



RESEARCH REPORT

# Student Enrollment in the First Two Cohorts of Partnership Schools

Samantha Cullum, *University of Pennsylvania*

Erica Harbatkin, *Florida State University*

Katharine O. Strunk, *University of Pennsylvania*

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## INTRODUCTION

Declining public school enrollment during the COVID-19 pandemic has sounded alarms across the country and in Michigan in particular (Bacher-Hicks et al., 2023; Dee & Murphy, 2021; Musaddiq et al., 2022). A recent study found that the Michigan public school system lost 40,000 students in fall 2020—a 3.2% decline overall that was felt even more substantially in the kindergarten cohort, which experienced an 11% decrease. Findings from other researchers showed that enrollment had partially but not entirely rebounded by fall 2021 (Bacher-Hicks et al., 2023),<sup>1</sup> and the Michigan Department of Education (MDE) reported continued growth into 2022-23 (Ackley, 2022). Some national evidence points to especially large enrollment declines among socioeconomically disadvantaged and Black students, respectively (Chatterji & Li, 2021). Economically disadvantaged students in particular are more likely to contend with housing insecurity and homelessness (Cowen, 2017; De Gregorio et al., 2022), which is associated with high student mobility and may have exacerbated school enrollment and attendance challenges during the pandemic. However, research based in Michigan has found that enrollment losses were less pronounced among low-income students, particularly in fall 2021 (Bacher-Hicks et al., 2023), suggesting MDE's efforts to engage these students and their families has demonstrated some success in the aggregate. It is therefore unclear whether we might expect enrollment declines to have been more or less prevalent in Partnership schools and districts, which serve a disproportionate share of both Michigan's economically disadvantaged students and Black students. This report provides Michigan enrollment figures drawing on data through 2022-23 in order to fill that gap in knowledge.

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Enrollment declines matter for at least four reasons. First, we do not know where students who never enrolled in public schools received their education. While there is evidence of a proliferation of homeschooling during the COVID-19 pandemic (Bacher-Hicks et al., 2023; Dee, 2023; Musaddiq et al., 2022; Roy & Nguyen-Hoang, 2022), our earlier research showed that students in Partnership districts took on a heavy share of new childcare responsibilities—which could have undermined academic learning even in the case of homeschooling (Harbatkin et al., 2023a; Strunk et al., 2021). Additionally, the largest enrollment declines have been in pre-K and in kindergarten (Bacher-Hicks et al., 2023; Schueler & Miller, 2023), which is not compulsory in Michigan. While it is possible to track older students out of the public school system, little is known about what happened to the youngest students who never enrolled in public school to begin with.<sup>2</sup>

Second, enrollment losses that outpace population declines raise concern about interrupted learning. As students who left (or never enrolled in) school during the COVID-19 pandemic return to the public education system, educators will be tasked with academically and socioemotionally supporting those students—including those who attended schooling of unknown quality outside of the public school system. The challenges associated with providing those supports have implications for teaching and learning for years to come.

Third, enrollment declines can also emerge from inter-school and district mobility. Switching schools and districts can disrupt a student's education and already occurs more frequently among students from lower income backgrounds such as those served by Partnership schools and districts (Rumberger, 2003). We focus on this report on enrollment and not mobility because our econometric analyses do not find meaningful and significant differences in student mobility between Partnership and similarly-low-performing schools after the pandemic's onset.<sup>3</sup>

Finally, federal and state funding are tied to enrollment—and this is especially important in Partnership districts, which rely heavily on these funds (Strunk et al., 2021). To the extent pandemic-era enrollment declines persist into future years, Partnership schools and districts will lose formula funding. Because funding is critical to student outcomes (see, e.g., Jackson, 2020), previous progress toward school improvement could be in jeopardy.

In this report, we examine enrollment in the first two cohorts of Partnership schools and districts relative to other schools statewide over a 10-year period from prior to the COVID-19 pandemic through fall 2022. We examine these trends overall and for the youngest students, who reached school age during the height of the COVID-19 pandemic.

## BACKGROUND

The goal of the Partnership model is to improve student outcomes in low-performing schools by building the capacity of the districts or charter organizations that run them. The first round of Partnership schools was identified in spring 2017 and began implementation in the 2017-18 school year. Round 1 schools were selected for improvement because they had been identified as Priority schools, meaning they were in the bottom 5% of schools on Michigan's Top-to-Bottom index for three consecutive years from 2013-14 through 2015-16. These schools faced closure threats for several years leading up to Partnership, but threats were suspended when they agreed to enter Partnership status. Thus, Partnership lessened existing accountability measures for Round 1 schools and there is reason to believe it could have curtailed enrollment declines driven by previous fears of closure.

The second Partnership round was identified in fall 2017 and began implementation in 2018-19. The Michigan Department of Education (MDE) selected schools for Round 2 if they were low performing in 2015-16 and experienced continued low achievement in 2016-17. The third round was identified in spring 2018 and also started implementation in 2018-19. These schools were the bottom 5% of schools on the state’s Every Student Succeeds Act (ESSA) index system that was first released based on data from the 2017-18 school year. Unlike Round 1 schools, rounds 2 and 3 of Partnership schools were not at risk of closure due to low performance leading up to their Partnership designation. Therefore, any enrollment changes that preceded Partnership identification are unlikely to be associated with state or federal accountability systems.

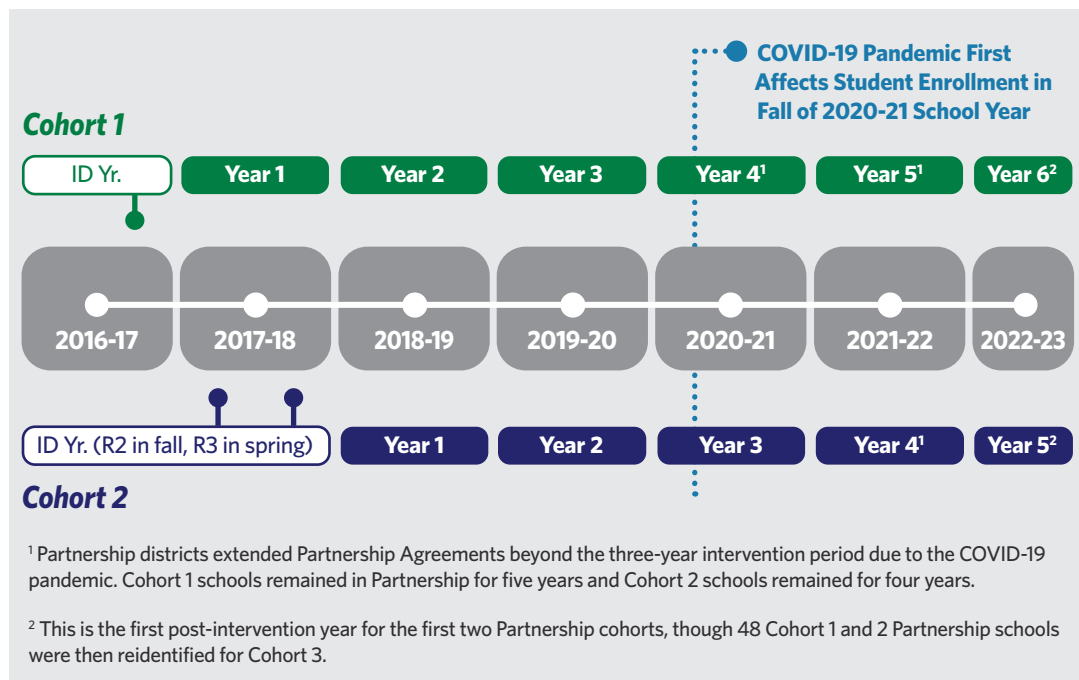
We examine these three identification rounds as part of two implementation cohorts, referring to Round 1 as Cohort 1 and rounds 2 and 3 together as Cohort 2 because they implemented on the same timeline.

## SAMPLE, DATA, AND METHODS

### Sample and Data

For this report, we draw on school-level enrollment data from the Michigan Education Data Center (MEDC) for 10 years from 2013-14 through fall 2022. We restrict the sample to 3,105 unique schools open for the full time period, including 106 Partnership schools and 113 near-selected comparison schools.<sup>4</sup> In total, our analyses include 31,050 school-year observations. Because we use fall semester numbers, the first COVID-19 pandemic-affected school year is 2020-21, which coincides with fall 2020 enrollment. Because Partnership districts extended their Partnership Agreements due to the COVID-19 pandemic, fall 2022 marks the first post-intervention year for the first two Partnership cohorts—though 48 Cohort 1 and 2 Partnership schools were then reidentified for Cohort 3.

**FIGURE 1. Partnership Identification and Implementation Timeline**



Throughout our analyses, we are interested in five groups of schools. These are the two cohorts of Partnership schools, non-Partnership schools in Partnership districts, a group of near-selected comparison schools, and all other schools in the state. The near-selected comparison schools are those that just missed being identified for Partnership due to 2016-17 or 2017-18 performance that was slightly higher than Partnership school performance.

In sum, the two cohorts of Partnership schools are among the state's most historically underserved, lowest performing schools; non-Partnership schools in Partnership districts tend to be relatively low performing though not as disadvantaged as Partnership schools; and comparison schools are relatively low performing but did not qualify for state intervention. The all other schools group comprises the rest of the state and therefore is on average higher performing and historically more well-resourced than each of the first four groups.

We operationalize enrollment as total (or, in some cases, grade-level) enrollment in our descriptive analyses and then use logged enrollment in our econometric analyses as described later. We also draw on variables representing student race/ethnicity, gender, economic disadvantage, English learner status, and special education status. Where relevant, we collapse these variables to the school-by-year level to control for school demographics.

## Methods

We begin with a descriptive analysis of enrollment over time. We display enrollment as a share of fall 2013 enrollment to enable a straightforward comparison across time and school subgroups. We show the enrollment of all schools by Partnership condition (i.e., Cohort 1, Cohort 2, comparison, non-Partnership schools in Partnership districts, and all other schools) and then show enrollment by grade-level band. In this report, we present grade-level enrollment in kindergarten, first grade, and second grade because these grade levels were most affected by the COVID-19 pandemic. In a secondary analysis, we also show post-pandemic onset early-grade enrollment as a share of 2019 enrollment to compare it with the last pre-pandemic year.

Next, we estimate event study models to examine the effects of Partnership on enrollment.<sup>5</sup> Because we log enrollment, the coefficient estimates can be interpreted as approximately the percent change in enrollment attributable to Partnership. For example, we would interpret a coefficient estimate of +0.05 as a 5% enrollment *increase* and a coefficient estimate of -0.05 as a 5% enrollment *decrease* from pre-intervention trends relative to comparison schools.<sup>6</sup>

We present event study plots showing estimated effects for each cohort of Partnership schools, respectively, in each year. In these plots, the vertical axis represents the coefficient estimate and the horizontal axis represents the year relative to the cohort's identification year. The school year is included in the relevant cohort's color (green for Cohort 1 and blue for Cohort 2) beneath the implementation year. The markers denote the coefficient estimate and the spikes show the upper and lower bounds of the 95% confidence interval around that estimate. When the spikes intersect with the horizontal zero line, we cannot say with 95% confidence that the estimate is statistically different from zero. When both the upper and lower bounds are above the zero line, the estimate is statistically significant and positive. When both the upper and lower bounds are below the zero line, the estimate is statistically significant and negative.



We show pre- and post-implementation estimates. For post-implementation estimates to be interpreted as plausibly causal effects of Partnership, the pre-intervention estimates should not be statistically significant. Evidence for this is reflected in the pre-intervention estimates on the plots (all confidence intervals should intersect with the zero line) and in the regression results tables in Appendix table B-1.

## FINDINGS

### Finding One: The COVID-19 Pandemic Did Not Appear to Adversely Affect Total Enrollment in Partnership Schools

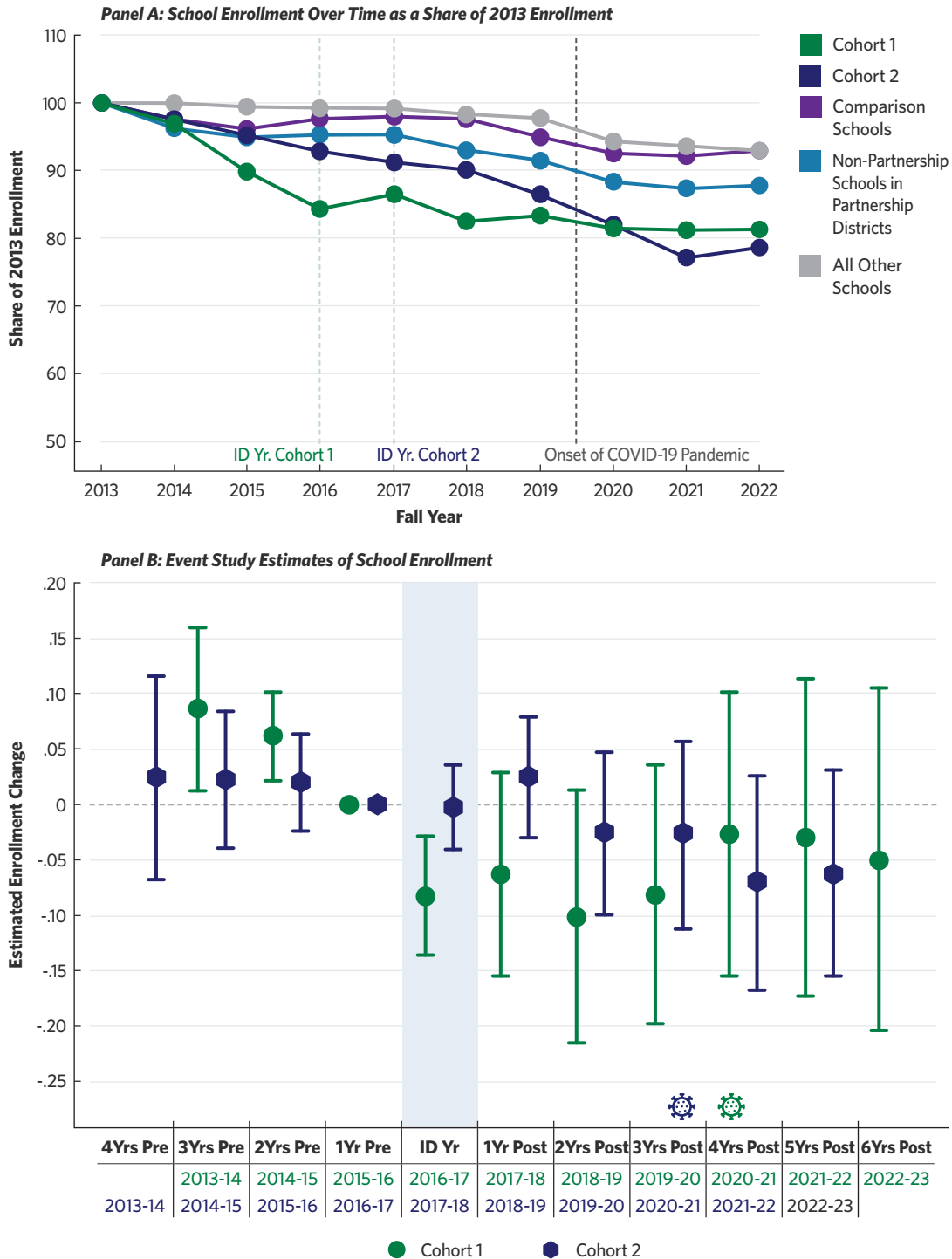
Figure 2 shows long-term trends in overall student enrollment in Partnership and other schools. Panel A provides unadjusted trends and Panel B shows the effect of Partnership on enrollment, relative to similarly low-performing comparison schools. More specifically, Panel A displays descriptive enrollment figures from fall 2013 through fall 2022 separately for both cohorts of Partnership schools, low-performing comparison schools, non-Partnership schools in Partnership districts, and all other schools not included in one of these prior groups. Panel B provides event study estimates for the two cohorts of Partnership schools relative to the group of similarly low-performing comparison schools shown in purple in Panel A.

It is evident from Panel A that enrollment has been declining statewide since 2013, with the steepest declines in the two cohorts of Partnership schools. Panel A also highlights that while the COVID-19 pandemic had a clear effect on statewide enrollment in fall 2020, as shown in other recent research (Bacher-Hicks et al., 2023; Musaddiq et al., 2022), its effect appeared to be less acute on average in Partnership schools, which largely followed pre-pandemic trends.

In fall 2022, Cohort 2 enrollment ticked upward for the first time in our 10-year panel, while Cohort 1 enrollment remained flat for a second straight year. This suggests that on average, the COVID-19 pandemic did not appear to substantially weaken total Partnership school enrollment—which was already declining at a faster rate than the rest of the state—and that Cohort 2 enrollment may in fact be rebounding after a long period of decline.

Panel B explicitly accounts for the longer-term enrollment trends by comparing changes in Partnership school enrollment with changes in near-selected comparison schools. Before focusing on the effect estimates, represented by the markers and spikes to the right of the vertical shaded region, it is useful to examine the pretreatment trends to its left. In Cohort 2, the estimates are close to zero and the confidence intervals intersect with the horizontal zero line, providing evidence that pretreatment trends here meet the model's necessary identifying assumption. Cohort 1, on the other hand, had higher enrollment than comparison schools in the pre-identification years relative to the omitted reference year and significantly lower enrollment in the identification year. Cohort 1 estimates should therefore be interpreted with caution; decreases could simply represent a continuing trend while increases could represent a return to long-run patterns of enrollment. However, we believe these estimates increase understanding of larger patterns.

**FIGURE 2. Overall Enrollment in Partnership Schools, Districts, and Comparisons Over Time**



Note: Sample restricted to schools that were open for all 10 years of the observed period. In Panel A, markers denote share of fall 2013 student enrollment by year. In Panel B, markers denote coefficient estimates on Year x Partnership indicators and spikes represent 95% confidence intervals. Because enrollment outcome is logged, Panel B's y-axis can be interpreted as the approximate proportion change in enrollment (e.g., 0.05 represents a 5% increase from pre-intervention trends relative to comparison schools and -0.05 represents a 5% decrease). COVID-19 markers along x-axis denote the first pandemic-affected enrollment year for each cohort (i.e., 2020-21, or "3Yrs Post" for Cohort 2 and "4Yrs Post" for Cohort 1).



Turning to the effect estimates, we do not observe effects of Partnership on total enrollment either before or after the onset of the COVID-19 pandemic. In other words, though enrollment declined in Cohort 2 during the intervention, those changes were not significantly different from post-intervention changes in the comparison group, controlling for school covariates. Still, the steady decline in Cohort 2 enrollment during Partnership raises potential concern about future enrollment, and it remains to be seen whether the most recent year uptick marks the beginning of a true reversal or a one-year bump.

Cohort 1, meanwhile, reversed a pre-identification trend of falling enrollment. After experiencing declining enrollment in each of the years leading up to Partnership implementation, Cohort 1 schools fared similarly to comparison schools in 2022 and in every year of the intervention, which may stem from several factors. First, with encouragement from the Office of Partnership Districts and support from state liaisons, Partnership schools used state-provided 21h funds toward family engagement strategies and attendance agents, which may have helped retain students. Second, state Partnership liaisons have supported districts in employing the Early Warning Intervention and Monitoring System to support dropout prevention. Third, Partnership districts have worked to increase awareness about the importance of kindergarten among families of kindergarten-age students, which may have bolstered initial enrollment among the youngest students. Finally, the reduced threat of closure that came with Partnership may have brought students back into Cohort 1 schools. This policy change—following multiple years of closure threats—may have alleviated previous pressure on families to find alternative schooling options.

### Finding Two: Kindergarten Enrollment Rebounded More Slowly in Partnership Schools Than Elsewhere in the State

Closer examination of the youngest grades highlights that, consistent with other research, early COVID-19 pandemic enrollment declines occurred largely in kindergarten—and this was particularly the case in Partnership schools. Figure 3, Panel A, shows that kindergarten enrollment plummeted statewide in fall 2020, the first pandemic-affected enrollment year, and that declines were sharpest among Partnership schools. Cohort 1 schools dropped the most, with kindergarten enrollment tumbling from nearly 100% of 2013 numbers in fall 2019 to just 60% in fall 2020. Put another way, the 2019 entering kindergarten class enrolled 1,077 students across all Cohort 1 Partnership schools, while the 2020 entering kindergarten class enrolled only 653 students. That means as many as 424 students who were expected to enter kindergarten during the COVID-19 pandemic did not do so.

However, in each of the past two years, kindergarten enrollment began to rebound, which may reflect delayed enrollment, academic redshirting (holding children back for a year before putting them in kindergarten), or a combination of both. Cohort 1 schools were enrolling about

**Kindergarten enrollment continued to climb in both cohorts of Partnership schools while stabilizing in the rest of the state.**

80% of their fall 2013 kindergarten figures by fall 2021 and about 90% by fall 2022. Cohort 2 schools went from about 65% in 2020 to 76% in 2021 to 80% in 2022. In 2022, kindergarten enrollment continued to climb in both cohorts of Partnership schools while stabilizing in the rest of the state.

Though this continuing kindergarten enrollment growth is promising for Partnership schools, it also reflects Partnership schools' especially stark COVID-19 pandemic enrollment losses. Specifically, Partnership school kindergarten enrollment decreased by 40% in Cohort 1 and 29% in Cohort 2 from fall 2019 to fall 2020. This was a larger drop than in comparison schools and non-Partnership schools in Partnership districts, where kindergarten enrollment declined by about 19%, and steeper still than the all other schools category where enrollment declined by about 11%.

In sum, the lowest performing, highest needs schools (including comparison schools and non-Partnership schools in Partnership districts) experienced steeper COVID-19 pandemic kindergarten enrollment declines than more affluent schools—and declines in Partnership schools were the steepest. Over the two-year period from 2021-22 to 2022-23, kindergarten-age students returned to Partnership and other low-performing schools. Still, kindergarten enrollment throughout the state continued to lag behind pre-pandemic levels and Partnership schools were no exception.

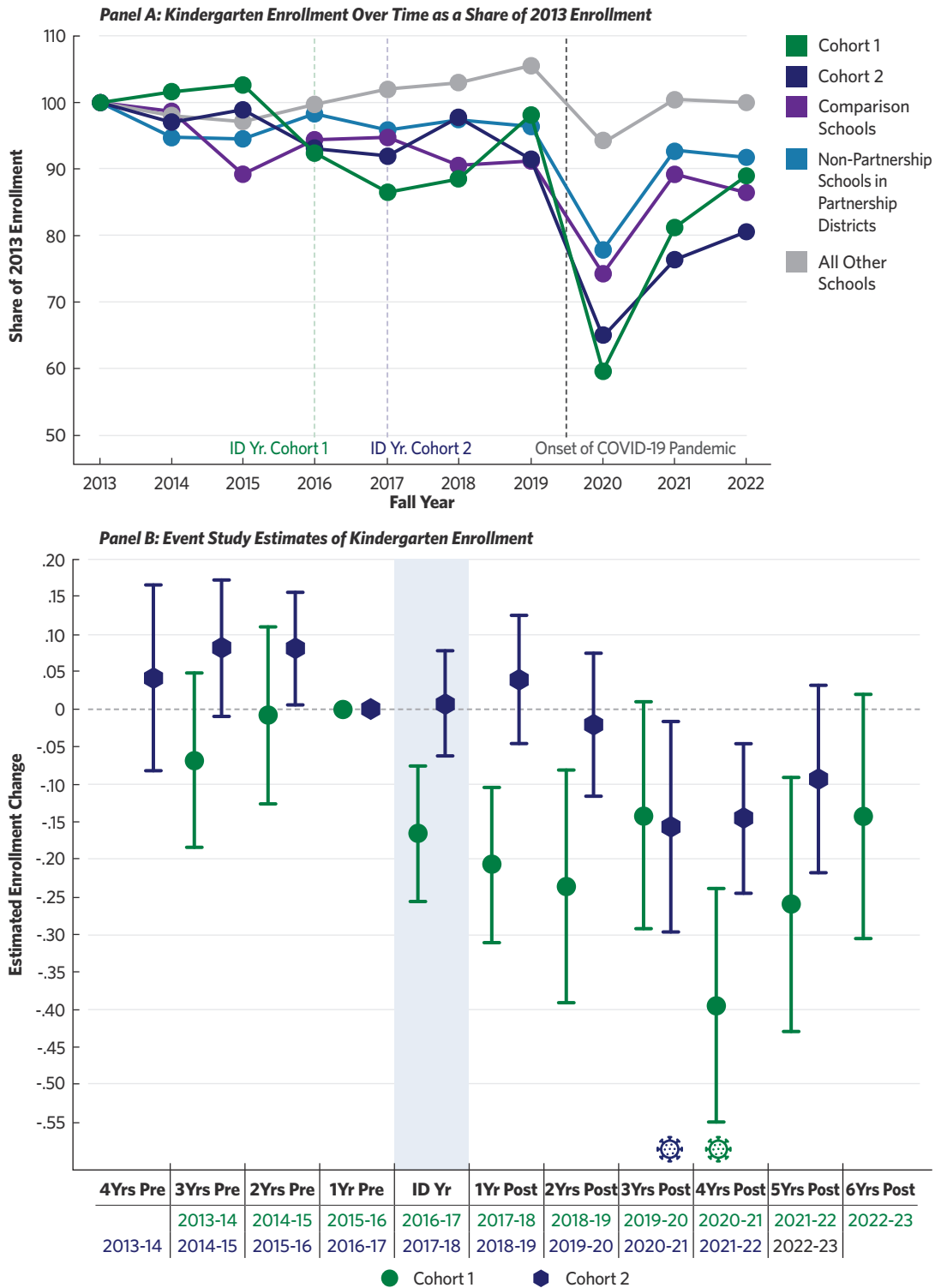
Panel B provides event study findings for kindergarten enrollment to compare Partnership with similarly low-performing comparison schools. In parallel to the descriptive findings in Panel A, Cohort 1 kindergarten enrollment dropped sharply relative to comparison schools after the COVID-19 pandemic's onset, followed by a steady rebound.<sup>7</sup> By fall 2022, Cohort 1 schools had kindergarten enrollment that was descriptively about 13% lower than comparison schools relative to pre-Partnership trends, though the difference was not statistically significant. Cohort 2, on the other hand, experienced a smaller drop in 2020 followed by a more muted recovery. By fall 2022, enrollment was about 9% lower in Cohort 2 than comparison schools, though again the difference was not statistically significant.

Together, these findings show that kindergarten enrollment fell at the start of the COVID-19 pandemic throughout the state, and Partnership schools took the greatest hit. By fall 2022, statewide kindergarten enrollment had approached but not fully rebounded to pre-pandemic levels and Partnership school enrollment recovery lagged just behind other low-performing schools in the state.

These findings have implications for state and federal funding because schools lose funding when they lose students. This may be an especially salient issue for Cohort 1 and 2 Partnership schools that exited Partnership after the 2021-22 school year and lost the additional school improvement funds that came with their Partnership designation.

Additionally, the initial enrollment losses—even as students return to public schools—can have lasting implications for the students entering the public school system and the educators responsible for supporting them. To understand the scope of these implications, we turn next to an analysis of entering kindergarten classes by year.

**FIGURE 3. Kindergarten Enrollment in Partnership Schools, Districts, and Comparisons Over Time**



Note: Sample restricted to schools that enrolled at least five kindergarteners for all 10 years of the observed period. In Panel A, markers denote share of fall 2013 kindergarten enrollment by year. In Panel B, markers denote coefficient estimates on Year x Partnership indicators and spikes represent 95% confidence intervals. Panel B's y-axis can be interpreted as the approximate proportion change in kindergarten enrollment (e.g., 0.05 represents a 5% increase from pre-intervention)

trends relative to comparison schools and -0.05 represents a 5% decrease). COVID-19 markers along the x-axis denote year of pandemic's onset for each cohort (i.e., 2020-21, or "3Yrs Post" for Cohort 2 and "4Yrs Post" for Cohort 1).

## Finding Three: The Entering Kindergarten Classes of 2020 and 2021 Returned in Partnership Schools at Greater Rates Than in Other Schools

The declining kindergarten enrollment we document above may affect enrollment in subsequent grades as classes of children who reached school age during the COVID-19 pandemic enter the public school system in later grades. The youngest students who did not enroll in kindergarten in 2020-21 could have entered public school beginning in kindergarten a year late, first grade in 2021, or even second grade in 2022. These students could be coming from private school, homeschool, or could have skipped kindergarten entirely because it is not compulsory in Michigan. While there is evidence of increased reliance on private school and homeschool during the COVID-19 pandemic (Musaddiq et al., 2022), there is reason to believe that students in Partnership communities were less likely to have the resources to enroll in private school (Harbatkin et al., 2023a). Students initially entering Partnership schools in first or second grade may therefore have skipped kindergarten or come from COVID-19 pandemic homeschool

settings, where they may not have received full preparation in line with curriculum standards or socialization skills that are central to early learning. The public-school system bears the responsibility to support these students regardless of prior preparation.

To understand whether children who missed in-person kindergarten returned in later grades, we longitudinally track enrollment of the entering kindergarten classes of 2020 (the first pandemic-affected year) and 2021. We track each unique class through fall 2022 (i.e., for 3 years through second grade for the class of 2020 and for 2 years through second grade for the class of 2021) to assess the extent to which students who did not initially enroll in kindergarten returned to public schooling.

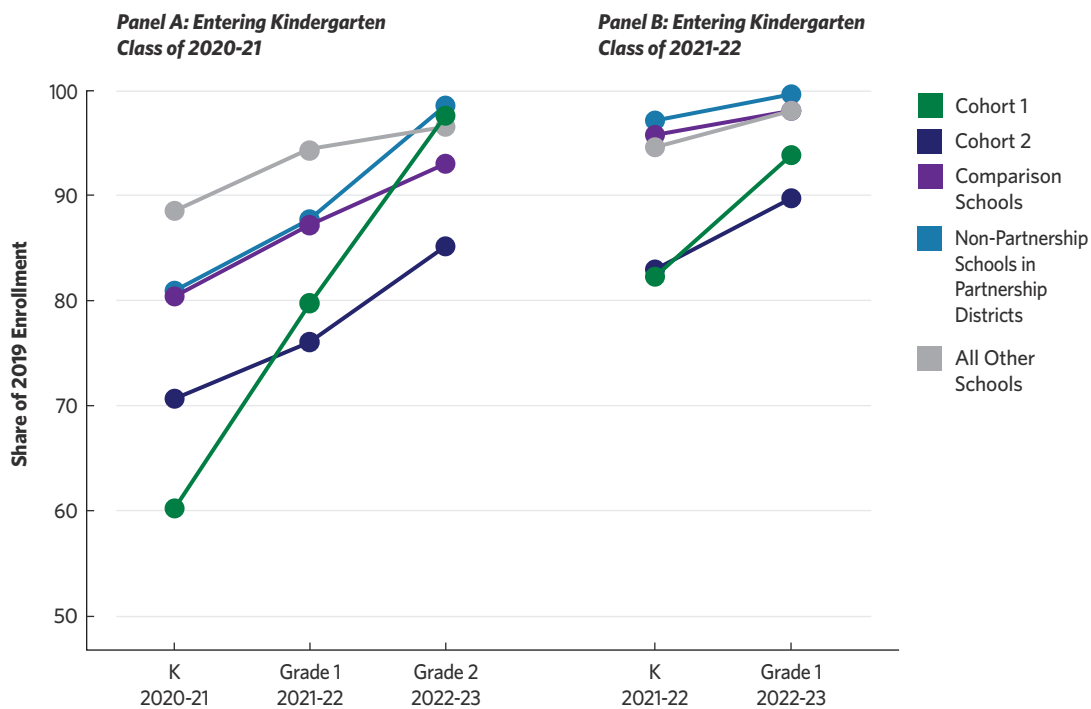
The two panels of Figure 4 provide enrollment for the entering classes of 2020 and 2021, respectively, as a share of fall 2019 enrollment in each grade level. In each panel, the initial kindergarten marker shows the extent to which

a given entering kindergarten class was smaller than the last pre-pandemic kindergarten class. Within a panel, the second set of markers represent first-grade enrollment for the same entering class of students relative to the last pre-pandemic *first*-grade class, and the third set of markers represent second-grade enrollment for the same entering class of students relative to the last pre-pandemic *second*-grade class. A complete return to public schooling would be evident in a return to the 100% line. However, because enrollment was declining prior to the COVID-19 pandemic, the entering classes would have likely been smaller than the 100% line even in the absence of the pandemic.

**The upward trend across all five groups of schools shows that the entering kindergarten class of 2020 continued to return to public schools in fall 2021 and fall 2022.**

In Panel A, the upward trend across all five groups of schools shows that the entering kindergarten class of 2020 continued to return to public schools in fall 2021 and fall 2022. The year-to-year increase from kindergarten to first grade was steepest for Cohort 1 schools and similar for the other four groups. The year-to-year increase from first to second grade is again steepest in Cohort 1 schools, followed by Cohort 2 and non-Partnership schools in Partnership districts, and finally similar low-performing comparison schools. Substantially fewer students returned to the all other schools group in second grade. In other words, more students are returning to Partnership and other low-performing schools in later grades.

**FIGURE 4. Enrollment for Classes That Entered School After the Onset of the COVID-19 Pandemic**



Note: Sample restricted to schools that enrolled at least five kindergarteners in each of the 10 years of the observed time period. Markers represent share of 2019 grade-level enrollment for each entering kindergarten class in each year.

Panel B shows that initial public-school enrollment for the entering kindergarten class of 2021 was lower than it was pre-pandemic though not as low as the class of 2020. Initial declines were again largest in Partnership schools and enrollment climbed more steeply than in the rest of the state—again especially in Cohort 1. Together, these findings provide reason for both cautious optimism and concern. About 95% of the entering kindergarten class of 2020 appears to have returned in Cohort 1 schools, non-Partnership schools in Partnership districts, and other schools in the state, and about 92% of the class returned in comparison schools. While Cohort 2 second-grade enrollment was lower, enrollment in these schools was declining at a steeper rate pre-pandemic and we might therefore expect continued lower enrollment. Still, in each group of schools, enrollment has not returned fully to pre-pandemic levels. Other research suggests that students who began outside of public school settings due to the COVID-19 pandemic may choose to remain there (Bacher-Hicks et al., 2023; Musaddiq et al., 2022).

Some students may have redshirted and entered kindergarten in fall 2021, though if this happened at scale (combined with full enrollment of younger classes of students) we would expect a disproportionate increase in kindergarten 2021 and 2022 enrollment, which we do not see in Figure 3 above. Thus, to the extent that students did return to kindergarten rather than first grade, these estimates may represent a lower bound on lost enrollment.

In sum, Partnership schools are now responsible for educating and supporting the students who entered in later grades. For schools serving students entering from private school or a rigorous homeschool setting, this responsibility may be largely tantamount to a school's typical function. However, schools serving more students who experienced disrupted learning during their time away from public schools may need more support and resources to provide adequate instruction. The steep upward slope of the green line in Figure 4 underscores potentially serious challenges for Cohort 1 schools in particular. In each of the past two years, Cohort 1 schools were responsible for educating a growing number of young children who may have been entering formal schooling for the first time.

## POLICY IMPLICATIONS

### Lower Public-School Enrollment Continues to Have Critical Implications for Funding—Especially in Partnership and Other Low-Performing Schools

Any declining public-school enrollment will lead to reduced funding. This could be particularly harmful for students in Partnership and other low-performing schools, whose total budgets rely more heavily on state and federal funds than other districts that have more robust local revenue streams (Strunk et al., 2021). While Partnership enrollment largely stabilized during the COVID-19 pandemic, longer-term trends show Partnership enrollment has been declining at a faster rate than the rest of the state. Meanwhile, pandemic-affected kindergarten classes have not fully returned—pointing to possible downstream enrollment implications. Continued enrollment declines will come at the expense of students who remain in the public school system.

### Schools May Need Extra Resources to Support Students Coming From Other Education Settings

Our analysis shows that many children reaching school age during the COVID-19 pandemic entered the public education system in first or second grade rather than kindergarten. While it is possible that students could have come from private schools or homeschooling, it is highly plausible that those entering Partnership schools may not have received ample preparation for formal education. Because we do not have data on their pathways into public school and their level of preparation, it is imperative that schools have the resources to assess and support these students moving forward. The benchmark assessments that public schools administer will help to identify incoming student needs, but educators will then need adequate supports to track their students' data and provide any necessary acceleration that these assessments identify as necessary.



## School Improvement Policies That Provide Additional Resources and Support May Facilitate Student Recruitment and Retention

Our findings show that Cohort 1 enrollment rebounded when schools entered Partnership and were no longer likely to be closed. This suggests that closure threats rather than a dissatisfaction with local schools may have been contributing to falling student enrollment. Ultimately, the students enrolled in these schools benefited—experiencing moderate to large achievement gains (Burns et al., 2023). Teachers became less likely to turn over even after the COVID-19 pandemic (Harbatkin et al., 2023b). Thus, school improvement interventions focused on support and resources—like the Partnership Model—may benefit under-resourced schools and the students they serve without producing negative effects such as decreased enrollment.

## ENDNOTES

1. Given data availability in Michigan, the authors of the cited study have not yet examined enrollment trends into the 2022-23 school year.
2. State Superintendent Michael Rice has advocated for a change in state law that would require counting students not attending public schools in order to better track these students (Slagter, 2020). While little is known about where students have entered Michigan public schools have entered from since fall 2020, there are some observable differences between students who entered in kindergarten, first, and second grade in Appendix Table B-3. Students who first entered Partnership schools and districts in first and second grade were less likely to be Black and economically disadvantaged, respectively, than students who entered in kindergarten. By contrast, students who first entered non-Partnership schools and districts in first and second grade were more likely to be Black and economically disadvantaged, respectively.
3. Appendix table B-2 includes the student mobility model estimates comparing Partnership schools to near-selected comparison schools.
4. In models examining specific grade levels, we restrict the sample to schools enrolling at least five students in observed grade in all 10 observed years.
5. We provide technical details on these event study models in Appendix A.
6. This approximation is highly accurate when the coefficient estimates are small and becomes less accurate as coefficient estimates become larger. Where the logged coefficient estimate diverges from the approximation, we include a footnote in the text.
7. Here, the exact percentage change for the Cohort 1 decline in the first COVID-19 pandemic year is  $100 \times (\exp(-0.395) - 1)$ , or -32.6%. All other percentage changes are close to the approximation, i.e., the coefficient estimate given the logged outcome closely approximates the estimated percentage change.

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# Appendices

## APPENDIX A. METHODS

To examine the effects of Partnership on enrollment before and during the pandemic, we estimate event study models examining the percent change in enrollment for Partnership schools relative to our set of near-selected comparison schools. We pool data from the two cohorts and the comparison group and create a series of year indicators centered at the identification year for each cohort and then estimate event study models with school and year fixed effects. Because there is evidence from prior research of heterogeneous effects by cohort (Burns et al., 2023), and because there is reason to expect differential effects before and during the COVID-19 pandemic (which initially affects the two cohorts in different implementation years), we estimate two-way Mundlak regressions (Wooldridge, 2021) allowing for separate effects in each of the cohorts in each of the pre- and post-COVID years. These models take the form:

$$Outcome_{jct} = \sum_{k=-4}^6 \sum_{c=1}^2 \tau_k 1(t=t_s^*+k) \times PartnershipCohort_c + \rho(\mathbf{X}'_{jt=2016} \times Year_t) + \alpha_j + \theta_t + \varepsilon_{jct}$$

where  $Outcome_{jct}$  is logged enrollment for school  $j$  in implementation cohort  $c$  in school year  $t$ . The term  $1(t=t_s^*+k)$  represents a set of indicators for the years pre- and post-Partnership implementation, with  $t_s^*$  denoting the year in which school  $s$  adopted Partnership spanning from four years prior to Partnership identification through six years of implementation.  $PartnershipCohort_c$  takes a value of 1 for schools that were included as part of each of the two implementation cohorts, and zero otherwise.  $\mathbf{X}$  is a vector of school-level covariates as described above, interacted with a linear time trend, denoted as  $Year_t$ . Each model includes school fixed effects ( $\alpha_j$ ), year fixed effects ( $\theta_t$ ), and an idiosyncratic error term ( $\varepsilon$ ) clustered at the school level.

The coefficients of interest are those represented by  $\tau_k$ , which provide the estimated effect of Partnership for Cohort  $c$  in the  $k^{\text{th}}$  year of implementation. We measure the effects relative to the year before Partnership identification ( $k=-1$ ), so  $\tau_{-4}$  through  $\tau_{-2}$  and  $\tau_0$  are the difference between Partnership and comparison schools in the years prior to Partnership and  $\tau_{-1}$  through  $\tau_6$  are the estimated effects in the years of Partnership implementation. For the enrollment models, the  $\tau_k$  estimates are logged enrollment values. The coefficient estimates can be interpreted as the percent change in enrollment in Partnership schools in a given cohort relative to comparison schools in relative year  $k-1$ .

We do not present  $\tau_k$  estimates with the two cohorts pooled together (e.g., Partnership implementation year 1, Partnership implementation year 2, etc.) because the pandemic struck at different implementation years for the two cohorts; to that end, we present each cohort's  $\tau_k$  estimates separately. For Cohort 1 schools, which were identified for Partnership in 2016-17 and first implemented in 2017-18, we observe three pre-identification and six implementation years, with years 4, 5, and 6 directly affected by the COVID-19 pandemic. For Cohort 2 schools, which were identified for Partnership in 2017-18 and first implemented in 2018-19, we observe four pre-identification years and five implementation years, with years 3, 4, and 5 directly affected by the COVID-19 pandemic.

There are two important identifying assumptions. The first is that the two cohorts of Partnership schools jointly followed a pre-identification trajectory parallel to that of the comparison schools, conditional on covariates. The second is that there was no anticipatory effect of Partnership, again conditional on covariates. The event study plots that we show provide visual evidence about these assumptions, and we present tables of regression estimates in Appendix table B-1.

## APPENDIX B. ADDITIONAL RESULTS

Table B-1. Event Study Estimates From Mundlak Models Predicting Student Enrollment		
	(1)	(2)
	Total	Kindergarten
Cohort 2 t-4	0.024 (0.048)	0.042 (0.065)
Cohort 1 t-3	0.083* (0.039)	-0.068 (0.061)
Cohort 2 t-3	0.020 (0.033)	0.082+ (0.047)
Cohort 1 t-2	0.059** (0.021)	-0.009 (0.061)
Cohort 2 t-2	0.017 (0.023)	0.081* (0.039)
Cohort 1 t-1	-	-
Cohort 2 t-1	-	-
Cohort 1, ID Year	-0.083** (0.028)	-0.166*** (0.047)
Cohort 2, ID Year	-0.003 (0.020)	0.008 (0.037)
Cohort 1 Year 1 (Fall 2017, pre-COVID)	-0.064 (0.048)	-0.208*** (0.054)
Cohort 2 Year 1 (Fall 2018, pre-COVID)	0.024 (0.029)	0.040 (0.045)
Cohort 1 Year 2 (Fall 2018, pre-COVID)	-0.102+ (0.059)	-0.236** (0.080)
Cohort 2 Year 2 (Fall 2019, pre-COVID)	-0.027 (0.038)	-0.021 (0.050)
Cohort 1 Year 3 (Fall 2019, pre-COVID)	-0.082 (0.060)	-0.142+ (0.078)
Cohort 2 Year 3 (Fall 2020, COVID Onset)	-0.028 (0.044)	-0.156* (0.073)
Cohort 1 Year 4 (Fall 2020, COVID Onset)	-0.028 (0.066)	-0.395*** (0.080)
Cohort 2 Year 4 (Fall 2021)	-0.072 (0.050)	-0.145** (0.052)
Cohort 1 Year 5 (Fall 2021)	-0.031 (0.074)	-0.260** (0.088)
Cohort 2 Year 5 (Fall 2022)	-0.062 (0.048)	-0.093 (0.065)
Cohort 1 Year 6 (Fall 2022)	-0.050 (0.080)	-0.142+ (0.083)
N	2,863	1,624
F-statistic on pretreatment coefficients	0.92	0.02
Adjusted R <sup>2</sup>	0.877	0.822
Within R <sup>2</sup>	0.105	0.228

+  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Note: Estimates from two-way Mundlak models. All models include year fixed effects and school covariates. School covariates include the proportion of students by race/ethnicity, economic disadvantage, English learner status, and special education status. F-test on pretreatment coefficients tests whether the pretreatment coefficient estimates for both cohorts together are jointly significantly different from zero. Here, an insignificant joint estimate provides evidence for the conditional parallel trends assumption.

**Table B-2. Event Study Estimates from Mundlak Models Predicting Student Mobility**

	Elementary school			Middle school			High school		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	LEAVE SCHOOL	LEAVE DISTRICT	LEAVE MI ED	LEAVE SCHOOL	LEAVE DISTRICT	LEAVE MI ED	LEAVE SCHOOL	LEAVE DISTRICT	LEAVE MI ED
Cohort 2 t-4	-0.019 (0.012)	0.004 (0.009)	-0.004 (0.004)	-0.000 (0.014)	0.011 (0.009)	-0.005 (0.005)	-0.049+ (0.027)	-0.029 (0.025)	-0.028 (0.025)
Cohort 1 t-3	-0.041+ (0.022)	-0.016+ (0.010)	-0.002 (0.003)	-0.014 (0.013)	-0.009 (0.011)	0.001 (0.004)	-0.017 (0.014)	-0.003 (0.014)	-0.001 (0.015)
Cohort 2 t-3	0.006 (0.013)	0.011 (0.009)	-0.004 (0.003)	-0.005 (0.012)	0.003 (0.009)	-0.002 (0.004)	-0.018 (0.021)	-0.007 (0.019)	-0.006 (0.019)
Cohort 1 t-2	-0.019 (0.025)	-0.017+ (0.009)	0.002 (0.004)	-0.011 (0.012)	-0.032*** (0.010)	-0.008* (0.004)	0.007 (0.015)	0.014 (0.016)	0.015 (0.016)
Cohort 2 t-2	0.007 (0.012)	0.016+ (0.009)	-0.002 (0.003)	0.013 (0.011)	0.017* (0.008)	0.000 (0.005)	-0.039* (0.017)	-0.034* (0.016)	-0.034* (0.016)
Cohort 1 t-1	-	-	-	-	-	-	-	-	-
Cohort 2 t-1	-	-	-	-	-	-	-	-	-
Cohort 1, ID Year	-0.022 (0.022)	-0.034*** (0.010)	0.007 (0.004)	-0.002 (0.014)	-0.021+ (0.012)	0.006 (0.005)	0.008 (0.014)	0.001 (0.013)	0.001 (0.013)
Cohort 2, ID Year	0.009 (0.015)	0.004 (0.010)	-0.003 (0.004)	0.005 (0.011)	0.001 (0.009)	-0.006 (0.004)	-0.030 (0.027)	-0.034 (0.028)	-0.034 (0.028)
Cohort 1 Year 1 (Fall 2017, pre-COVID)	-0.003 (0.025)	-0.017* (0.008)	0.006 (0.004)	0.011 (0.014)	-0.011 (0.013)	0.001 (0.004)	-0.014 (0.021)	-0.028 (0.021)	-0.027 (0.021)
Cohort 2 Year 1 (Fall 2018, pre-COVID)	-0.000 (0.014)	-0.004 (0.011)	-0.004 (0.003)	-0.007 (0.011)	0.003 (0.008)	-0.002 (0.003)	-0.001 (0.024)	-0.010 (0.024)	-0.011 (0.024)
Cohort 1 Year 2 (Fall 2018, pre-COVID)	-0.029 (0.023)	-0.026** (0.009)	-0.000 (0.004)	-0.007 (0.017)	-0.017 (0.015)	0.003 (0.006)	0.002 (0.017)	-0.017 (0.017)	-0.017 (0.017)
Cohort 2 Year 2 (2019-20, COVID Onset)	-0.051*** (0.015)	0.021 (0.013)	0.016** (0.006)	-0.042** (0.016)	0.014 (0.010)	0.003 (0.005)	-0.017 (0.025)	-0.030 (0.028)	-0.030 (0.028)
Cohort 1 Year 3 (2019-20, COVID Onset)	-0.064*** (0.016)	-0.010 (0.011)	0.008 (0.005)	-0.065*** (0.019)	-0.014 (0.012)	0.007 (0.005)	0.002 (0.020)	-0.024 (0.022)	-0.024 (0.022)
Cohort 2 Year 3 (2020-21)	-0.001 (0.013)	0.007 (0.011)	-0.003 (0.004)	-0.024 (0.016)	-0.001 (0.015)	0.000 (0.005)	0.002 (0.029)	-0.015 (0.030)	-0.015 (0.030)
Cohort 1 Year 4 (2020-21)	-0.053* (0.024)	-0.019+ (0.012)	0.006 (0.005)	-0.010 (0.020)	-0.018 (0.021)	0.006 (0.005)	0.024 (0.021)	-0.008 (0.020)	-0.007 (0.020)
Cohort 2 Year 4 (2021-22)	0.000 (0.016)	0.015 (0.014)	0.002 (0.005)	-0.025 (0.015)	-0.004 (0.013)	-0.000 (0.005)	-0.022 (0.026)	-0.042 (0.026)	-0.043 (0.026)
Cohort 1 Year 5 (2021-22)	-0.039 (0.026)	-0.006 (0.011)	0.010+ (0.006)	-0.015 (0.016)	-0.013 (0.014)	0.016** (0.005)	0.036 (0.025)	-0.003 (0.023)	-0.003 (0.024)
N	544,957	544,957	544,957	271,024	271,024	271,024	346,420	346,420	346,420
F-statistic on pretreatment coefficients	0.318	0.386	0.697	0.352	0.389	0.774	0.257	0.471	0.644
Adjusted R <sup>2</sup>	0.067	0.051	0.014	0.151	0.127	0.028	0.170	0.172	0.173
Within R <sup>2</sup>	0.031	0.021	0.005	0.094	0.065	0.011	0.129	0.131	0.132

+  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Note: Estimates from two-way Mundlak models. All models include year fixed effects, school covariates, and student covariates. School covariates include race/ethnicity, economic disadvantage, English learner status, special education status, and logged enrollment measured at baseline and interacted with linear year trend. Student covariates include gender, race, ED, EL, and special education. F-test on pretreatment coefficients tests whether the pretreatment coefficient estimates for both cohorts together are jointly significantly different from zero. Here, an insignificant joint estimate (evidenced by small F-statistics and a lack of significance stars) provides evidence for the conditional parallel trends assumption. “Leave school” (Columns 1, 4, and 7) involves leaving the school for any pathway out (i.e., to transfer within district, out of district, or to leave the public education system entirely) “Leave district” (Columns 2, 5, and 8) involves leaving the district for any pathway out (i.e., to transfer to another school out of district or to leave the public education system entirely), and “Leave MI ed” (Columns 3, 6, and 9) involves leaving the public education system in Michigan entirely.



**Table B-3. Demographics of Students First Entering Michigan Public Schools in Kindergarten, First, and Second Grade, by Partnership Status (Expected Entering Kindergarten Class of 2020)**

	Partnership schools			Non-Partnership schools in Partnership districts			All other schools		
	Entered in K	Entered in 1st grade	Entered in 2nd grade	Entered in K	Entered in 1st grade	Entered in 2nd grade	Entered in K	Entered in 1st grade	Entered in 2nd grade
White	0.040	0.035	0.039	0.173	0.142	0.150	0.673	0.571	0.525
Black or African American	0.860	0.871	0.801	0.598	0.619	0.556	0.138	0.204	0.205
Hispanic or Latino/a/x	0.059	0.066	0.131	0.139	0.195	0.226	0.086	0.102	0.132
Asian	0.006	0.001	0.000	0.020	0.016	0.030	0.037	0.052	0.076
Other race	0.035	0.027	0.029	0.070	0.028	0.038	0.065	0.070	0.062
Economically disadvantaged	0.940	0.894	0.848	0.893	0.821	0.857	0.546	0.613	0.628
Special education	0.096	0.109	0.157	0.127	0.170	0.158	0.144	0.151	0.158
English learner	0.021	0.033	0.123	0.080	0.107	0.248	0.082	0.119	0.217
Female	0.492	0.484	0.416	0.496	0.434	0.444	0.480	0.481	0.487
Observations	3,000	883	382	1,628	318	133	105,701	9,313	4,354

Note: Figures in cells represent the proportion of students in each category, with columns summing to 1. Other race is a combination of the following race/ethnicities that have low representation in our data: American Indian or Alaska Native, Native Hawaiian or Pacific Islander, and Two or more races. Individual students are only represented once in the table in the grade they first entered Michigan public schools. Students entered kindergarten in 2020-21, first grade in 2021-22, and second grade in 2022-23.



**Education Policy Innovation Collaborative**

MICHIGAN STATE UNIVERSITY  
236 Erickson Hall | 620 Farm Lane  
East Lansing, MI 48824

(517) 884-0377  
[EPICedpolicy@msu.edu](mailto:EPICedpolicy@msu.edu)  
[www.EPICedpolicy.org](http://www.EPICedpolicy.org)