Apples 2 Apples

The Definitive Look
at School Test Scores in
Milwaukee and Wisconsin for 2018

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WISCONSIN INSTITUTE
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EXECUTIVE SUMMARY

This is the Wisconsin Institute for Law & Liberty's annual report comparing the academic performance of Wisconsin's schools across sectors. In this report, peer-reviewed by a University-based academic, we put schools in the state on a level playing field by controlling for a number of factors that are known to influence academic outcomes to create "apples to apples" comparisons using the 2017 Forward Exam and ACT results for the state. New additions to the report this year include a ranking of all the schools in the state and a model that attempts to account for disability rates in the Milwaukee Parental Choice Program. Among the key findings:

Milwaukee

1. **Private schools in the Milwaukee Parental Choice Program (MPCP) outperform Milwaukee Public Schools (MPS).** Students in the MPCP were about 4 percentage points more likely to score proficient or above in mathematics and 5 percentage points more likely to score proficient or above in reading.

2. **MPCP performance advantage continues when disability is considered.** Under higher bound assumptions about the rate of students with disabilities in the MPCP from existing research, the MPCP continues to significantly outperform MPS.

3. **Catholic and Lutheran schools continue to drive the MPCP performance advantage.** Catholic schools outperform MPS in both ELA and Mathematics, and Lutheran Schools outperform MPS in mathematics. Other choice schools are no different from MPS in terms of performance.

4. **Charters outperform MPS.** Both independent and non-instrumentality charters have higher proficiency rates than MPS. Students in non-instrumentality charter schools were about 12 percentage points more likely to be proficient in reading and 15 percentage points more likely to be proficient in math than traditional public school students. Independent charter school students were about 5 percentage points more likely to be proficient in reading and 8 percentage points in math. Unlike last year, instrumentality charters have about 6 percentage point higher proficiency rates than MPS.

5. **UWM charters outperform other charters.** Among charter schools, the best performers are those authorized by UWM. On the Forward Exam, UW-Milwaukee charters have approximately 8 percentage points higher proficiency in English and mathematics compared to MPS.

6. **MPS specialty schools are no different than neighborhood MPS**. Like last year, we find that demographic factors explain the performance advantage of MPS Specialty schools – MPS schools that have special admission requirements unlike neighborhood MPS schools, charters, or private schools in the MPCP – that are found when one looks at the raw data. Indeed, proficiency in these schools is approximately 5 percentage points lower than regular MPS schools in math once proper control variables are included in the analysis.

Statewide

7. **Choice and Charter schools outperform public schools overall in Reading statewide.** On the Forward Exam, there was significantly higher performance on the reading portion of the Forward Exam for students in the state's voucher programs and charter schools. This is the first time a positive association has been found between choice programs overall in Wisconsin and academic outcomes.

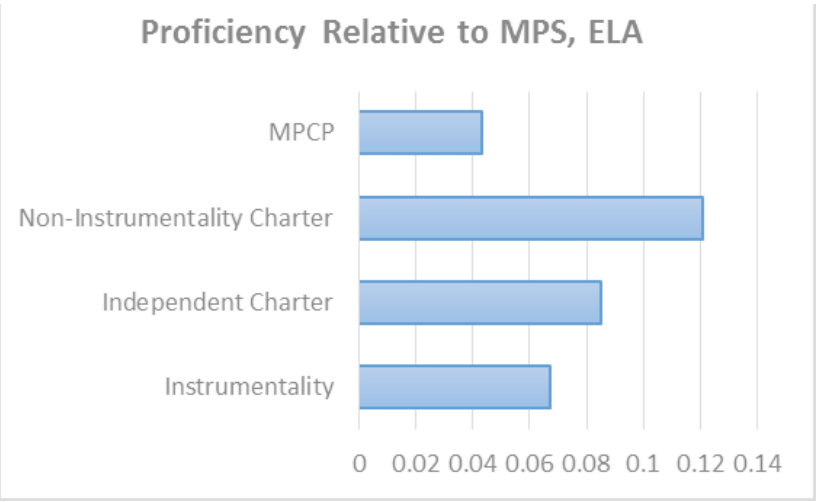
8. **Choice and Charter outperform public schools overall in ACT Scores.** Choice schools throughout the state score approximately .678 higher on the ACT than and charter schools score approximately .503 points higher than traditional public schools throughout the state.

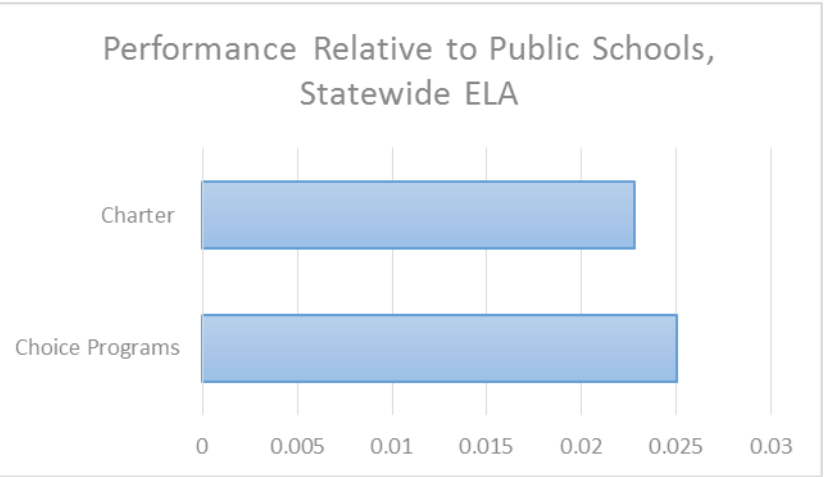
Individual School Rankings

9. **Adjusted Performance Ranking (APR).** For the first time, we rank most Wisconsin schools on a level playing field that adjusts for a number of demographic factors widely known to affect student performance. We also provide rankings for schools by city, urbanicity, and 80/80 status in this report and on our website.

10. **Choice Schools are overrepresented at both the top and bottom of APR.** While schools in the MPCP represent a much higher share of the top performing schools in the state than would be expected given their share of total schools, they are also overrepresented at the bottom. Some of the reason for disproportionality at the bottom may be a misreporting of rates of economically disadvantaged students in some choice schools.

11. **Rural and Small town schools perform worse than urban schools.** When schools are divided by level of urbanicity, rural schools have significantly lower performance on the Forward Exam in both math and reading than urban schools. All school sectors have lower levels of proficiency than suburban schools.





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I. INTRODUCTION

Once again, it is the time of year for WILL's comprehensive examination of the test scores of Wisconsin's students across school sectors. Our annual "apples to apples" report puts schools on a level-playing field by accounting for factors that influence academic performance such as economic status, race, and English Language Learner status.

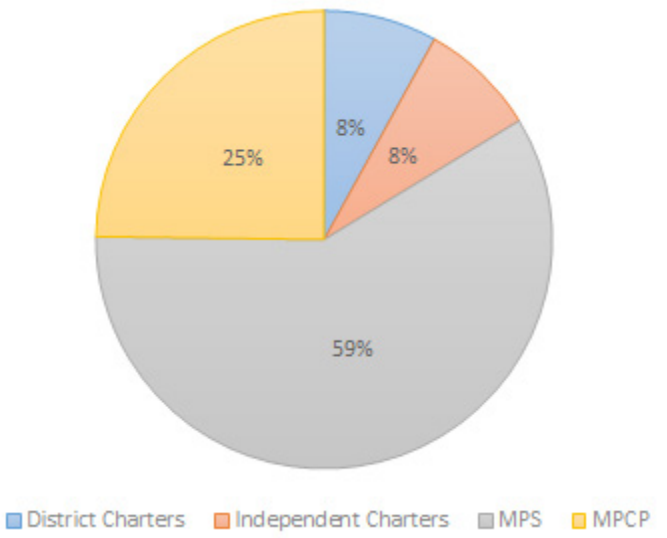
New this year is a ranking of all of Wisconsin's schools on that level playing field. While a few issues remain with these rankings due to poor measurement of economic status in choice schools (more on this later), this report is useful to parents and policymakers in determining which specific schools are most effective at improving academic performance.

II. OVERVIEW: EDUCATION IN WISCONSIN

Wisconsin enjoys some of the most diverse educational options of any state in the country. Consider the following types of schools and choice programs in Wisconsin:

Milwaukee Parental Choice Program (MPCP): The MPCP is the oldest school choice program in the country. Started in 1990 by a diverse coalition of Republicans and Democrats, the program aimed to provide better educational options for a public school system that had failed its kids for too long. The program is open to students in the city of Milwaukee whose families are within 300% of the poverty line. There are no enrollment caps. The program served over 28,000 students in 126 private schools during the 2017-18 school year.

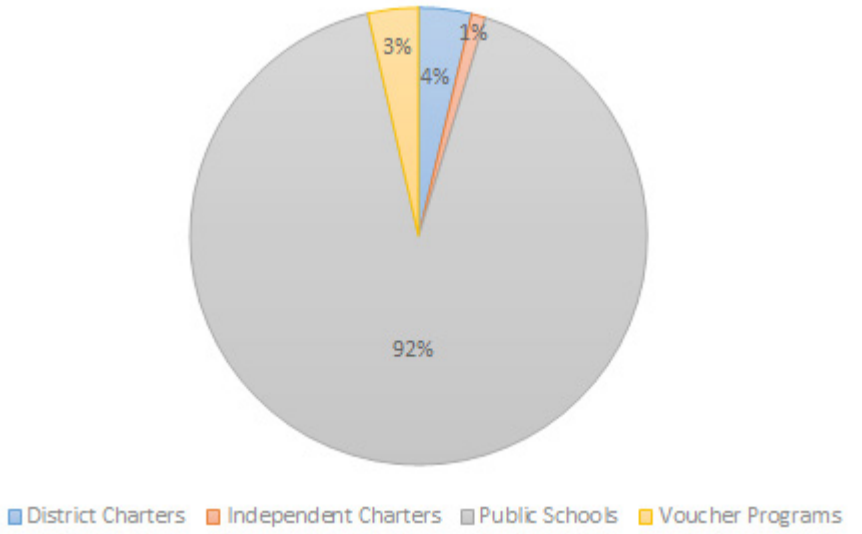
Figure 1. Enrollment by School Sector, Milwaukee



Racine Parental Choice Program (RPCP): The RPCP expanded access to voucher schools beyond Milwaukee in Wisconsin. The program began in 2011 and is open only to residents of the city of Racine whose family income is within 300% of the poverty line. During the 2017-18 school year, the program included 23 schools and 3,007 students.

Wisconsin Parental Choice Program (WPCP): The newest school-voucher program in Wisconsin, the WPCP, expanded access to vouchers statewide in 2013. The program has a lower income limit than other choice programs in Wisconsin, at only 220% of the poverty line. This program also faces strict enrollment caps that are set to increase over the years at a slow rate. For 2016-17, 2% of students in each school district were eligible for enrollment. This increases by 1% per year until caps are lifted after 10 years. During the 2017-18 academic year, there are 154 schools enrolled in the program serving 4,540 students.

Figure 2. Enrollment by School Sector, Wisconsin



Special Needs Scholarship Program (SNSP): The SNSP is open to students in Wisconsin with disabilities who wish to attend a private school that better meets their needs. There are 28 schools participating in the program and 246 students for the 2017-18 school year.

Independent Charters: Independent charter schools are public schools outside of the purview of local school boards. They are chartered by a number of entities throughout the state including universities and the city of Milwaukee. These schools are freed from many of the regulatory burdens found in traditional public schools. 24 independent charters operate in Milwaukee. Only two independent charters operate outside of Milwaukee. These schools enroll a total of 8,160 students for the 2017-18 school year.

Non-Instrumentality Charters: These charter schools are under the purview of the school district, but maintain a level of independence not seen in traditional public schools. The teachers are employees of the school rather than the district and are usually not unionized. Thirteen non-instrumentalities operate in Milwaukee. Seventeen non-instrumentality charters operate outside of Milwaukee, however many of these are virtual schools or schools devoted to at-risk students.

Instrumentality Charters: These schools are under the purview of the local school board, and their employees are employees of the district. Instrumentality charters also have far more limited curricular freedom than other charters. Of the 211 charters in Wisconsin outside of Milwaukee, 193 (91.4%) are instrumentality charters.

Traditional Public Schools: Public schools make up the vast majority of schools in Wisconsin. They are run by local school districts, and in many cases have unionized teachers. There are also different types of public schools that vary in their admission requirement for students. Some public schools, such as citywide specialties in Milwaukee, have admissions requirements.

III. LITERATURE REVIEW OF MPCP, CHARTERS

Milwaukee's voucher program being the oldest in the nation, there has been extensive research conducted about the effects of school vouchers on student performance. The School Choice Demonstration Project (SCDP) was funded by the state in 2006 to conduct extensive research on the effectiveness of the program using a wide variety of metrics. Scholars in the SCDP applied state-of-the-art matching methods to compare students in the MPCP with students in MPS who were similar in neighborhood, race, and prior achievement. Such studies represent the best analytic techniques short of true experiments where students are randomly assigned to a choice school or not via a lottery.

Among the findings from this matching analysis are that students in the MPCP were 4-7 percentage points more likely to graduate from high school (Cowen et. al. 2013). Moreover, students in the MPCP were found to achieve higher scores in reading, though similar scores in math (Witte et. al. 2012). Other findings, not related to academic achievement, include lower incidences of criminal behavior (DeAngelis and Wolf 2016) and extensive economic benefits (Flanders and DeAngelis

2017).

Later research has found similar positive effects of the MPCP. Flanders (2018), in a peer-reviewed study, found that the school choice marketplace, coupled with the current accountability regime, is effective at culling bad schools from the program while encouraging growth in higher performing schools. Governmental accountability is primarily based on financial reporting, but also includes provisions that schools must maintain accreditation from a state determined list of accreditors.

In the area of charter schools, Flanders (2017) found that schools in Milwaukee with greater independence from the school district (independent and non-instrumentality) gave Wisconsin taxpayers a better return on investment per tax dollar spent than charters more closely tied to the district (instrumentality) and traditional public schools. There is not extensive research into the Racine and Wisconsin Parental Choice Programs because they are relatively small and new.

IV. STUDY METHODOLOGY

Wisconsin is relatively unique in providing extensive data on the demographic and economic characteristics of Wisconsin schools in choice programs across all sectors – public, charter, and private. The data set shows a school's racial makeup, socioeconomic status, enrollment counts, and English language learner counts.[1]

This data enables a more fine-grained analysis than has been conducted previously outside of the work by the School Choice Demonstration Project, for whom individual-level student data was made available by the Department of Public Instruction. Also, all students in Wisconsin are now mandated to participate in the ACT.[2] These factors include the percentage of minority students, the percentage of students in the school who are economically disadvantaged, the school enrollment, the percentage of students in the school who are English language learners, and the grade levels served by the school. Doing so results in something approximating an "apples-to-apples" comparison.

Our dependent variables are primarily measures of achievement gathered from DPI's WISEdash system. I gathered data on two of the most important subject areas for success later in life: ELA and mathematics. This data is aggregated at the school level. Students who took the alternative exam for disabilities are not included in the analysis. ACT results were also gathered from DPI's publically-available data. Because the MPCP is so large, I am able to break out Milwaukee and examine the effects of choice sectors on performance with the city. Additionally, Milwaukee contains a far wider variety of charter schools than the rest of the state, with varying degrees of connectedness to the school district (Flanders 2017). For Milwaukee, I run the following model on both Forward Exam and ACT data:

$$\text{Test Score}=\beta_1(Private) + \beta_2(Independent\ Charter) + \beta_3(Instrumentality\ Charter) + \beta_4(Non-Instrumentality\ Charter) + \beta_5(Controls)+\mu$$

Test scores are only included for the voucher students in each school rather than for all students in the school as I am most interested in determining the association of school choice with performance rather than the association of private schooling in general with performance. For districts in Wisconsin outside of Milwaukee, there is a need to additionally control for variation that occurs at the local level, as localities tend to differ in ways that are difficult to measure given the available data. In the primary analysis, this is done through the inclusion of fixed effects for each Wisconsin city. There is also little need to control for the types of charter schools, which are almost universally instrumentalities outside of the city. I run the following model:

$$\text{Test Score}=\beta_1(Private) + \beta_2(Charter) + \beta_3(District\ Dummies) + \beta_4(Controls)+\mu$$

A Word on Measurement Error

There are still issues with the objectivity of the state report card scores for schools in the voucher program. Rates of disability reported for choice schools lag significantly behind those reported in the most in-depth research on the topic (Wolf et. al. 2012).

Additionally, rates of economic disadvantage in some choice schools are significantly lower than what one would expect in a city where the vast majority of families fall close to the poverty line, and only students from families earning less than 300% of the federal poverty limit are eligible to participate. Errors in these variables have a significant impact on the growth scores that are reported for choice schools on the report card, as well as the school rankings found in this paper. For example, the lowest performing school in the state by our new APR metric is St. Joseph Grade School in Racine. However, this school is reported to have 0% of economically disadvantaged students, something that seems exceedingly unlikely in a program where students were only eligible for participation under 185% of the federal poverty limit[3].

The reason for this is that schools are given "credit" for achievement gains among these groups. When these groups are undercounted and are instead counted as part of the general population, schools do not receive this credit. The extent to which these errors create bias in report-card outcomes is a subject for further study, but it is something that policymakers and school leaders should be aware of. Underreporting of disability rates in choice schools could hurt their standing in evaluations of academic performance. Report-card scores for private schools in the choice program could benefit from better measurement of economic status and disability.[4]

In the Milwaukee section of this paper, I attempt to account for issues with the disability rates in the choice sector by recalculating the rates for choice schools using Wolf's estimates. However, this should be viewed as an extremely rough estimate. This is preferable to using DPI data which severely underestimates the number of disabled students in choice schools.

V. Results: Milwaukee

The figure below shows the relative proficiency of students on the Forward Exam across sectors in Milwaukee. Students in the MPCP, independent charters, and non-instrumentality charters significantly outperform their peers in mathematics and English Language Arts (ELA). Proficiency rates are approximately 4.3% higher in choice schools, 8.5% higher in independent charters, and 12.1% higher in non-instrumentality charters in math relative to traditional public schools. I have also identified a significant increase in math proficiency in instrumentality charters. In those schools, math proficiency rates are approximately 6.7% higher than traditional public schools ($p<.1$).

Table 1. Proficiency Rates by School Sector, Milwaukee

VARIABLES	Math Proficiency	ELA Proficiency
MPCP	0.0433**	0.0583***
	(0.0176)	(0.0197)
Independent charters	0.0852***	0.0536*
	(0.0288)	(0.0323)
Non-Instrumentality Charters	0.121***	0.154***
	(0.0372)	(0.0416)
District Charters	0.0671*	0.0391
	(0.0399)	(0.0447)
Non-White	-0.458***	-0.469***
	(0.0552)	(0.0617)
Enrollment	2.24e-05	4.04e-05
	(2.81e-05)	(3.15e-05)
English Language Learners	0.121**	0.0614
	(0.0557)	(0.0624)
Economic Status	-0.141***	-0.302***
	(0.0461)	(0.0516)
Alternative School	-0.0208	0.000490
	(0.0539)	(0.0603)
Elementary/Secondary	-0.0619**	-0.0508*
	(0.0251)	(0.0281)

High School	-0.0351	-0.00257
	(0.0221)	(0.0247)
Middle School	0.0604	0.0565
	(0.0412)	(0.0461)
Constant	0.203***	0.346***
	(0.0723)	(0.0809)
Observations	234	234
R-squared	0.537	0.598

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<.1

A similar story holds for math proficiency. Students are between 5 and 15% higher in proficiency across Milwaukee's choice sectors relative to public schools. The racial achievement gap is evident in this data. A school with 100% minority students would be projected to have a 45 percentage point (46 percentage point) lower rate of proficiency in math (ELA) than a hypothetical school with no minority students. Economic status also plays a large role in proficiency rates, leading to an estimated 14.1% decrease in proficiency in math and a 30.1% decrease in English proficiency. Visual depictions of the results across sectors in Table 1 are presented in Figures 1 and 2 which follow. Note that bar charts shown as '0' represent a lack of statistical significance of the estimate.

Figure 1. Proficiency of Each Sector Relative to MPS (Math)

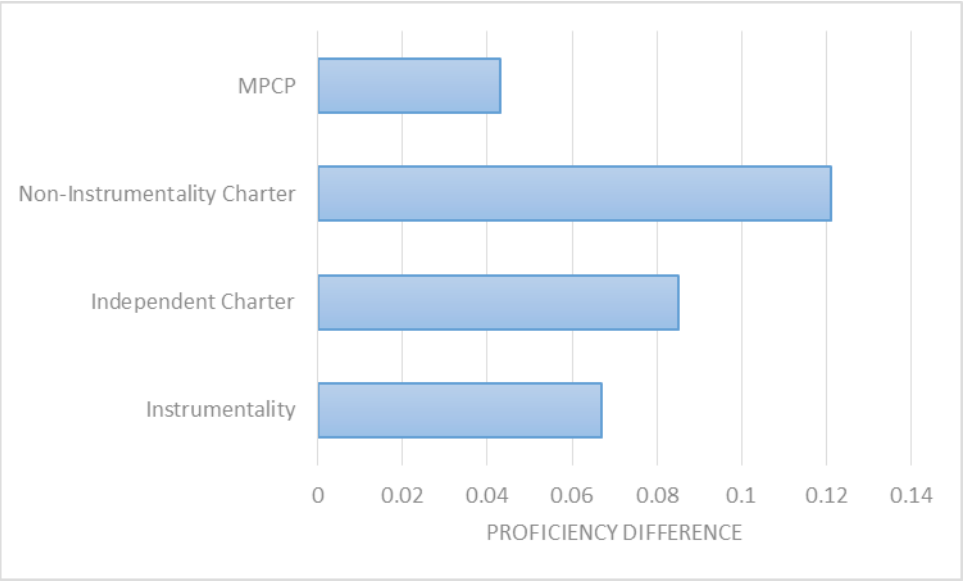
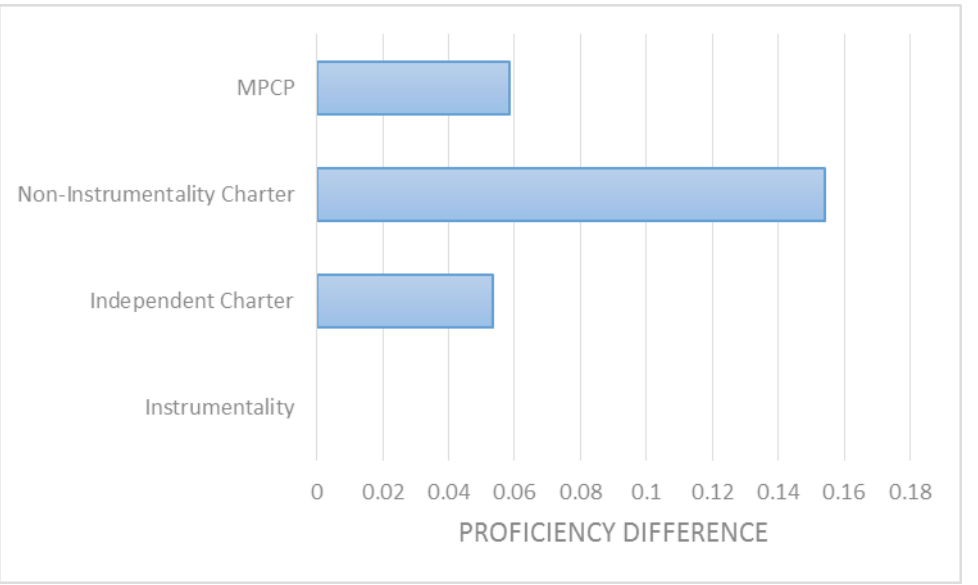


Figure 2. Proficiency of Each Sector Relative to MPS (ELA)



These results are similar to what I found last year, with non-district and non-instrumentality charters and MPCP schools significantly outperforming MPS once again. The lone exception being that I now find a significant, positive association of district charters, though at the lowest level of statistical significance (p<.1).

Charter Authorizers

In this section, I look at any differences in performance for Milwaukee's multiple independent charter school authorizers. Independent charters in Milwaukee are currently authorized by UW-Milwaukee, the city of Milwaukee, and UW-Parkside. However, only one school authorized by UW-Parkside was available for analysis, making statistical comparisons impossible. For ease of interpretation, only the charter school variables are reported in the tables in this section. However, all of the same control variables are included in the actual analyses.

In math proficiency, schools authorized by both UW-Milwaukee and the city of Milwaukee outperform their traditional, public-school peers. Proficiency rates in mathematics are approximately 8% higher in both sets of schools. In ELA proficiency, the results are more mixed. Schools authorized by UW-Milwaukee have about 8% higher proficiency than MPS schools, but schools authorized by the city of Milwaukee are statistically indistinguishable.

Table 2. Proficiency by Charter Authorizer, Milwaukee

VARIABLES	Proficiency ELA	Proficiency Math
UW Milwaukee	0.0796*	0.0838**
	(0.0438)	(0.0392)
City of Milwaukee	0.0271	0.0866**
	(0.0443)	(0.0397)
Observations	234	234
R-squared	0.600	0.537

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

MPS Specialty Schools

In last year's Apples to Apples report, I noted that the higher performance of MPS's citywide specialty schools relative to traditional MPS schools was entirely explained by factors other than academic quality; chiefly the demographic characteristics of the school. Unlike choice and charter schools, MPS specialty schools have admissions requirements that allow them to select students. In this section, I examine the extent to which this is the case using the most recent test-score data. Like Table 2 above, all of the same control variables are included in the analysis but excluded from the table.[5] In the area of ELA, I see no statistical difference between citywide specialty schools and other public schools in Milwaukee. In mathematics, there are lower proficiency rates at a minimally statistically significant level (p<.1). In other words, the performance advantage of specialty schools remains with the students whom they accept rather than differences in the quality of the educational services offered.

Table 3. Performance of Citywide Specialty Schools Relative to Other MPS Schools

	(1)	(2)
VARIABLES	Proficiency ELA	Proficiency Mathematics
Citywide Specialty	-0.00965	-0.0483*
	(0.0297)	(0.0267)
Constant	0.366***	0.234***
	(0.0805)	(0.0723)
Observations	234	234
R-squared	0.594	0.525

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Religious Choice Schools

Last year I found performance advantages for Catholic schools in both math and ELA relative to MPS, and a performance advantage among Lutheran schools in math only. This year, Catholic schools enjoy a proficiency rate 7.5 percentage points higher than MPS schools in math, and 14.9 percentage points higher in ELA. Lutheran schools have approximately 8.5 percentage points higher rates of proficiency in math, but no significant difference from MPS in ELA proficiency. These religiously-affiliated schools are the main drivers of the performance advantage of school choice relative to MPS. Schools in the MPCP not affiliated with the Catholic or Lutheran church are no different from MPS in proficiency.

Table 4. MPCP Performance Relative to MPS by Religious Affiliation

VARIABLES	Math Proficiency	ELA Proficiency
Catholic	0.0753***	0.149***
	(0.0257)	(0.0283)
Lutheran	0.0854***	0.0430
	(0.0289)	(0.0318)
Other Choice	-0.0157	-0.000439
	(0.0192)	(0.0212)
Constant	0.205***	0.357***
	(0.0708)	(0.0781)
Observations	234	234
R-squared	0.546	0.619

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

On the following page, all of the variables that are included individually are considered simultaneously to provide an overall summary of our findings from Milwaukee. In this table, citywide specialty schools are excluded from the baseline MPS comparison group to have their own column. Because the baseline is changed, the results are not identical to those that are found above[6].

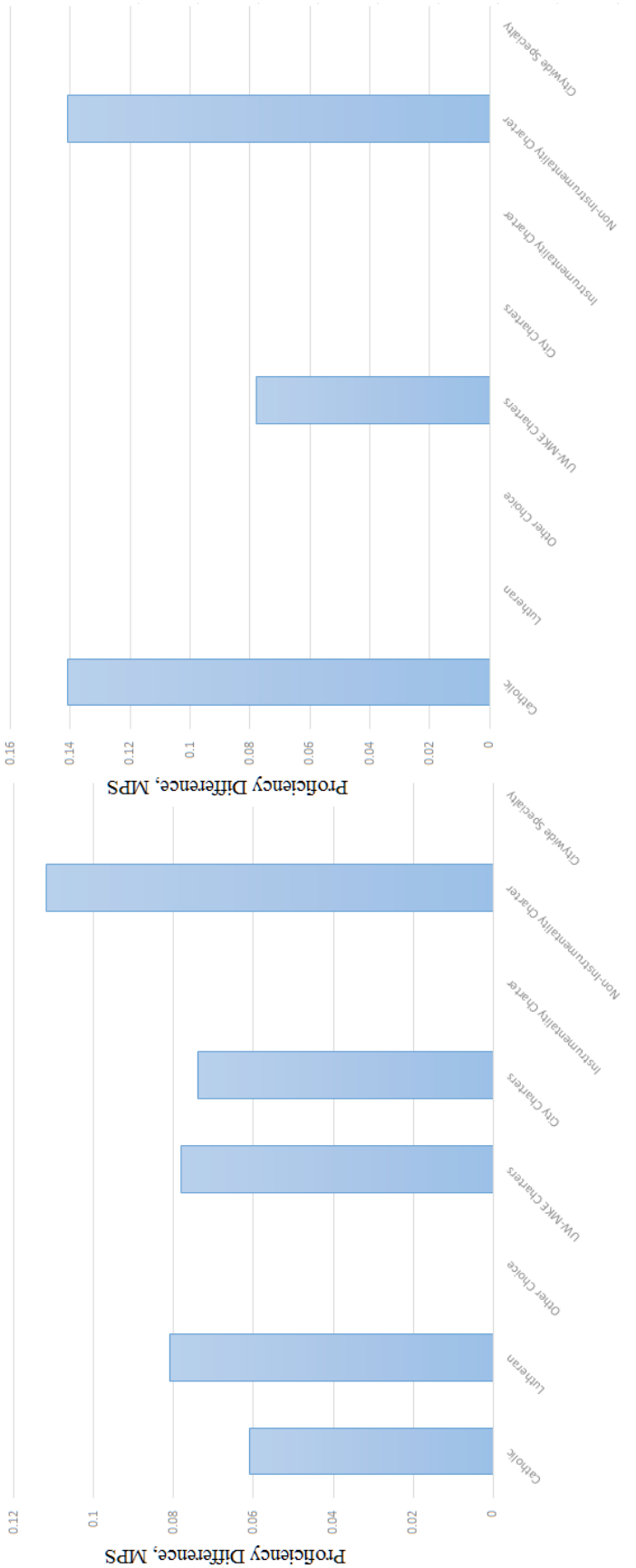


Figure 3. Proficiency Differences from MPS, All Sector Breakdowns

ACT Scores, Milwaukee

The figure below shows ACT scores by sector in Milwaukee. As I saw in our results for the Forward Exam, the MPCP and charters with a higher degree of independence from the school district significantly outperform traditional public schools. In private voucher schools, ACT scores exceed those of traditional public schools by approximately 1.413 points. In non-instrumentality charters, ACT scores exceed those of traditional public schools by approximately 2.717 points. Independent charters had an even large estimated association, at 4.208 points higher than traditional public schools.

Table 5. ACT Scores by Sector, Milwaukee

VARIABLES	ACT Score
MPCP	1.413*
	(0.753)
Non-Instrumentality Charter	2.717**
	(1.132)
District Charter	1.793
	(1.940)
Independent Charter	4.208***
	(1.373)
Non-White	4.069
	(3.579)
Enrollment	0.000566
	(0.000876)
English Language Learner	-1.809
	(3.332)
Economic Status	-14.30***
	(2.630)
Alternative School	0.360
	(1.960)
Constant	25.58***
	(3.210)
Observations	37
R-squared	0.749

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Results: Accounting for Disability

The preceding analyses have not accounted for the disability rate of students in Milwaukee's schools given the difficulty in accurately measuring such data highlighted in the Measurement error section. Wolf, et. al. (2012) estimated a 'true' disability

rate for the MPCP that ranges from 7-14%, while the measured disability rate according to DPI was 1.6%. The inaccuracy of the DPI rate means that any studies that make use of it would be treating choice schools unfairly, yet it is potentially unfair to public schools to not include disability at all as a control variable. In this section, I provide two estimates based on both ends of the range identified in the Wolf paper. In the lower bound estimates, I assume that disability measurement in each MPCP school is off by a factor 3.68. This figure is arrived at by comparing the DPI measured disability rate in the Wolf study with the lower bound estimate the scholars arrived at for the "true" disability rate in MPCP.

In the higher bound estimates, I assume that disability measurement is off by a factor of 8.125.[7] Again, these estimates are very rough and rest on the assumption that disability rates in the MPCP are measured consistently across schools, even if to a much lower degree than MPS. This assumption is far too broad, and further highlights the need for a better measure of disability rates in choice-participating schools.

Table 6. Effect of MPCP on Performance under Various Disability Assumptions

VARIABLES	3.68 Adjustment Factor ELA Proficiency	3.68 Adjustment Factor Math Proficiency	8.125 Adjustment Factor ELA Proficiency	8.125 Adjustment Factor Math Proficiency
MPCP	0.0121	0.00640	0.0488***	0.0313**
	(0.0200)	(0.0191)	(0.0200)	(0.0157)
Disability	-0.252***	-0.197**	-0.230***	-0.162***
	(0.0889)	(0.0848)	(0.0694)	(0.0603)
Constant	0.301***	0.174**	0.261***	0.142*
	(0.0778)	(0.0742)	(0.0766)	(0.0729)
Observations	234	234	234	234
R-squared	0.650	0.544	0.642	0.536

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

This analysis shows that assumptions about the disability rate are important in what I can say about the effectiveness of the MPCP as a sector. Under the assumption that disability rates in the MPCP are mismeasured to a lesser extent, the association of the MPCP with performance becomes null. Under the assumption of greater mismeasurement, however, positive performance effects remain (p<.05) that are relatively similar to those identified in Table 1. Mathematics performance proficiency rates are approximately 3% higher in this model than MPS, and ELA proficiency rates are approximately 4% higher.

VI. Results: Statewide

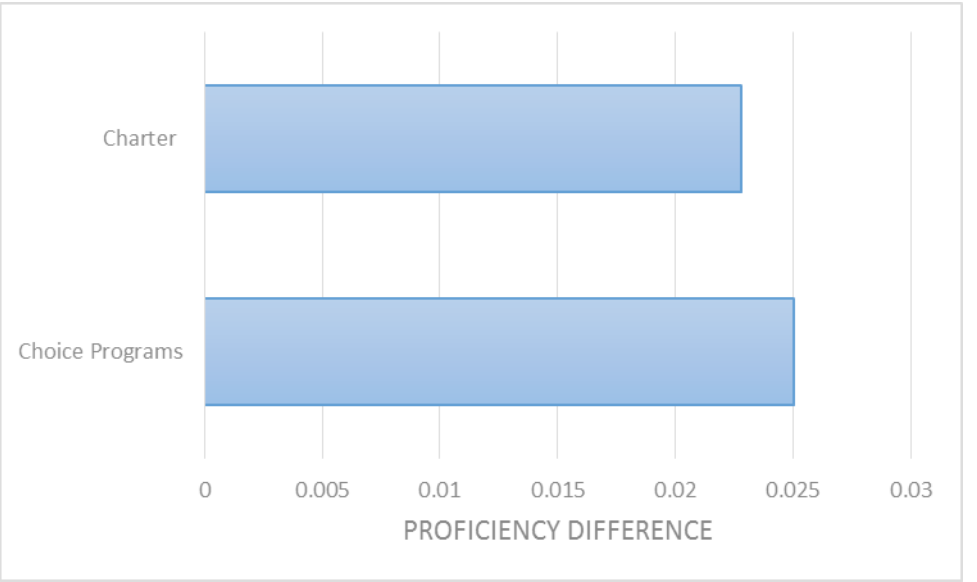
Like last year, schools with students participating in the state's choice programs show no significant performance difference from students in traditional public schools in math. However, in this year's model, we do see significant, positive associations for both the state's choice programs and charter schools in ELA.[8] Proficiency of students in choice programs was 2.5 percentage points higher than student proficiency in traditional public schools. Similarly, students in charter schools 2.28 percentage point higher rates of English proficiency (p<.05).

Table 7. Forward Exam Proficiency by Sector, Wisconsin

VARIABLES	Math Proficiency	ELA Proficiency
Choice Program	0.00532	0.0251**
	(0.0121)	(0.0113)
Charter	-0.00599	0.0228**
	(0.0109)	(0.0102)
Non-White	0.412***	0.357***
	(0.0343)	(0.0320)
Enrollment	2.00e-05**	2.05e-05**
	(1.00e-05)	(9.37e-06)
English Language Learner	0.115***	0.125***
	(0.0373)	(0.0349)
Economic Status	-0.250***	-0.334***
	(0.0263)	(0.0245)
Alternative School	-0.0195	0.00418
	(0.0172)	(0.0161)
Elementary/Secondary School	-0.0857***	-0.0531***
	(0.0158)	(0.0148)
High School	-0.142***	-0.104***
	(0.00717)	(0.00670)
Junior High School	-0.108***	-0.0677***
	(0.0264)	(0.0246)
Middle School	-0.0759***	-0.0300***
	(0.00693)	(0.00647)
Constant	0.308***	0.393***
	(0.0820)	(0.0766)
Observations	1,972	1,972
R-squared	0.781	0.775

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 4. Performance of Choice & Charter Relative to TPS-Wisconsin, ELA



Economic status and the racial composition of the school are significant factors in predicting performance across Wisconsin. Proficiency rates in a school that was 100% white would be predicted to be nearly 35.7 percentage points higher in ELA and 42 percentage points higher in mathematics than a school that was 100% minority. Similarly, a school that was entirely made up of economically disadvantaged students would be predicted to have proficiency rates over 33.4 percentage points lower in mathematics and 25.4 percentage points lower ELA.

ACT Scores

The table below shows the results across Wisconsin's parental choice programs for ACT scores. Similar to our findings last year, the performance of students utilizing Wisconsin's parental choice programs significantly exceeds the performance of students in traditional public schools.

Table 8. ACT Scores by Sector

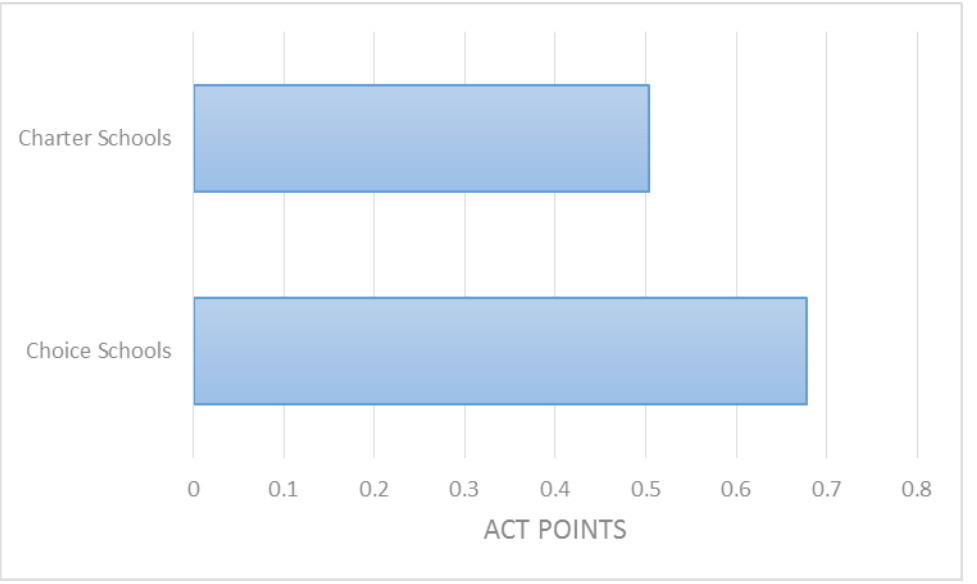
VARIABLES	Act Scores
Choice Programs	0.678**
	(0.332)
Charter Schools	0.503**
	(0.250)
Non-White	-0.454
	(0.456)
Enrollment	0.000360**
	(0.000153)
English Language Learners	-0.800
	(1.772)
Economic Status	-8.284***

	(0.509)
Alternative School	-0.212
	(0.397)
Constant	21.77***
	(0.805)
Observations	438
R-squared	0.644

Standard errors in parentheses
*** p<0.01, ** p<0.05, *p<.1

Students in choice programs score, on average, .678 points higher on the ACT controlling for other factors that are likely to affect performance on the test. Students in Wisconsin charter schools also show significantly greater performance at approximately .503 points higher relative to public schools.

Figure 5. ACT Scores by Sector Relative to Traditional Public Schools, Wisconsin



Urbanicity

Our final analysis in this portion of the paper is analyzing school performance by how urban or rural a school district is. DPI categorizes schools in the state into urban schools, suburban schools, small town schools, and rural schools. Table 9 below shows Forward Exam proficiency in each category relative to the baseline, suburban schools. Again, the same control variables are included in the analysis as in the previous tables.

Table 9. Proficiency by Urbanicity

VARIABLES	Math Proficiency	ELA Proficiency
Rural	-0.0852***	-0.0640***
	(0.00904)	(0.00789)
Urban	-0.0421***	-0.0292***
	(0.0101)	(0.00880)
Small Town	-0.0639***	-0.0527***
	(0.0100)	(0.00874)
Constant	0.552***	0.642***
	(0.0401)	(0.0351)
Observations	1,972	1,972
R-squared	0.538	0.584

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Like last year, we find that all types of school districts perform significantly worse than suburban schools. Proficiency rates in Wisconsin's rural schools are about 8 percentage points lower in ELA and 6 percentage points lower in math. The performance of rural schools is worse by a statistically significant extent in both subjects (p<.01). Small towns don't fare much better, with performance 5 percentage points lower in ELA and 6 percentage points lower in math than suburban schools.

Figure 6. Proficiency Relative to Suburban Schools by Urbanicity (Math)

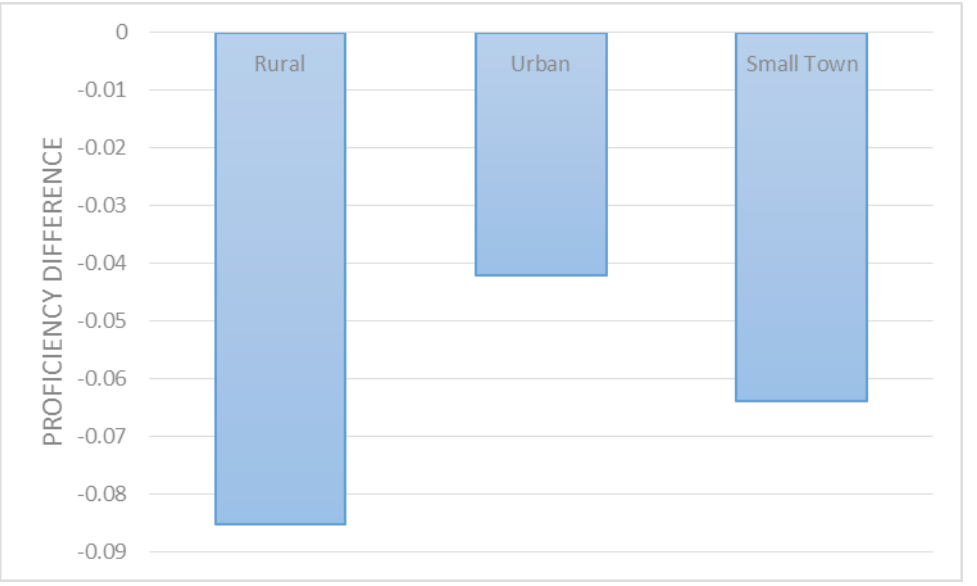
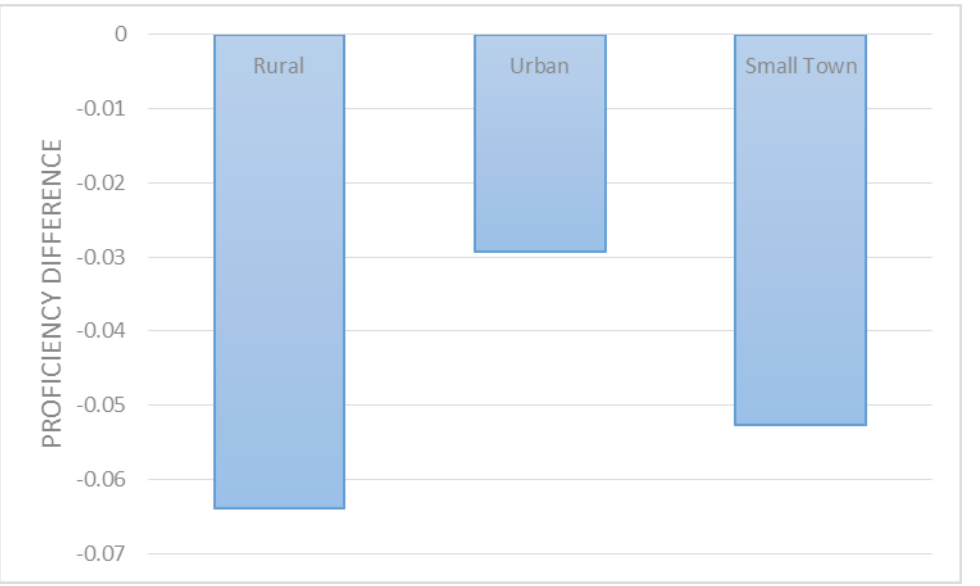


Figure 6. Proficiency Relative to Suburban Schools by Urbanicity (ELA)



VII. RANKING WISCONSIN'S SCHOOLS

The control variables that are included in our models to create a level playing field also allow us to estimate the association of each school in the state with performance. This enables the creation of an Adjusted Performance Ranking (APR) that covers most schools in the state for which I have sufficient data. The APR list will rank schools from 1 to 1,972 in terms of their achievement. This paper includes the top 20 and bottom 20 schools in the state. The full list is available on our website: will-law.org.

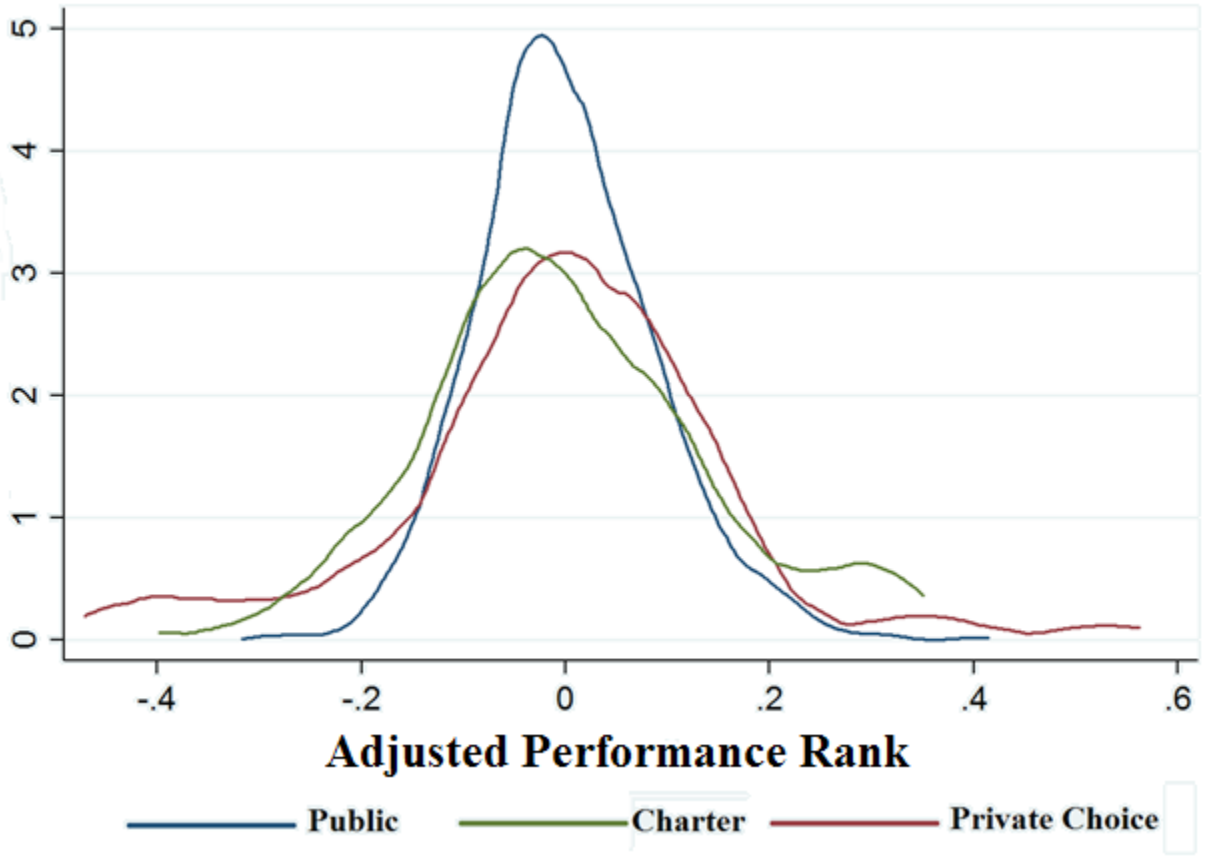
To create our APR variable, I run a model to estimate the effect of a number of control variables from our previous analysis on performance. This generates a predicted level of performance for each school, .

$$\hat{p}=\alpha+\beta_1(\text{Non-White})+\beta_2(\text{Economic Status})+\beta_3(\text{Grade Level})+\beta_4(\text{English Language Learner})+\beta_5(\text{Enrollment})+\beta_6(\text{Additional Controls})$$

Schools for which academic outcomes on the forward exam exceed their value for would be said to have a positive association with performance, while schools for which their actual Forward Exam performance is less than the model predicts would be said to have a negative association with performance. Similar work is done by the Mackinac Center for Public Policy in its ranking of high schools in Michigan.

Figure 7 depicts the density of APRs for schools by sector throughout Wisconsin. Public schools in blue are more tightly distributed about the 0 point. However, charter schools in green and choice schools in red have a lower peak – meaning there is more variation in the APR of such school.

Figure 7. Adjusted Performance Ranking by Sector



The approximate top 1% of schools in Wisconsin – twenty schools – are included in the chart below. Because proficiency is the average across both mathematics and ELA proficiency rates in the school, APR can be interpreted as the impact of the school on performance above what would be predicted based on school demographics.

Table 10. Top 1% of Schools by APR in Wisconsin

School Name	Sector	City	APR
Marquette University High	Private	Milwaukee	0.56
Divine Savior Holy Angels High	Private	Milwaukee	0.49
Leonardo da Vinci School for Gifted Learners	Public	Green Bay	0.41
Sevastopol Middle	Public	Sevatapol	0.40
Sheboygan County Christian School	Private	Sheboygan	0.36
Lighthouse Christian School	Private	Milwaukee	0.36
Accelerated Advanced Learning Program	Charter	Oshkosh	0.35
Nativity Jesuit Middle School	Private	Milwaukee	0.33
Consolidated Elementary	Public	Milton	0.33
Carmen High School of Science and Tech South	Charter	Milwaukee	0.32
Milwaukee College Prep School-- 38th St	Charter	Milwaukee	0.32

Marengo Valley Elementary	Public	Ashland	0.31
Whittier Elementary	Public	Milwaukee	0.31
Cornell Elementary	Public	Cornell	0.30
Parkview Elementary	Public	New London	0.30
Odyssey-Magellan	Charter	Appleton	0.30
Waukesha Engineering Preparatory Academy	Charter	Waukesha	0.29
Quest Charter School	Charter	Menomonee Falls	0.29
High School of Health Sciences	Charter	Wales	0.29
Milwaukee College Preparatory School-- Lloyd St	Charter	Milwaukee	0.28

One may note the high presence of Milwaukee schools across all sectors in this analysis. The factors that have the most significant impact on proficiency in our model – race, economic status, etc. – are highly prevalent in Milwaukee schools. Milwaukee schools that do an impressive job increasing the proficiency of these students receive a good amount of "credit" in the model for doing so.

The chart below contains the bottom 1% of schools in the state.

Table 11. Bottom 1% of Schools by APR in Wisconsin

School Name	Sector	City	APR
Saint Joseph Grade School	Private	Racine	-0.47
Saint Adalbert Grade School	Private	Milwaukee	-0.43
Saint Josaphat Parish School	Private	Milwaukee	-0.41
Friedens Lutheran School	Private	Kenosha	-0.40
iForward	Charter	Grantsburg	-0.40
Siloah Lutheran School	Private	Milwaukee	-0.38
New Testament Christian Academy	Private	Milwaukee	-0.34
Trinity Lutheran School WI. Synod	Private	Caledonia	-0.34
Jefferson Elementary	Public	Merrill	-0.32
Highland Community Elementary	Charter	Highland	-0.29
Rosholt Elementary	Public	Rosholt	-0.28
Concordia Lutheran School	Private	Sturtevant	-0.28
Maple Grove School	Charter	Hamburg	-0.28
Park Elementary	Public	Marinette	-0.27
Columbus Elementary	Public	Columbus	-0.27
Martin Luther High	Private	Greendale	-0.27
Rural Virtual Academy	Charter	Medford	-0.26
New Lisbon Elementary	Public	New Lisbon	-0.25
Saint Agnes Catholic Grade School	Private	Butler	-0.24
Wisconsin Virtual Academy High	Charter	McFarland	-0.24

One may also note the prevalence of choice schools in Milwaukee on this list. As mentioned in the "Measurement Error" section, a number of these schools appear to be miscounting the number of students in their school who are lower

income. For example, St. Joseph Grade School ranked as the worst in the state reports with no students from economically disadvantaged backgrounds, something that seems highly implausible for a school in Milwaukee with students receiving the voucher. This likely miscounting not only affects their ranking here, but also on the state report card. That said, we are limited by the data that is made available to us. It is our hope that this report will spur schools to better account for the economic status of their students.

Across the state, traditional public schools represent approximately 86% of schools in our sample. Charter schools represent approximately 7%, and choice schools 6%. However, choice and charter schools are overrepresented in the top 20 schools affected in the state. Choice schools represent approximately 22% of such schools, while charter schools represent nearly 43% of those schools.

That said, there is also a trend of choice and charter schools appearing near the bottom of the rankings. Choice schools represent approximately 50% of the lowest performing schools in the state, and charter schools represent about 25% of such schools. Though most choice and charter schools are indeed clustered near 0 in school effects just as public schools are, there is something of a more bi-modal distribution present with these schools than with traditional public schools.

The so called "80-80" designation has been a popular way to examine performance among schools over the past few years, particularly in Milwaukee. 80/80 schools are defined as those schools where more than 80% of students are economically disadvantaged and more than 80% of students come from minority backgrounds. The top 20 80/80 schools are listed in the table below.

All of the top and worst performing 80/80 schools are in Milwaukee. However, it is important not to read too much into this because the vast majority of such schools in the state of Wisconsin are in the Milwaukee area.

Table 12. Top 1% of 80/80 Schools by APR in Wisconsin

School Name	Sector	City	APR
Lighthouse Christian School	Private	Milwaukee	0.3574916
Nativity Jesuit Middle School	Private	Milwaukee	0.3286311
Carmen High School of Science and Technology South	Charter	Milwaukee	0.3187953
Milwaukee College Preparatory School-- 38th Street	Charter	Milwaukee	0.3179386
Milwaukee College Preparatory School-- Lloyd Street	Charter	Milwaukee	0.2826591
Pilgrim Lutheran School	Private	Milwaukee	0.1819308
Milwaukee Collegiate Academy	Charter	Milwaukee	0.1576934
Rocketship Southside Community Prep	Charter	Milwaukee	0.1561154
Atonement Lutheran School	Private	Milwaukee	0.1451182
Carmen MS/HS of Science & Tech NW	Charter	Milwaukee	0.1417698
Pratt Elementary	Public	Milwaukee	0.140181
Central City Cyberschool	Charter	Milwaukee	0.1361803
Sherman Park Lutheran School & Preschool	Private	Milwaukee	0.1281951
Veritas High	Public	Milwaukee	0.1181866
Hampton Elementary	Public	Milwaukee	0.1173535
Mount Lebanon Lutheran School	Private	Milwaukee	0.1130491
Saint Marcus Lutheran School	Private	Milwaukee	0.1087984
Kilbourne Elementary	Public	Milwaukee	0.1040729
Saint Martini Lutheran Grade School	Private	Milwaukee	0.1014189
Notre Dame School of Milwaukee	Private	Milwaukee	0.1013475

A number of other breakdowns, including by sector, urbanicity, and several cities are included in the appendix to this paper.

Figure 8. Distribution of All Wisconsin Schools

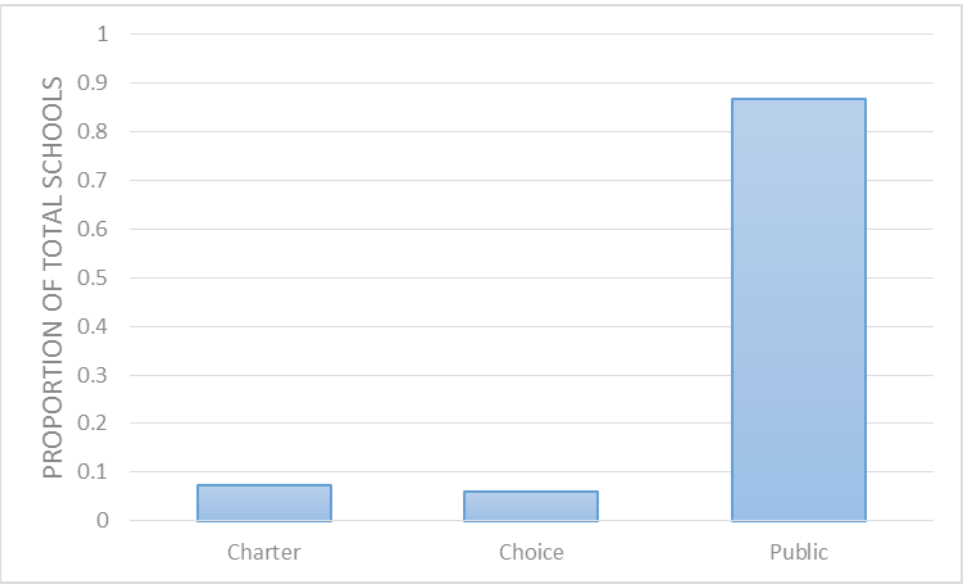


Figure 9. Distribution of Top 1% of Wisconsin Schools by APR

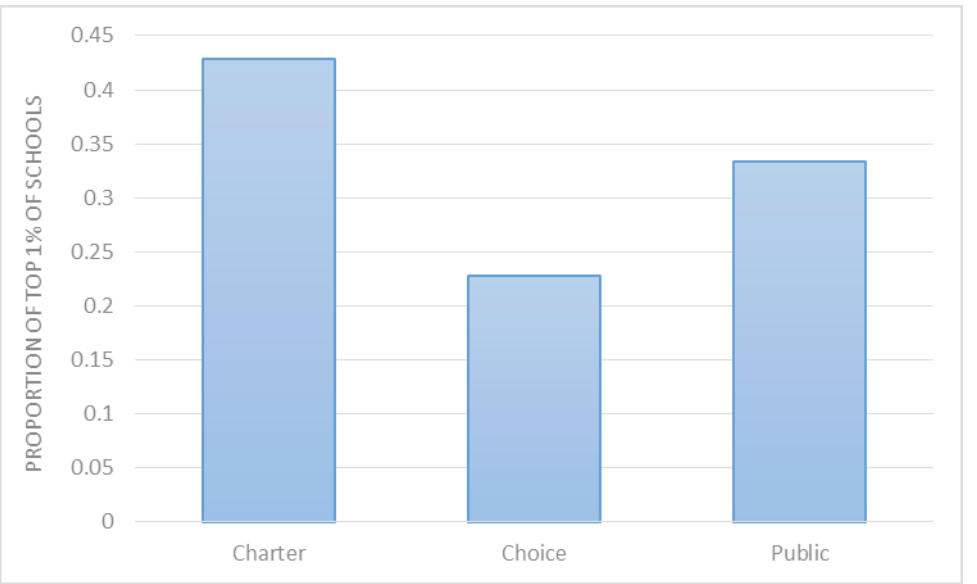
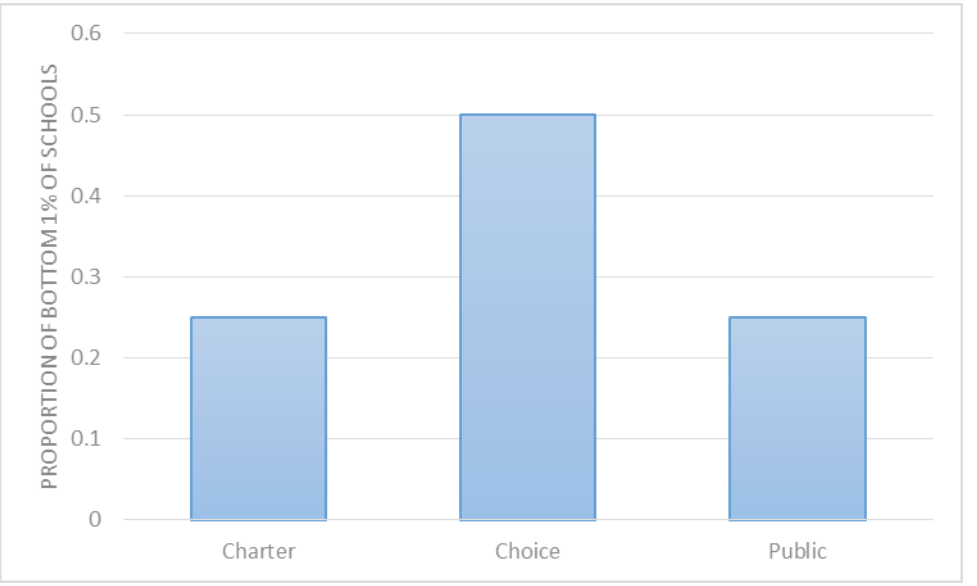


Figure 10. Distribution of Bottom 1% of Wisconsin Schools by APR



VIII. CONCLUSIONS

Making fair comparisons across sectors in Wisconsin schools is an important challenge for policymakers and scholars. Different schools serve different types of families and comparisons of raw data can't separate out the effect schools have on students from these underlying differences.

Once again, this paper has attempted to make the best apples-to-apples comparisons given the available data. We find, once again, that choice and charter schools are outperforming their public-school peers in Wisconsin. Using both Forward Exam and ACT data, I find that school choice is producing tangible benefits to students and families across Wisconsin. Policymakers should work to expand access to these high-performing schools by raising income limits and lifting the caps on enrollment into the statewide parental choice program. That said, our "School Effects" data shows that problems remain across all sectors. There are any number of schools that not only suffer from low levels of proficiency, but that do even worse than would be predicted given their demographics.

Appendix

This appendix table shows the state proficiency associations of the voucher program in the absence of fixed effects for city. Without the inclusion of these fixed effects, we observe little significant difference between choice schools and traditional public schools with the exception of a small, significant benefit for charters in ELA. However, the model included in the text of the paper is likely preferable given the significantly higher R^2.

Table A1. Proficiency by Sector without Fixed Effects

VARIABLES	ELA Proficiency	Math Proficiency
Choice Programs	0.0120	-0.00421
	(0.0117)	(0.0126)
Charter Schools	0.0169*	-0.0106
	(0.00962)	(0.0104)
White	0.118***	0.178***
	(0.0153)	(0.0166)
Enrollment	3.47e-05***	4.81e-05***
	(8.70e-06)	(9.39e-06)
English Language Learners	0.0292	0.0562*
	(0.0310)	(0.0335)
Economic Status	-0.458***	-0.432***
	(0.0160)	(0.0172)
Alternative School	-0.00168	-0.0206
	(0.0153)	(0.0165)
Elementary/Secondary	-0.0634***	-0.0992***
	(0.0149)	(0.0161)
High School	-0.125***	-0.170***
	(0.00643)	(0.00695)
Junior High School	-0.0869***	-0.129***
	(0.0232)	(0.0250)
Middle School	-0.0436***	-0.0860***
	(0.00661)	(0.00714)
Constant	0.545***	0.534***
	(0.0279)	(0.0302)
Observations	1,972	1,972
R-squared	0.630	0.634

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A2. APR by Sector

Private Voucher Schools	Charter Schools	Public Schools
Marquette University High	Accelerated Advanced Learning Program	Leonardo da Vinci School for Gifted Learners
Divine Savior Holy Angels High	Carmen High School of Science and Technology S	Sevastopol Middle
Sheboygan County Christian School	Milwaukee College Preparatory School-- 38th Street	Consolidated Elementary
Lighthouse Christian School	Whittier Elementary	Marengo Valley Elementary
Nativity Jesuit Middle School	Odyssey-Magellan	Cornell Elementary
Saint Thomas More High School	Waukesha Engineering Preparatory Academy	Parkview Elementary
Waukesha Catholic School System Inc	Quest Charter School	North Shore Middle
Eastbrook Academy	High School of Health Sciences	Kennedy Elementary
Pilgrim Lutheran School	Milwaukee College Preparatory School-- Lloyd Street	Bluff View Elementary
Garden Homes Lutheran School	Tesla Engineering Charter School	Lebanon Elementary
Wisconsin Lutheran High School	Renaissance School	Roosevelt Elementary
Atonement Lutheran School	Wauwatosa STEM	Sullivan Elementary
Fox Valley Lutheran High	Catalyst Charter Middle	Cedarburg High
Shoreland Lutheran High	Brompton School	Magee Elementary
Rock County Christian School	Wausau Engineering and Global Lead.Acad.	Iron River Elementary
Rock County Christ. Sch.- Janesville	Dimensions of Learning Academy	Gibraltar Elementary
Kettle Moraine Lutheran High	NorthStar Community Charter School	Redgranite Elementary
Sherman Park Lutheran School	Milwaukee Collegiate Academy	Shorewood Hills Elementary
Salam School	Rocketship Southside Community Prep	Kohler High
Mount Lebanon Lutheran School	Innovations STEM Academy	Gillett Middle
Saint Marcus Lutheran School	ACE Alliance Charter Elementary	Cassville Elementary

Table A3. APR, Selected Cities

Appleton	Beloit	Eau Claire	Green Bay
Odyssey-Magellan	Hackett Elementary	Flynn Elementary	Leonardo da Vinci School
Tesla Engineering Charter	Converse Elementary	Longfellow Elementary	Chappell Elementary
Renaissance School	Fran Fruzen	Memorial High	Tank Elementary
West High	McNeel Intermediate	Meadowview Elementary	McAuliffe Elementary
Valley New School	Robinson Elementary	Robbins Elementary	Jackson Elementary
Classical School	Aldrich Intermediate	Lakeshore Elementary	Keller Elementary
North High	Merrill Elementary	Northwoods Elementary	Fort Howard Elementary
Jefferson Elementary	Cunningham Int.	Locust Lane Elementary	Lincoln Elementary
Horizons Elementary	Memorial High	Davey Elementary	Red Smith K-8
Berry Elementary	Todd Elementary	Manz Elementary	MacArthur Elementary
McKinley Elementary	Gaston Elementary	Chippewa Valley Mont.	West High
Richmond Elementary		Northstar Middle	East High
Wisconsin Conn. Acad.		North High	Preble High
Lincoln Elementary		Sherman Elementary	Southwest High
Highlands Elementary		Roosevelt Elementary	Baird Elementary
East High		South Middle	Doty Elementary
Wilson Middle		Putnam Heights Elementary	Wequiock Elementary
Madison Middle			Jefferson Elementary
Appleton Public Montessori			Danz Elementary

Table A3 Cont'd. APR, Selected Cities

Kenosha	La Crosse	Madison	Milwaukee
Roosevelt Elementary	Logan High	Shorewood Hills Ele.	Marquette University High
Brompton School	Lincoln Middle	Memorial High	Divine Savior Holy Angels
Dimensions of Learning Academy	Summit Environmental School	West High	Nativity Jesuit Middle
Grewenow Elementary	Hamilton Early Learning Cen.	Marquette Elementary	Carmen HS of Science & Tech South
Kenosha School of Tech. Adv. Cur.	La Crosse Design Institute	East High	Milwaukee College Prep-38th St
Edward Bain School- Dual Language	Emerson Elementary	Van Hise Elementary	Whittier Elementary
Somers Elementary	Central High	Hamilton Middle	Milwaukee College Prep-Lloyd
Grant Elementary	Longfellow Middle	O'Keeffe Middle	St Thomas More High
Prairie Lane Elementary	Spence Elementary	James Wright Middle	Golda Meir School
Bullen Middle	North Woods Internat. School	Randall Elementary	Bayside Middle
Mahone Middle	School of Tech. & Arts II	Thoreau Elementary	Eastbrook Academy
Washington Middle	Hintgen Elementary	Elvehjem Elementary	Garden Homes Lutheran
Pleasant Prairie Elementary	State Road Elementary	Cherokee Heights Middle	Wisconsin Lutheran High
Brass Community School	Southern Bluffs Elementary	Stephens Elementary	Reagan College Prep High
Nash Elementary	Coulee Montessori Chart. Sch.	Sherman Middle	Stormoth Elementary
Southport Elementary	Logan Middle	Cesar Chavez Elementary	Milwaukee Collegiate Acad.
Forest Park Elementary	Northside Elementary	Jefferson Middle	Rocketship Southside Com. Prep.
Stocker Elementary		Black Hawk Middle	Atonement Lutheran School
Frank Elementary		Emerson Elementary	Carmen MS/HS of Science & Tech NW
Jeffery Elementary		LaFollette High	Pratt Elementary

Table A3 Cont'd. APR, Selected Cities

Racine	Stevens Point	Wausau	Wisconsin Rapids
Walden III High	McDill Elementary	Wausau Engineering & Global Lead. Acad.	THINK Academy
Janes Elementary	Ban.ch Elementary	Thomas Jefferson Elementary	Washington Elementary
Fine Arts Elementary	P J Jacobs Junior High	Rib Mountain Elementary	Woodside Elementary
Walden III Middle	McKinley Center	Horace Mann Middle	Mead Elementary Charter School
Wadewitz Elementary	Jefferson Elementary	West High	Howe Elementary
Fratt Elementary	Kennedy Elementary	John Muir Middle	Vesper Community Academy
Red Apple Elementary	Washington Elementary	Stettin Elementary	East Junior High
Julian Thomas Elementary	Madison Elementary	John Marshall Elementary	Grant Elementary
Jones Elementary	Benjamin Franklin Jr. High	Lincoln Elementary	Lincoln High
Case High	Roosevelt Elementary	Maine Elementary	Grove Elementary
Roosevelt Elementary	Stevens Point Area Sen. High	Grant Elementary	
McKinley Middle	Point of Discovery School	East High	
Park High		Hawthorn Hills Elementary	
Racine Civil Leaders Acad.		South Mountain Elementary	
Goodland Elementary		Franklin Elementary	
Johnson Elementary		Enrich Excel Achieve Learning Academy	
Horlick High		Riverview Elementary	
Knapp Elementary		G D Jones Elementary	
Giese Elementary		Hewitt-Texas Elementary	
West Ridge Elementary		Wausau Area Montessori Charter School	

Table A4 APR by Urbanicity

Please note that school choice schools cannot appear in this chart because information on urbanicity is not gathered by DPI for those schools.

Rural	Urban	Suburban
Sevastopol Middle	Leonardo da Vinci School for Gifted Learners	High School of Health Sciences
Consolidated Elementary	Accelerated Advanced Learning Program	North Shore Middle
Marengo Valley Elementary	Carmen High School of Science and Tech S	Cedarburg High
Cornell Elementary	Milwaukee College Preparatory School-- 38th Street	Magee Elementary
Parkview Elementary	Whittier Elementary	Shorewood Hills Elementary
Quest Charter School	Odyssey-Magellan	Kohler High
Bluff View Elementary	Waukesha Engineering Preparatory Academy	Wauwatosa STEM
Lebanon Elementary	Milwaukee College Preparatory School-- Lloyd Street	College Park Elementary
Sullivan Elementary	Kennedy Elementary	Willow Glen Primary School
Iron River Elementary	Tesla Engineering Charter School	Saukville Elementary
Gibraltar Elementary	Roosevelt Elementary	Northside Elementary
Redgranite Elementary	Renaissance School	Roosevelt Elementary
Gillett Middle	Jefferson Elementary	Foxview Intermediate
Cassville Elementary	Golda Meir School	McLane Elementary
Pembine High	Memorial High	Lincoln Elementary
Lyndon Station Elementary	Reagan College Preparatory High	Bayside Middle
Bangor Elementary	West High	Whitefish Bay High
Sevastopol Elementary	Sabish Middle	Eisenhower Middle/High
Platteville High	Milwaukee Collegiate Academy	Brompton School
Phillips High	Cooper Elementary	Nicolet High

Table A3. MPS Specialty Schools and Admission Requirements

School Name	Admission Requirement Identified	School Name	Admission Requirement Identified
King IB HS	Early Admissions Process	Maryland Ave Montessori	Previous Montessori experience
Meir School	Early Admissions Process	Morse MS	More than general MPS application
MKE HS-arts	Early Admissions Process	New School	Students must have HS 10 credits
Hayes Bilingual	K-1 only, previous language experience 2-5		
MKE French Immersion School	K-1 only, previous language experience 2-5		
MKE German Immersion School	K-1 only, previous language experience 2-5		
MKE Spanish Immersion	K-1 only, previous language experience 2-5		
Bradley Tech	More than general MPS		
School of Languages	More than general MPS application		
Audubon HS	More than general MPS application		
Elm Creative Arts	Parents must pay fees for art experiences		
Barbee Montessori	Previous Montessori experience		
Craig Montessori	Previous Montessori experience		
Fernwood Montessori	Previous Montessori experience		
MacDowell Montessori	Previous Montessori experience		

Endnotes

1 In most Wisconsin school districts, economic disadvantage is defined as whether or not the student utilizes free or reduced lunch. However, some school districts in the state have universal free lunch. In these districts, an alternative measure of economic status is utilized.

2 In previous years, ACT score analysis would lead to important concerns about selection bias. However, the mandated universal participation in the exam now makes it an appropriate measure of high school performance. In each of the analyses that follow, I control for many factors that could account for differences in student achievement other than school sector.

3 The income limit for the WPCP has subsequently been raised to 220% of the poverty limit.

4 The exact extent of the problem with measurement of economic status is unclear. 15 schools report rates of economic disadvantage under 20%.

5 A list of MPS Specialty schools, along with their admission requirements, is included in Appendix Table A2.

6 The only significant change is that district charters are no longer significantly different from the baseline.

7 This conversion resulted in a disability rate exceeding 100% for one school. This number was adjusted downward to plausibility.

8 The associations seen here are somewhat dependent on the choice of city-level fixed effects. An alternative model that does not include these fixed effects is found in Appendix Table A1, and shows choice and charter schools having no association with outcomes. The R^2 is significantly higher in the fixed effects model, however, suggesting that it is the preferable choice.

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