment by 22%.

Table 3.
Predicted Relationships between School Funding & Outcomes with Student Demographic and Academic Covariates

		Predicted Effect of School Funding on ACT Outcomes		Predicted Likelihood of Postsecondary Outcomes Relative to Per-Pupil Revenue			
		ACT Composite	ACT Math	Any Enrollment	Four-Year Enrollment	Any Degree	Four-Year Degree
Variable		β	β	O. R.	O. R.	O. R.	O. R.
District	Per Pupil Revenue	0.56***	0.66***	1.14***	1.27***	1.25***	1.29***
Student	Female	-0.76***	-1.70***	1.11***	1.01	1.18***	1.13***
	Male	—	—	—	—	—	—
	American Indian/ Alaskan Native	-1.13***	-0.65**	0.66**	0.72*	0.41***	0.44***
	Black	-2.07***	-1.86***	1.06	1.33***	0.86***	0.85***
	Latino	-1.52***	-1.17***	0.72***	0.72***	0.61***	0.60***
	Asian	-0.52***	0.66***	1.08	1.10	1.06	1.04
	White	—	—	—	—	—	—
	$30k - $50k	0.57***	0.40***	1.27***	1.25***	1.38***	1.40***
	$50k - $80k	0.88***	0.75***	1.51***	1.52***	1.73***	1.78***
	Over $80k	1.45***	1.36***	1.70***	2.00***	2.32***	2.43***
	Under $30k	—	—	—	—	—	—
	High School GPA	2.43***	2.64***	1.66***	2.22***	2.73***	2.98***
	College Prep Curriculum	1.49***	1.48***	1.43***	1.69***	1.57***	1.63***
	Not College Prep	—	—	—	—	—	—
	Bachelor's Degree or Higher	1.31***	0.96***	1.97***	2.66***	2.32***	2.71***
	Less than Bachelors	—	—	—	—	—	—
Constant		18.53***	19.21***	0.65***	0.20***	0.09***	0.06***

** p< .05; **p <.01; ***p <.001*

Table 4.
Predicted Relationships between School Funding & Outcomes with Student- and School-level Covariates

		Predicted Effect of School Funding on ACT Outcomes		Predicted Likelihood of Postsecondary Outcomes Relative to Per-Pupil Revenue			
		ACT Composite	ACT Math	Any Enrollment	Four-Year Enrollment	Any Degree	Four-Year Degree
Variable		β	β	O. R.	O. R.	O. R.	O. R.
District	Per Pupil Revenue	0.38***	0.50***	1.11***	1.21***	1.19***	1.20***
Student	Female	-0.76***	-1.70***	1.11***	1.01	1.18***	1.14***
	Male	—	—	—	—	—	—
	American Indian/ Alaskan Native	-1.11***	-0.64***	0.67**	0.73*	0.42***	0.45***
	Black	-1.98***	-1.79***	1.16***	1.39***	0.94	0.94
	Latino	-1.50***	-1.17***	0.74***	0.73***	0.62***	0.61***
	Asian	-0.52***	0.66***	1.08	1.09	1.06	1.04
	White	—	—	—	—	—	—
	$30k - $50k	0.56***	0.39***	1.26***	1.25***	1.37***	1.39***
	$50k - $80k	0.87***	0.74***	1.50***	1.51***	1.71***	1.76***
	Over $80k	1.44***	1.35***	1.68***	1.98***	2.29***	2.40***
	Under $30k	—	—	—	—	—	—
	High School GPA	2.43***	2.64***	1.66***	2.22***	2.73***	2.98***
	College Prep Curriculum	1.49***	1.47***	1.42***	1.68***	1.56***	1.62***
	Not College Prep	—	—	—	—	—	—
	Bachelor's Degree or Higher	1.31***	0.96***	1.97***	2.66***	2.32***	2.70***
	Less than Bachelors	—	—	—	—	—	—
School	Percent Minority	-0.16*	-0.16	0.91***	0.97	0.91**	0.91**
	ITAC	0.51***	0.49***	.09***	1.14***	1.17***	1.22***
Constant		18.47***	19.15***	0.63***	0.20***	0.08***	0.06***

** p< .05; **p <.01; ***p <.001*

Summary of Findings

The results of these six models indicate that district per-pupil revenue is a significant explanatory and predictive factor in educational outcomes for Illinois public high school students. After accounting for both student- and school-level predictor variables, per-pupil revenue is positively and significantly related to each of the six postsecondary-related outcomes. A one standard deviation increase in per-pupil revenue predicts 0.42 and 0.55 point increases in ACT composite and math scores, respectively, and increases in the likelihood of postsecondary enrollment (11%), four-year postsecondary enrollment (21%), two- or four-year degree attainment (19%), and four-year degree attainment (20%). These findings are consistent with prior research regarding the relationships among student factors (parental income, high school GPA, high school curriculum, and student aspirations), school-level factors, and both educational achievement (Dixon-Roman, Everson, & McArdle, 2013) and attainment (Palardy, 2013). Unique to this study was the use of statewide, student-level cohort data to examine the effects of state funding policy on postsecondary-related outcomes. This study also bridges the gap between K-12 and postsecondary research, providing evidence that differences in high school resources are likely to impact postsecondary outcomes.

Implications for Policy and Practice

School Funding and Social Mobility

The positive relationship between ACT exam scores and school funding should not be surprising. Socioeconomic status, as a proxy for wealth, is strongly correlated with results on standardized tests, like the ACT (Orr, 2003; Zwick, 2002). And, as noted by Martire (2013), Illinois public schools have historically had one of the highest rates of between-district economic segregation in the country. This, in combination with a regressive school-funding policy (Baker et al., 2017) in which more dollars are spent in schools with wealthier student populations, may partially explain the statistically significant relationships among per-pupil revenue and ACT measures. It could also help explain, to some extent, the relationship between per-pupil revenue and postsecondary enrollment, specifically at four-year institutions. Because standardized tests like the ACT are often a criterion in the college admissions process, students that score higher on the ACT are, to an extent, more likely to enroll in a four-year institution.

The positive relationships between school funding and both college entrance and completion are not surprising. After controlling for factors associated with positive postsecondary outcomes, like students aspirations and high school preparation, findings suggest that increases in per-pupil revenue significantly increase the likelihood of postsecondary enrollment and degree attainment. Engberg and Wolniak (2010), using nationally representative data, concluded that the average socioeconomic composition of a school's student population was related to both two- and four-year college enrollment. Additionally, Niu and Tienda (2013), using data from Texas, found that the average economic composition of students attending a high school was related to a student's college persistence. In both cases, the average economic composition of the school's student populations can be considered a proxy for school funding. As with ACT scores, college entrance and degree completion is usually necessary for upward social mobility (Venator & Reeves, 2015), particularly in the day of credentialism (see Cottom, 2017). Furthermore, college entrance and matriculation have workforce implications for the state. Students who are more likely to enter college and eventually obtain a postsecondary credential are more likely to be of greater benefit to the state through a number of economic and social means (Bloom, Hartley, & Rosovsky, 2007).

Teachers as School Resources

In each of the six models in this study, the coefficients for per-pupil revenue decrease when average teacher academic capital is introduced. This should not be surprising given prior research indicating that increases in school funding correlate with an increase in the quality of instruction in the district (Hedges et al., 1994) and increases in the quality of teachers within schools (Darling-Hammond, 2000). Further, the continued significance of per-pupil revenue after the introduction of average teacher characteristics suggests there are school characteristics related to revenue—beyond teacher quality—that also influence student academic outcomes (Hanushek, 1989). For these reasons, it is important that further research on Illinois' school funding system examines how funds are allocated within schools and across districts (Hanushek, 1994). Future studies, especially any assessment of the new Illinois school-funding bill, should include some measure of classroom- or school-level teacher quality to fully understand how the increases in funds are related to student outcomes.

SB 1947

If there is to be equity in resource allocation to public schools, continuing to base the bulk of resource generation on local wealth seems to be a flawed approach. From an equity perspective, Illinois policymakers should aim to reduce the effect of per-pupil revenue on these educational outcomes. Prior to 2017, multiple attempts to redistribute the state's share of school funding failed to garner the bipartisan support needed to pass. On August 31, 2017, the Illinois' governor signed SB 1947 into law, marking a needed change to one of the most regressive school funding policies in the country. Under the old school funding formula, less than 50% of the state's allocation was based on the poverty level of a district, which limited the local district's ability to pay for schools (Advance Illinois, 2016; Funding Illinois' Future, 2016). According to analysis by the Center for Tax and Budget Accountability, the new funding formula under SB 1947 will allocate "99 percent of the new funding for education to those districts that are least adequately funded" (Martire, et al., 2017, p. 6). This new allocation will ultimately direct the majority of new state school funding revenues to those schools that educate the poorest students. Such redistribution would increase the per-pupil revenue of low-income schools, which over time, could result in similar student outcomes as seen among student population in states that have undergone similar funding reforms like in Michigan (Hyman, 2017; Papke, 2005) and New Jersey (Mensah et al., 2013). Parents and students residing in higher funded schools may have concerns over the loss of benefits; however, prior research suggests that redistribution based on school funding policies reduces vertical equity (unequal treatment of unequals) across schools but does not impact horizontal equity (equal treatment of equals; Mahoney, 2013).

Discussion: Funding Reform and Changes in Student Outcomes

The findings in this study suggest that, in Illinois, money does matter for educational upward mobility. Per-pupil funding was positively related to three key points in the upward mobility path: the measure of college readiness, college enrollment, and college completion. That is, school funding matters to educational outcomes, and differential school funding matters even more in Illinois.

In light of the recent school funding legislative reform, a discussion on how the findings of this study could change, grounded in recent school funding reform literature, is warranted. Regarding the gaps in college entrance exam scores, we should expect the average differences between those students attending wealthier schools and those at poorer schools to decrease. Card and Payne (2002) estimated that a reduction in the spending distribution between schools would reduce average SAT scores test-score gaps "between children with highly-educated and poorly-educated parents by about 8 points" (p. 80). Papke (2005) studied the effects of school-funding reforms in Michigan in 1994 and concluded that there were increases in the percentage of students with satisfactory performance on the fourth grade state math test and that the effects of increased spending were larger in previously low-performing schools. Additional studies found that changes in school funding had positive effects on standardized test scores in Vermont (Sherlock, 2011), Pennsylvania (Flaherty, 2013), and New Jersey (Mensah et al., 2013). Chung (2015) examined changes in Maryland's school funding formula and concluded that reforms did increase spending in lower-wealth districts but did not reduce gaps in dropout rates. Thus, standardized test scores at the primary levels are likely to increase in schools that receive additional funding.

Regarding postsecondary matriculation, the likelihood of students enrolling in postsecondary education should also improve over time as more students are affected by continued increases in per-pupil expenditures. In examining the results of school funding equalization in Kansas between 1989 and 1995, Deke (2003) estimated that a 20% increase in spending increased the likelihood of students enrolling in postsecondary institutions by 5%.

Although Illinois' school funding reforms may not produce large gains in the outcome measures used in this study in the short term, evidence does suggest that important systemic changes can produce significant impacts in the long-term. Specifically, Jackson et al. (2015) examined the longitudinal impacts of state school finance reforms across a nationally representative sample of students born between 1955 and 1985. Focusing only on school funding changes linked to state school finance reforms, they found that students who experienced increases in per-pupil spending each year for 12 years had higher levels of educational attainment, higher wages, and a lower likelihood of adult poverty, noting that the effects were more pronounced for students from low-income families.

A more recent study sheds light on the cautions that need to be taken when new monies are introduced to districts. Hyman (2017) studied the long-term effects of school funding changes in Michigan from 1994 and found that spending increases were related to improved likelihood of postsecondary enrollment and degree attainment. However, unlike Jackson et al. (2015) where the gains were seen at higher-poverty schools, the gains were "concentrated among districts that were urban and suburban, lower-poverty, and higher-achieving" at the onset of the policy changes. Hyman (2017) further noted that extra monies received under the funding reform by the districts were directed toward lower-poverty schools. Thus, it is important for the Illinois legislature to continue decreasing the gaps in school funding by adding new monies to the education fund, of which 99% will be directed to districts with less than adequate funding. Further, additional measures should be taken to ensure that the distribution of new monies within districts is also equitable

Conclusion

Lewis and Nakagawa (1995) note the following regarding decentralization and school reforms:

Whereas reformers purport to represent minority parents and communities, the actual politics of the decentralization effort end up as an interplay between reform organizations and conventional political groups, rather than representation of class interests (p. 169).

The long-term deniability of both the Illinois judicial and legislative government branches in addressing the disparate impact of the school funding system has helped shape the Illinois public school system into one of the most regressive in the country, allocating less monies, on average, to those schools charged with educating the state's poorest students. Forty-plus years of providing "an efficient system of high quality public educational institutions and services" (IL Const. art. X, sect. 1) has effectively maintained a stratified educational system that lacks equity, let alone equality, for all. With the passage of SB 1947, Illinois lawmakers took a laudatory first step toward providing an adequate school funding mechanism and equitable opportunities for all students, specifically to the growing numbers of low-income and minority students in Illinois. To continue providing support for the state's most marginalized students, steps should be taken to regularly and systematically monitor, assess, and evaluate the implementation and overall impact of SB 1947. Furthermore, the state legislature should make concerted efforts to provide additional revenue towards public PreK-12 education, as the impact of SB 1947 is dependent solely on newly allocated state funds.

Taken together, the findings from this study suggest that, if fully funded, the recent school funding reforms in Illinois are likely to improve postsecondary readiness, enrollment, and completion for public school students, particularly those in low-wealth districts. However, prior research suggests it will likely take years to see the full impact of these reforms.

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Appendix A

Descriptive Statistics of Analysis Samples by Racial Classification

			White, Non-Hispanic	American Indian/ Alaskan Native	Black/ African American	Latina/o/ Hispanic	Asian/ Pacific Islander	Total
N			47,456	317	7,016	5,861	3,082	63,732
%			74.5%	0.5%	11.0%	9.2%	4.8%	100.0%
District-level	Mean Per Pupil Revenue, state & Local sources (SD)		$9,896	$9,433	$9,292	$9,690	$11,604	$9,891
			($3,329)	($3,103)	($2,901)	($3,015)	($3,578)	($3,297)
Student-level	Mean Parent Income	Less than $30,000	17.3%	38.5%	54.5%	47.9%	28.6%	24.9%
		$30,000 - $50,000	26.7%	26.5%	26.6%	30.3%	26.1%	27.0%
		$50,000 - $80,000	27.4%	19.9%	11.3%	14.8%	23.1%	24.2%
		More than $80,000	28.58%	15.14%	7.58%	7.06%	22.29%	23.92%
	Mean HS GPA (SD) 1 = (D- to D) 0.5 - 0.9 2 = (D to C-) 1.0 - 1.4 3 = (C- to C) 1.5 - 1.9 4 = (C to B-) 2.0 - 2.4 5 = (B- to B) 2.5 - 2.9 6 = (B to B+) 3.0 - 3.4 7 = (A- to A) 3.5 - 4.0		5.5	4.4	4.7	4.7	5.9	5.4
			(1.4)	(1.6)	(1.4)	(1.5)	(1.3)	(1.4)
	Gender	Female	51.2%	45.7%	58.4%	53.4%	49.1%	52.1%
		Male	48.8%	54.3%	41.6%	46.6%	50.9%	47.9%
	HS Curriculum	College Prep	53.2%	29.7%	41.1%	35.2%	58.1%	50.3%
		Other	46.8%	70.4%	58.9%	64.8%	41.9%	49.7%
	Postsecondary Degree Expectations	≥ BA/BS	83.9%	65.0%	81.5%	73.7%	91.8%	83.0%
		< BA/BS	16.1%	35.0%	18.5%	26.3%	8.2%	17.0%
School-level	School Percent Minority		12.9%	20.8%	70.1%	49.9%	22.9%	23.1%
	(SD)		15.4%	27.9%	32.3%	32.5%	22.2%	28.3%
	Mean ACT Math Score		0.8	0.6	0	0.5	1.1	0.7
	(SD)		0.6	0.7	0.9	0.7	0.5	0.7
Student-level Outcomes	Mean ACT Composite Score		21.5	17.5	16.8	17.5	22.4	20.7
	(SD)		5.0	4.7	3.9	4.2	5.4	5.2
	Mean ACT Math Score		21.5	17.9	16.7	17.8	23.7	20.7
	(SD)		5.4	4.6	3.7	4.1	6.0	5.5
	Enrolled in Any Post-Secondary	Yes	62.3%	39.4%	48.0%	41.5%	70.0%	59.1%
		No	37.7%	60.6%	52.0%	58.5%	30.0%	41.0%
	Enrolled in Four-year Postsecondary	Yes	53.1%	28.1%	43.6%	31.8%	65.7%	50.6%
		No	46.9%	71.9%	56.4%	68.2%	34.3%	49.4%
	Any Postsecondary Degree	Yes	39.2%	12.0%	20.0%	16.4%	50.0%	35.4%
		No	60.8%	88.0%	80.0%	83.6%	50.0%	64.6%
	Bachelor's Degree or Higher	Yes	37.9%	11.7%	18.3%	15.2%	49.0%	34.1%
		No	62.1%	88.3%	81.7%	84.8%	51.0%	65.9%

NOTE: Sample restricted to the 63,732 cases with complete data. Full public-school data file consists of 94,763 cases.

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