NBER WORKING PAPER SERIES

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Working Paper 31261
http://www.nber.org/papers/w31261

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
May 2023

We greatly appreciate feedback from audiences at the Association for Public Policy Analysis and Association for Education Finance and Policy annual meetings The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305B200009 to Michigan State University. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education. This work was also supported by grants received from the State of Michigan and private philanthropy to the Education Policy Innovation Collaborative. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

Trends in Special Education Identification During the COVID-19 Pandemic: Evidence from Michigan

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NBER Working Paper No. 31261
May 2023
JEL No. I10,I20

ABSTRACT

We use data from Michigan and an interrupted time series (ITS) strategy to show how the COVID-19 pandemic impacted new special education classifications and discontinuations. We find a substantial decrease in K-5 classifications and discontinuations during the 2019-20 and 2020-21 school years. Classifications fell by 19 and 12 percent in these years, respectively, with smaller but still significant reductions in discontinuations. Districts with remote schooling and Black, Asian, and economically disadvantaged students saw larger decreases in classifications. While rates returned to trend in 2021-22, there was little "catch up" beyond that to make up for these delays, suggesting that as of that year many students had not yet gained access to services for which they may be eligible.

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1. Introduction

Increasing evidence shows that the COVID-19 pandemic negatively impacted student learning (e.g., Goldhaber et al., 2022; Jack et al., 2022; Kilbride et al., 2022; Kogan & Lavertu, 2021; Kuhfeld & Lewis, 2022; Nation's Report Card, 2022; Sass & Ali, 2022). Policymakers and educators have been particularly worried about how the pandemic affected students with disabilities (SWDs; Government Accountability Office, 2020; National Council on Disability, 2021). In particular, there are indications that the pandemic disrupted schools' and districts' abilities to maintain access to services and instructional environments consistent with the needs of SWDs. For example, a report by the American Institutes of Research found that early in the pandemic, between May and September of 2020, surveyed districts overwhelmingly indicated they had difficulties complying with the requirements of the Individuals with Disabilities Education Act (IDEA), with high poverty districts more likely to report challenges (Jackson & Bowden, 2020).

As the pandemic continued to interrupt typical schooling and moved both students with and without disabilities into remote learning contexts that limited in-person interactions between educators and students, the process for referring students who may have a disability for initial special education eligibility determination (SEED) was likely impacted. This is because the SEED process is facilitated by students attending in-person instruction, including observation of the student during learning, and providing evidence that the student has received appropriate instruction prior to placement into special education services. Students are required to be given several weeks of scientific, research-based intervention before being evaluated for special education. School teams could not ensure students received this intervention because in-person attendance for school buildings that were open was significantly lower than attendance in virtual

schooling and engagement in virtual schooling was significantly lower than in-person schooling (Darling-Aduana et al., 2022). Attendance rates were even lower for Black students, economically disadvantaged students, and SWDs (Darling-Aduana et al., 2022). Moreover, many special education teachers, school psychologists, and speech language pathologists had to shift assessments to virtual formats or amend assessment practices to account for face masks and/or social distancing requirements (Brunson et al., 2020; Song et al., 2020). These deviations may have rendered the evaluation results inaccurate or invalid. It is therefore unsurprising that anecdotal evidence suggests that classification rates for SWDs dropped during the 2020-21 school year, with districts across the country reporting decreases in SEED evaluations (Association of Psychology Training Clinics, 2020).

The process for conducting the evaluations to discontinue students' special education services, which we call "discontinuation," was also likely impacted by the pandemic. To discontinue special education services, best practices suggest that schools conduct a problem-solving process in which a multi-disciplinary team monitors students' progress toward achieving the goals set out in their individualized education programs (IEPs) and determines that intensive intervention is no longer needed to maintain the students' academic achievement (Grimes et al., 2006; Powell-Smith & Ball, 2002). However, there is evidence to suggest that SWDs were not provided with all of the necessary services or appropriate instruction during the pandemic (e.g., hands-on instruction, differentiated instruction), which may have hampered their full participation and ability to access content, thus impacting their learning growth and achievement – key determining factors for the discontinuation of services (Hurwitz et al., 2021; Sonnenschein et al, 2022).

In this study, we use student-level administrative data from Michigan in an interrupted time series (ITS) framework to investigate how the classification of new SWDs and

discontinuation of services progressed over the course of the pandemic. Michigan is a useful context in which to consider these patterns as it is a diverse state with students from a wide range of economic and racial backgrounds. Further, while all schools in Michigan switched to remote schooling in the spring of 2020, districts implemented a mix of different educational modalities (fully in-person, hybrid, and fully remote) throughout the 2020-21 academic year (Hopkins et al., 2021). This allows us to examine whether any changes in classification and discontinuation rates for SWDs varied across districts' instructional modalities. While our results are descriptive in that even our fully-specified ITS models cannot fully account for unobserved and time-varying factors, they are nonetheless valuable as they provide the first systematic look at the ways in which special education classifications and discontinuations shifted during the COVID-19 pandemic.

Our results show that there was a substantial decrease in new K-5 classifications and discontinuations during the 2019-20 and 2020-21 pandemic-impacted school years. Overall, new classifications deviated from their long-term trend by 0.77 and 0.49 percentage points in these years, respectively, equivalent to a 19 and 12 percent reduction in classification rates relative to 2018-19 (the year before the onset of the pandemic). The largest decreases in classifications occurred for two categories of disabilities: speech and language impairments (SLI) and specific learning disabilities (SLD). In the raw data, new SLI classifications rebounded in 2021-22, with more students being classified as SLI than would have been expected prior to the pandemic, suggesting a possible "catch up" to identify students who were missed during the pandemic. The classification rate of students with SLDs, on the other hand, only returned to the level that would have been predicted prior to the pandemic, suggesting that some of these classifications may have been permanently missed. Similarly, discontinuations in the same years decreased by 0.15 and 0.10 percentage points relative to 2018-19 (13 and 8 percent below the 2018-19

discontinuation rate of 1.2 percent, respectively). This suggests that during the pandemic, access to, or the discontinuation of, special education services was delayed for a substantial share of SWDs.

We further look at how the evolution of classifications and discontinuations during the pandemic differed by student characteristics. First, we show that Black students experienced greater reductions in both new classifications and discontinuations than did White, Asian, and Latino students. Similarly, the changes in classification and discontinuation rates for economically disadvantaged students were significantly larger than for non-economically disadvantaged students. These data provide evidence of the inequitable provision and discontinuation of special education services to Black and low-income students during the pandemic.[1] Finally, we consider the role of districts' instructional modality policies (e.g., fully in-person vs hybrid or fully remote learning), and find that students in districts that were remote for a majority of the 2020-21 school year had a 0.88 percentage point lower likelihood of being newly classified with a disability (21 percent of the mean classification rate the year prior to the pandemic), and a 0.25 percentage point lower likelihood of being discontinued than students in districts that were mostly in-person. Despite this gap, we see no evidence these "lost" classifications were offset by higher rates among remote districts the following year.

This paper proceeds as follows. In section two, we motivate this study based on the extant literature that outlines the ways in which the failure to accurately classify students for special education services may be harmful. We also discuss the ways in which retaining students in special education programming when they no longer require it can negatively impact students. The third section describes the Michigan student-level administrative data and our methods of

[1] Note that while we consider new classifications and discontinuations, we do not measure how the services provided to students with existing classifications changed during the pandemic. We leave that for future research.

estimating changes in special education classification and discontinuations rates during the pandemic. The fourth section describes our results. The fifth section concludes with a discussion of results and implications for policymakers.

2. Relevant Literature

Any potential pandemic-induced delays in SEED and disruptions to special education services could have substantial deleterious impacts on the short- and longer-term achievement and health outcomes of SWDs. SWDs perform better when they are identified earlier in life, providing students with a "foundation for later learning" which then supports future academic achievement (Peltzman, 1992; Steele, 2004). For example, Lovett et al. (2017) find that students with reading disabilities who first received intervention in first or second grade made gains in literacy almost twice that of children first receiving intervention in third grade and continued to grow at faster rates over the following years. Moreover, early intervention reduces the need for intensive special education services in later grades (Kulkarni & Sullivan, 2019). For instance, Walker et al. (1998) show that students with delayed identification of emotional-behavioral disorders often display patterns of disruptive and externalizing behavior that is unremitting and resistant to treatment by the time they are identified.

Early identification and services can avert secondary challenges to students' long-term development that may arise if SWDs are not identified (Ballis & Heath, 2021; Catts, 1991). For example, children with autism often are first diagnosed after reaching school age and engaging with the education system (van't Hof et al., 2021). Evidence-based interventions for these students are often provided in schools, and the early application of such programs are critical to improved future outcomes (Peters-Scheffer et al., 2011). As another example, low academic achievement (i.e., illiteracy) directly hampers a person's access and ability to understand health information and to adhere to therapy and medicine schedules. Low academic achievement is also

associated with negative societal and crime outcomes, including a greater likelihood of carrying a weapon and bringing weapons to school (Davis et al., 1999; DeWalt et al., 2004; Vaughn & Wanzek, 2014; World Literacy Foundation, 2018).

Pandemic impacts on the discontinuation of special education services could also harm later academic and mental health outcomes for SWDs. If SWDs did not receive the intensity of instruction that they needed during the pandemic and therefore are not making adequate academic progress, they likely will not meet achievement criteria necessary to discontinue special education services. SWDs who are not discontinued, and thus receive unnecessary special education services for more of their school career, are at risk of poorer future outcomes (Chesmore et al., 2016). For instance, time spent in school receiving special education instruction or related services (e.g., through time receiving speech, physical, or occupational therapy) displaces academic instruction in the general education classroom, potentially hampering educational attainment. Additionally, disability labeling can lead older students to be stigmatized and bullied, which can be deleterious to their mental health (Rose et al., 2009; Rose et al., 2011).

The effects of pandemic-induced disruptions to SEED and the discontinuation of special education services may have varied for students with, or at risk for, different types of disabilities. For example, disabilities like vision or hearing impairments are more often medically diagnosed and may be identified before students reach school-age, allowing for services to be put in place prior to their transition to schooling. Alternatively, students with high-incidence disabilities, including SLD or emotional-behavioral disorders (Francis et al., 1996; Losen & Orfield, 2002; Peterson et al., 2013), require measurement of students' response to instruction or behavioral intervention before special education evaluation to determine if their learning trajectory is due to a disability or to a lack of high-quality instruction (Fletcher et al., 2019; Lewis et al., 2010).

Therefore, SEED for disabilities that require measurement of response to instruction, like SLI and SLD, may have been particularly delayed during the COVID-19 pandemic as in-person instruction, along with the opportunities for high-quality face-to-face instruction and evaluation, was limited.

Further, it is possible that disruptions to SEED and the discontinuation of special education services may have been particularly acute for non-White students and students in schools that educate higher proportions economically disadvantaged students. Historically, Black and Latino students are more likely to be identified for special education services than their White peers but under-identified in schools with larger proportions of non-White students (Artiles et al., 2002; Elder et al., 2021; Losen et al., 2014; Oswald et al., 1999; Sullivan & Bal, 2013). Additionally, students in schools and districts serving larger proportions of economically disadvantaged students are more likely to be identified with an emotional-behavioral disorder (McCoy, Banks, & Shevlin, 2012). Given that, as elsewhere in the country, urban districts in Michigan were more likely to offer only remote instruction throughout the 2020-21 school year (Hopkins et al., 2021), and these same districts serve a large proportion of non-White and economically disadvantaged students, it is likely that SEED for some Black, Latino, and economically disadvantaged students may have been particularly delayed during the pandemic.

Overall, these studies make clear that SWDs could be greatly impacted if the COVID-19 pandemic hampered schools' and districts' abilities to classify students for receipt of special education services at the appropriate times or disrupted their abilities to evaluate SWDs for timely discontinuation of services. Importantly, these negative effects on students who should have qualified for special education services and who were not discontinued from special education services could surface in both the short- and the longer-term, causing both immediate harm to students' educational progress as well as later harm to their social, health, and societal

outcomes. As such, it is critical that educators and policymakers better understand the potential impacts of the COVID-19 pandemic on student classification into and discontinuation from special education services.

3. Data & Methods

Data

We use administrative student-level data for nearly 2.8 million unique K-12 Michigan traditional public and charter school students across 4,082 schools, totaling more than 15 million observations between fall 2012 and spring 2022. These data, provided by the Michigan Department of Education (MDE) and the Center for Educational Performance and Information (CEPI), contain demographic information for each student in the panel (i.e., gender, race/ethnicity, economically disadvantaged status, and English learner status) as well as the current grade, school, and district in which each student is enrolled. Important for this study, these data also provide information on special education status (i.e., a student has an IEP) and primary disability classification. We use this information to identify all years in which a student received special education services under an IEP.[2]

Our main outcomes of interest in our analyses are a set of indicators that capture when SWDs first and last receive special education services in Michigan.[3] Newly classified SWDs are identified by the first year they received special education services (i.e., "newly classified"). We

[2] While our main analyses are restricted to classifications and discontinuations of students with an IEP, that does not exclude students from having both an IEP and 504 plan. Over our full panel, only three percent of students with an IEP also have a 504 plan. Additionally, 84 percent of students with a 504 plan do not have an IEP. All of the ITS models estimated in this paper are repeated for students with a 504 plan. These results can be found in columns 4 through 6 of Appendix Tables A1 through A4.

[3] Qualification for special education services is a complicated process that relies on a well-functioning Multi-Tiered Systems of Support (MTSS) model. MTSS is a three-tiered public health model of prevention and monitoring intended to serve all students and provide increased intensity of instruction to meet the needs of students with, and at-risk for, disabilities (Walker and Shinn, 2002). Schools use universal and supplemental assessment and prevention practices in their SEED process and, when indicated, more intensive intervention is provided through IEPs for students who are determined eligible for special education services (Fuchs and Fuchs, 2009; IDEA, 2004).

are able to identify new SWDs in each year through the 2021-22 school year, thus allowing us to understand not only changes in identification rates during the pandemic, but also in the first relatively normal post-pandemic school year (2021-22). We identify former SWDs discontinuing special education by the last year they received services. We group these students into two categories: students who were discontinued and their special education status indicator turns off (i.e., "discontinued from SWD to general education [GEN]"), and students who stopped receiving services because they left the public school system and their unique identifier is absent in the time series (i.e., "exited Michigan public schools"). It is particularly important to separate out these two groups because the COVID-19 pandemic led to public school enrollment declines in both Michigan and across the country (Dee & Murphy, 2021; Musaddiq et al., 2022). As such, we need to draw distinctions between students who exited special education services because they left public schooling in Michigan and students who discontinued special education services because it was determined they no longer needed an IEP.[4] We rely on 2021-22 data to assess whether or not the student remained a SWD after the 2020-21 school year, thus constraining our assessment of service discontinuation to end with the 2020-21 school year. Note that for the rest of the paper we refer to the combination of the last two groups as "discontinuation" from special education.

To understand how special education classification and discontinuation rates varied across districts that offered students different instructional modalities throughout the 2020-21 school year, we merge these data with information on district-level monthly learning modalities collected by MDE.[5] For each Michigan school district that was not operating as a "cyber school"

[4] While it is possible that some students who exited public schools no longer required a special education classification, unfortunately we are not able to separate those from students who left public schools but still qualified.

[5] For more information on the collection and structure of these data, see Hopkins, Kilbride, and Strunk (2021).

prior to the pandemic (which represent 2 percent of all Michigan districts), we know the instructional modalities offered in each month during the 2020-21 school year (i.e., fully in-person, hybrid, fully remote, or a combination of multiple modalities). For our analysis, we assign students to each modality type based on the instructional modalities most commonly offered by the student's district throughout the entire 2020-21 school year. Given that districts were able to offer multiple instructional modalities each month during the 2020-21 school year, it is possible that districts have multiple "most common" modalities (e.g., if a district offered both in-person and remote instruction for all nine months during the school year). For these cases, we assign students to the "most in-person" option offered by districts (i.e., fully in-person is the "most in-person" option, followed by hybrid, and then fully remote instruction).[6]

Analytic Sample

We present results using three different samples of Michigan students. To explore global changes in the size of the SWD population, we examine trends using the full population of K-12 students across the state. When investigating unadjusted changes in classification and discontinuation rates by grade band and disability, we focus on the approximately 2.2 million students enrolled in kindergarten through 8th grade because almost 93 percent of newly classified Michigan SWDs in the last full pre-pandemic school year began receiving special education services prior to entering high school. Finally, in our ITS analyses estimating regression-adjusted trends in classification and discontinuation rates, we limit our sample to the nearly 1.8 million students enrolled in kindergarten through 5th grade to avoid conflating effects associated with

[6] In many cases, districts offered special education students an in-person option even if general education students were required to be remote. Averaging across all district-month observations from the 2020-21 school year, special education students were offered the option of in-person instruction in 57.3 percent of observations where a district indicated they planned to offer remote instruction to general education students.

structural school and district switches that students experience when transitioning from elementary to middle school.

Table 1 provides summary statistics for the K-5 sample of students in three representative school years: well prior to the pandemic (2013-14), the last pre-pandemic school year (2018-19), and first full school year during the pandemic (2020-21). This sample includes all students enrolled in a K-5 grade level at a traditional public or charter school, Intermediate School District (ISD),[7] or state-run school for at least one school year during our sample period. The sample does not include students enrolled in private schools. Overall, K-5 enrollment and the total number of SWDs decreased between 2013-14 and 2020-21. It is important to note, however, that the total number of SWDs decreased at a slower rate than did the full population of students, such that the SWD share of the total population increased over the sample period. This is one characteristic of the data that motivates our use of ITS models discussed in the next subsection.

The share of students who discontinued special education services – either by discontinuation or leaving the public school system – was relatively consistent before and during the pandemic, however the share of students receiving services for the first time increased in the years leading up to the pandemic. Between 2013-14 and 2018-19, students newly classified for special education services increased from 3.6 to 4.1 percent (a 14 percent increase). However, during the first full school year of the pandemic, this drops to 3.8 percent. A much smaller and consistent share of SWDs were either discontinued from SWD to GEN or left the Michigan public school system between 2013-14 and 2020-21. Across the entire sample period, slightly

[7] Michigan has 57 ISDs that help provide early intervention and special education services.

more than 1 percent of all students were discontinued from SWD to GEN each school year, while SWDs who left public schools represent only 0.5 percent of all Michigan students.

The distribution of disabilities within the Michigan SWD population was, for the most part, stable between 2013-14 and 2020-21, with some notable exceptions. SLI, representing nearly half of all SWDs in the state, was the most common primary disability, followed by SLD and Other Health Impairment (OHI). Notably, students classified with Autism rose from 7.5 to 10.3 percent during the sample period, while students classified with an Emotional Impairment (EI) decreased from 4.0 to 3.6 percent. These Michigan-specific trends follow national trends in classification (Kauffman & Badar, 2013; Zablotsky et al., 2019).

Other demographic characteristics were relatively stable during our sample period. The proportion of female students remained generally constant, while the proportions of non-White, economically disadvantaged, and English learner students increased slightly across the state. We find similar patterns in the school-level shares of each student demographic characteristic.

Methods

For our initial analysis, we explore raw trends in enrollment for the full K-12 population, as well as special education classifications and discontinuations for the K-8 population of Michigan students. Our regression analyses, described below, focus only on K-5 students. To understand how special education classification and discontinuation rates in Michigan changed during the COVID-19 pandemic, we use an ITS framework to identify changes in classification and discontinuation patterns specific to each school year directly impacted by the pandemic. We do so because we hypothesize that classification and discontinuation rates may have differed in each pandemic-impacted school year. Specifically, we estimate the following:

$$y_{ist} = \beta_0 + \beta_1 Trend_t + \beta_2 2019_t + \beta_3 2020_t + \beta_4 2021_t + \boldsymbol{\Omega X}_{ist} + \gamma_s + \varepsilon_{ist} \quad (1)$$

where y_{ist} represents an indicator for whether student *i* in school *s* is newly classified with a disability, discontinued from SWD to GEN, or was a SWD who left the Michigan public school system in year *t*. $Trend_t$ is the time elapsed (i.e., year) since fall 2012. The variables 2019_t, 2020_t, and 2021_t represent indicators for school years directly impacted by the pandemic, identified by the fall of that school year.[8] $\boldsymbol{X}_{ist}$ represents a vector of student (i.e., gender, race/ethnicity, economically disadvantaged status, and English learner status) and school (i.e., student shares by gender, race/ethnicity, economically disadvantaged status, English learner status, as well as school urbanicity) characteristics. γ_s is a school fixed effect. The coefficient on $Trend_t$ captures the change in average special education classification or discontinuation rates over time. For each of the indicators 2019_t, 2020_t, and 2021_t, β_2, β_3, and β_4 represent the year-specific net-change in classification or discontinuation rates relative to the long-term trend.

Assuming that classification rates were negatively affected by the initial school building closures in spring 2020, as well as the wide-spread provision of remote and hybrid instruction during the 2020-21 school year, we would expect a greater "recovery" or "rebound" in classifications in 2021-22 as schools "catch up" and work through their backlog of pre-referral interventions and evaluations delayed by the pandemic. For example, if $\beta_2 + \beta_3 \leq 0$, this implies that some students who may be eligible for special education services were not evaluated either at the start of the pandemic or during the first full school year following the initial school building closures. In this case, the direction and magnitude of β_4 provides some insight into how well recovery efforts have progressed as most Michigan students moved back to in-person schooling. If $\beta_4 < |\beta_2 + \beta_3|$ then the recovery has not yet caught up to trend and some eligible

[8] For models examining changes in students' propensity of discontinuations from SWD to GEN, or exit from the Michigan public school system, we are unable to estimate changes in the 2021-22 school year as these measures are dependent on enrollment counts for the 2022-23 school year, which are not yet available. Thus, we only provide estimates for the 2019-20 and 2020-21 school years.

students may have been "missed" for SEED. If $\beta_4 \geq |\beta_2 + \beta_3|$, this means that schools have likely worked through their backlog of evaluations and students who were eligible for services during the pandemic were finally identified.

Given existing evidence that students of color and economically disadvantaged students have experienced larger achievement declines during the COVID-19 pandemic (e.g., Jack et al., 2022; Kilbride et al., 2022; Sass & Ali, 2022), it is important to understand whether special education classification could be playing a role. Thus, to understand the heterogeneous effects of the pandemic on classification and discontinuation trends for these students, we extend the ITS specification in model (1) to include interactions with indicators for student-level race/ethnicity and economically disadvantaged status. This allows us to test whether specific groups of students may have been differentially affected by the pandemic and whether those effects varied over time. Specifically, we estimate:

$$y_{ist} = \beta_0 + \beta_1 Trend_t + \beta_2 2019_t + \beta_3 2020_t + \beta_4 2021_t + \boldsymbol{\phi_1} 2019_t \times \boldsymbol{Race_{it}} + \boldsymbol{\phi_2} 2020_{it} \times \boldsymbol{Race_{it}} + \boldsymbol{\phi_3} 2021_{it} \times \boldsymbol{Race_{it}} + \boldsymbol{\Omega X}_{ist} + \gamma_s + \varepsilon_{it} \quad (2a)$$

and,

$$y_{ist} = \beta_0 + \beta_1 Trend_t + \beta_2 2019_t + \beta_3 2020_t + \beta_4 2021_t + \theta_1 2019_t \times EconDis_{it} + \theta_2 2020_{it} \times EconDis_{it} + \theta_3 2021_{it} \times EconDis_{it} + \boldsymbol{\Omega X}_{ist} + \gamma_s + \varepsilon_{it} \quad (2b)$$

where $Race_i$ is a vector of indicators for each race/ethnicity and $EconDis_{it}$ represents an indicator for whether a student was classified as economically disadvantaged in a particular year. All variables are defined as in model (1). In these models, the coefficients on each of the indicators 2019_t, 2020_t, and 2021_t capture the post-COVID net-changes in classification or discontinuation rates for the reference group of students (White students for race regressions and non-disadvantaged for economic regressions) relative to the average underlying linear time trend,

while the $\boldsymbol{\phi}$ and θ coefficients reflect the increase or decrease in the trend deviations during the pandemic for each race relative to White students and economically disadvantaged students relative to non-disadvantaged, respectively.

Finally, while virtually all districts in Michigan operated remotely at the end of spring 2020, there was wide variation in modality during the 2020-21 school year.[9] As noted above, remote schooling likely limited the ability of schools to provide full evaluations and hence could have had a disproportionate impact on new classifications and the discontinuation of services. To understand how districts' 2020-21 instructional modalities are related to classification or discontinuation rates, we again extend model (1) and estimate the following:

$$y_{ijst} = \delta_0 + \delta_1 Trend_t + \beta_2 2019_t + \beta_3 2020_t + \beta_4 2021_t + \boldsymbol{\delta_1} 2019_t \times \boldsymbol{Modality_d} + \boldsymbol{\delta_2} 2020_{it} \times \boldsymbol{Modality_d} + \boldsymbol{\delta_3} 2021_{it} \times \boldsymbol{Modality_d} + \boldsymbol{\Omega X}_{ijst} + \gamma_s + \varepsilon_{ist} \quad (3)$$

where $\boldsymbol{Modality}$ for district *d* is a vector of indicators for hybrid and fully remote instructional modalities (fully in-person is the reference category). Again, all variables are defined as in model (1). In this model, the coefficients on 2019_t, 2020_t, and 2021_t capture the post-COVID net-changes in classification or discontinuation rates for students who attended school in a district that offered fully in-person instruction for a majority of the 2020-21 school year relative to the trend while the $\boldsymbol{\delta_1}$, $\boldsymbol{\delta_2}$, and $\boldsymbol{\delta_3}$ coefficient vectors capture the post-COVID trend deviations for hybrid and remote districts relative to in-person districts.

4. Results

Descriptive Trends in Overall SWD Population Over Time

[9] See Hopkins, Kilbride, & Strunk (2021) for information on modality in Michigan.

To understand overall changes in the Michigan special education population both before and during the pandemic, the bars and line in Figure 1 show how the total SWD population and share of SWDs relative to the total K-12 student population in Michigan, respectively, varied each year of our panel. For the first four years of our sample, the SWD population across the state decreased each year (from 208,784 to 200,896 students) before somewhat stabilizing in the years leading up to the pandemic (in 2018-19 there were 202,451 SWDs). During the first two years of the pandemic, the Michigan SWD population dropped 3.3 percent to just 195,748 total students. The SWD population then rebounded to near pre-pandemic levels between 2020-21 and 2021-22, increasing by nearly 5,000 students (2.6 percent). Overall, the total number of SWDs in Michigan decreased from 208,784 to 200,734 students between fall 2012 and spring 2022 (a 3.9 percent decline).

Even though the K-12 SWD population decreased over the course of our study period, in most years it did so at a slower rate than the full population of students. As a result, the share of Michigan K-12 public school SWDs increased from 13.5 to 14.2 percent between 2012-13 and 2021-22, with a notably larger uptick during the pandemic, indicating that existing or potential new SWDs were less likely to leave the state's public schools than were students in general education during the pandemic.

Descriptive Trends in Overall SWD Classification and Discontinuation Rates Over Time

To understand how patterns in special education classifications, discontinuations, and departures from the school system contributed to these changes in the Michigan SWD population, Figures 2 and 3 document classification and discontinuation rates for the K-8 SWD population between 2012-13 and 2021-22. Figure 2 first shows results for students in all elementary and middle school grade levels, and the remaining figure show differences by grade band (K-2, 3-5, and 6-8 in the top, middle, and bottom panels of Figures 3, respectively).

Figure 2 shows that Michigan experienced a steady increase in the proportion of newly classified SWDs between 2013-14 and 2018-19, the year prior to the pandemic. There was a sizable decrease in the proportion of newly classified SWDs in the 2019-20 school year (0.46 percentage points), followed by an increase in 2020-21 (0.27 percentage points) that was still below what would have been expected prior to the pandemic. Classifications increased above the pre-pandemic trend in the 2021-22 school year (up 0.59 percentage points to 3.38 percent).[10]

Figure 2 also shows the rate of SWD discontinuations slowly and steadily declining in the years leading up to the pandemic, including the 2019-20 school year (from 1.20 to 1.07 percent). However, there was a marked decrease in the proportion of students discontinued from SWD to GEN in 2020-21 and 2021-22 (0.17 percentage points). As expected, we see a sharp increase in the proportion of SWDs exiting Michigan public schools during the pandemic (from 0.36 to 0.51 between 2013-14 and 2021-22).

As seen in Figures 3, general trends in classification, discontinuation, and overall public school exit rates are similar across both the K-2 and grades 3-5 populations and reflect the averages shown in Figure 2. However, far higher rates of K-2 students are newly classified with a disability than students in grades 3 through 5, reflecting typical variation in timing of SWD classification. Nonetheless, there is one important difference between the two grade spans during the pandemic: while there was an increase in the proportion of K-2 students classified as SWD in the 2021-22 school year (0.98 percentage point increase to 6.73 percent), this largely reflects a return to the increasing pre-pandemic trend in classifications. In other words, the increase in classifications in 2021-22 seems in line with where we would have expected K-2 SWD

[10] One possibility is that this pandemic shift in SWD share reflects more students leaving the public schools. Figure A1 in the online appendix, however, shows that while there is a slight increase in SWD exits relative to non-SWD in 2019-20. This reverts to approximately the same pre-pandemic gap in 2020-21, though exits for both groups are highly elevated during this year.

classification rates to be in the absence of the pandemic, but does not reflect *additional* identifications that might be needed to identify students who were "missed" during the pandemic. By contrast, grade 3-5 SWD classifications dropped off substantially in 2019-20 (0.50 percentage point decline to 1.44 percent) before nearly rebounding to pre-pandemic levels in 2020-21 (1.86 percent) and surpassing them in 2021-22 (2.30 percent).

The bottom panel of Figure 3 shows classification and discontinuation trends for SWDs in 6th through 8th grade in Michigan. As with K-5 students, we see a slightly declining rate of middle school students classified as SWD leading up to the pandemic, decreasing substantially in 2019-20 before rebounding sufficiently to address "missed" classifications by 2021-22. Also similar to earlier grades, the percentage of 6th- through 8th-grade SWDs exiting public middle schools increased from 2019-20 to 2021-22. The percentage of students discontinued from SWD to GEN continued its decreasing trend (from 0.90 to 0.59 percent across the sample period).

Descriptive Trends in SWD Classification Rates Over Time by Disability

There are different criteria by which students qualify for special education services depending on the disability category. In Figure 4, we examine raw K-8 classification trends before and during the pandemic for students with different disabilities. Figure 4 illustrates a slowly increasing trend in most disability categories prior to the pandemic, with a decline in classification during the pandemic and differential recovery in 2020-21 and 2021-22 by disability category. For grades K-8, SLI is the primary diagnosis leading the pandemic "rebound" as these classifications increased beyond the pre-pandemic trend by 2021-22.

Appendix Figure 2 shows that SLI is primarily classified in early elementary grades (K-2) and is by far the most common at these grade levels, and thus, the patterns match those in

Figure 4.[11] Autism is the next most common classification in early elementary grades. Like classification rates nationally (Zablotsky et al., 2019), autism increased at one of the highest rates between 2013-14 and 2018-19. The decrease in autism classifications in 2019-20 was smaller than in other categories and the recovery in 2021-22 was higher than pre-pandemic trends would suggest, particularly in grades K-2.

Appendix Figures 3 and 4 demonstrate that SLD is the most common disability in grades 3-5 and 6-8 and had the largest decrease in new classifications during the pandemic among these grades. Like SLI, following a sharp drop in 2019-20, SLD exceeded pre-pandemic levels for both grade bands by 2021-22. The OHI classification, which is a diverse set of disabilities typically dominated by students with attention deficit hyperactivity disorder (ADHD), is generally the next most common diagnostic category to be classified in both grade bands and again in this case there was a drop off during the pandemic followed by a robust recovery. Two other smaller categories – cognitive impairment (CI; the Michigan classification for students with intellectual disabilities) and EI, however, also saw notable declines in both grade levels but recovery appears to be a bit slower in grades 3 through 5 than for other categories. Notably, though, EI rates were already falling leading into the pandemic, so this relatively slow recovery for the earlier of the two grade bands may simply be the continuation of a longer trend.

ITS Results of Deviations from Pre-Pandemic Trends in Classification and Discontinuation Rates

Our next set of results provides estimates from our ITS models examining changes in classification, discontinuation, and public school exit rates during school years directly impacted

[11] The relatively high classification rates for SLI seen in early grades (Appendix Figure 2) is in part because it includes both students with speech disfluencies and students with developmental language disorder. These children are often classified as SLI in K-2 and then reclassified as having a specific learning disorder (often in reading, math, and writing rather than language) in later grade levels (Georgan, 2022).

by the pandemic. Figure 5 summarizes baseline results for all three outcomes, while Figure 6 shows how trends differed across student characteristics and instructional modality policies during the pandemic (classifications, discontinuations, and school exit trends for each student subgroup are shown in the top, middle, and bottom panels of Figures 6, respectively).[12] In the latter figure, we show bar graphs that provide the magnitude and confidence intervals of the estimates from our ITS model on the coefficients for the two pandemic-impacted years (2019-20 and 2020-21) and, for new classifications, the first post-pandemic year (2021-22).

Figure 5 shows a marked decrease in classifications and discontinuations during the pandemic, while SWDs leaving the public school system increased. The classification rate decreased 0.77 percentage points in 2019-20, with a slightly smaller decrease relative to pre-trend of 0.49 percentage points in 2020-21 (19 and 12 percent below the 2018-19 classification rate of 4.1 percent, respectively). By 2021-22, the estimate is only marginally significant, indicating that overall classifications simply returned to trend rather than exhibiting a "catch up" of additional classifications.[13] Appendix Table A1 provides coefficient estimates for the underlying regression (column 1) and indicates that the total percent of students whose classifications are delayed or missed during the pandemic, assuming the long-term trend would have continued ($\beta_2 + \beta_3$) equals a total pandemic drop of 1.26 percentage points. Thus, the fact that in 2021-22 classification rates barely returned to trend indicates that many students still have residual delays in identification from the pandemic.

[12] Columns 1 through 3 of Appendix Tables A1 through A4 provide the full set of estimates for Figures 5 and 6.
[13] One concern is that some of what is being picked up in these patterns is simply students moving in and out of the public school system. To address that, in Appendix Table A5 column 1, we provide estimates that are restricted to grades K-5 and only include students who enter the public school system and remain through grade 5. The estimates are very similar except there is a slightly larger and significant rebound of 0.2 percentage point in 2021-22. Again, this rebound is smaller than the total pandemic drop in new classifications. Tables A6-A8 provide similar analyses when looking at differences by race, economic status, and instructional modality, respectively. In each case the results are similar to those in the corresponding figures in the main text.

Similarly, discontinuation rates dropped by 0.15 and 0.10 percentage points in 2019-20 and 2020-21 (13 and 8 percent below the 2018-19 discontinuation rate of 1.2 percent, respectively). We do not yet know if discontinuations have recovered to the point that they offset these values. Nonetheless, it is clear that many students are either not receiving special education services when they should, or continuing to receive services when they would have, previous to the pandemic, attended and engaged in enough instruction to be discontinued from special education services. Finally, SWDs exited the Michigan public school system at much higher rates during the pandemic than pre-pandemic school years. In 2019-20 and 2020-21, SWDs were 0.26 and 0.14 percentage points more likely to leave public schools, respectively, compared to pre-pandemic trends (65 and 35 percent above the 2018-19 exit rate of 0.4 percent).

The top panel of Figure 6 shows how new classifications changed by race/ethnicity, economically disadvantaged status, and instructional modality. Before addressing specific subgroups, we highlight three key overall patterns. First, there are statistically significant reductions in classifications for every subgroup in 2019-20 and 2020-21. Second, all subgroups returned to trend in 2021-22 except for Black students. Third, while some fare better than others, in no subgroup has the nascent recovery in 2021-22 been large enough to offset the reductions in classifications during the first two years of the pandemic.

Black and Latino students both experienced larger declines in classification rates than White students in 2019-20 and 2020-21. However, the magnitude of the reductions is much larger for Black students. The total deviation from trend for Black student classifications was -1.19 and -1.36 percentage points, respectively, in the first two pandemic-impacted years. This is compared to just -0.66 and -0.22 percentage points for White students, -0.51 and -0.67 percentage points for Asian students, and -0.76 and -0.48 percentage points for Latino students.

The story for economically disadvantaged students is similar to that seen for Black students. Non-disadvantaged students experienced a 0.67 percentage point decline in classifications in 2019-20. This shrunk to -0.20 and then turned positive at 0.26 percentage points in 2020-21 and 2021-22, respectively. Economically disadvantaged students experienced considerably greater decreases in classification rates during the pandemic than did their wealthier peers (-0.85, -0.71, and 0.43 percentage points in these three years, respectively).

The last set of comparisons in the panel show that new classifications were -0.36 percentage points below trend in 2020-21 for districts where in-person instruction was offered for the majority of the same year, with only slightly lower rates in districts that mostly offered hybrid instruction. However, the reduction in new classifications was more than two times larger for districts that operated remotely for the majority of the year (-0.88 percentage points).[14] This reflects a negative deviation from trend of 21 percent off the 2018-19 average classification rate. Nonetheless, districts on average returned to trend by 2021-22 regardless of modality. Thus, it appears that students in schools that were mostly remote had substantially more delayed classifications, and, given we do not see a disproportionate increase the following year, some of these delays may become permanent misclassifications.

Table 2 provides estimates of changes in new classifications for specific disability categories, including SLI, SLD, OHI, and autism.[15] The patterns during the first two pandemic years are similar across categories relative to their shares of the total student population. The key exception is autism which has a larger reduction in 2020-21 than in 2019-20. Even so, all of these disability categories experienced decreases in new classifications during the pandemic,

[14] Note that for some remote districts, students with disabilities were provided with in-person instruction or in-person options for service delivery.

[15] We also estimate models that examine changes in new classifications by instructional modality for students with an SLI, SLD, OHI, or autism across. We find similar results to those show in Figure 6, and these results are available from the authors upon request.

with a recovery in 2021-22. While SLI and autism show rebounds exceeding the long-term trend, implying some "catch up," none of the categories show enough of a rebound to fully offset the missed and delayed classifications.

The middle panel of Figure 6 looks at differences in discontinuation rates during the pandemic by race/ethnicity, economically disadvantaged status, and instructional modality. We find many of the same trends as those shown in the top panel. Again, Black (-0.26 and -0.28 percentage points in 2019-20 and 2020-21, respectively) and economically disadvantaged students (-0.20 and -0.17 percentage points) experienced the largest declines in discontinuation rates relative to their respective peers. Additionally, other than White students, Black and economically disadvantaged students were the only two sociodemographic subgroups to experience statistically significant declines in discontinuations in both 2019-20 and 2020-21. Similar to the previous results, students in districts that offered in-person instruction for a majority of the 2020-21 school year saw the smallest reductions in the propensity to be discontinued from SWD to GEN (-0.14 and -0.04 percentage points in 2019-20 and 2020-21), followed by those students in mostly hybrid (-0.19 and -0.08 percentage points in 2019-20 and 2020-21) and remote districts (-0.14 and -0.20 percentage points in 2019-20 and 2020-21).

Finally, the bottom panel of Figure 6 shows the pandemic-induced changes in SWDs' propensity to leave Michigan public schools during the pandemic by demographics and district-level instruction modality. We find that Black and Latino SWDs were less likely than White SWDs to exit public schools in both 2019-20 (0.15 and 0.22 percentage points for Black and Latino students, respectively) and 2020-21 (0.10 and 0.07 percentage points). Exit trends for economically disadvantaged students and their more advantaged peers were generally similar across years. Lastly, the exit propensity of students in districts that offered in-person instruction for a majority of the 2020-21 school year increased in both 2019-20 and 2020-21, by 0.28 and

0.13 percentage points, respectively. Students in remote districts were significantly more likely to leave than in-person students after 2020-21 (0.04 percentage points, respectively).

5. Discussion and Conclusion

The COVID-19 pandemic had substantial negative impacts on K-12 students' developmental, physical, and mental health. While the pandemic's effects were worse for students of color, economically disadvantaged students, and those who attended school remotely, there is little evidence detailing the scope of the pandemic's impact on SWDs. Specifically, little is known about the ways in which SEED and the discontinuation of services were affected. Given the well-documented importance of early and appropriate service provision for SWDs for their long-term mental and physical health, and the ways in which early academic achievement serves as a protective factor for social and health outcomes later in life, it is imperative that we understand the scope of this problem so that policymakers can direct the necessary resources towards SWDs.

Overall, our results indicate that Michigan students were less likely to be classified with a disability and less likely to be discontinued from receiving special education services during the height of the COVID-19 pandemic. For some disabilities like SLI and autism, new classifications in 2021-22 exceeded those expected based on pre-pandemic trends, indicating that there was some "catch up" of the backlog of non-classified students. In other cases, classifications merely returned to trend suggesting that some students may simply never have been identified even if they should have been. However, given that our data on new classifications exists only through the 2021-22 school year, it is possible that districts accelerated their identification processes to address this issue in 2022-23.

The dip in SWD classifications and discontinuations in both the 2019-20 and 2020-21 school years is likely due to pandemic-related interruptions to the 2019-20 school year which

likely disrupted the initial evaluation processes and re-evaluation of students for discontinuation that occur during a typical school year. As noted earlier, the SEED process often relies on students attending school so that educators can observe student learning, can ensure that students have received appropriate instruction, and that students have attended several weeks of pre-referral intervention prior to placement in special education services. Moreover, discontinuation from special education services is hampered by lower attendance and engagement rates in instruction that may have occurred due to COVID-19 spread in in-person learning and lack of engagement in virtual learning. Further, the decrease in discontinuations from special to general education may be driven by a variety of similar factors that disrupted special education services for SWDs, and created a lack of evidence (e.g., absence of progress monitoring data) to discontinue special education services in the following years. On top of these logistical challenges, and to put it plainly, educators and families were living through a global pandemic and many important events were curtailed simply because other things – such as physical safety and mental health – were more pressing at the time.

Even if districts eventually "catch up" in providing classifications to all students who were unable to receive an appropriate classification during the pandemic, the sharp declines in 2019-20 and 2020-21 raises significant concerns for these students as the initial receipt of special education services would have been delayed by at least one to two years. Given the importance of early intervention, this delay in receiving intensive intervention could have significant impacts on long-term student achievement and additional outcomes. Future research should continue to follow these students to determine how this delayed classification relates to long-term outcomes.

Additional research should also explore why classifications for some disabilities were differently impacted compared to others. For K-5 students, disabilities that are often diagnosed when students reach school age (e.g., SLI and ADHD within OHI) decreased at a steeper rate

than those disabilities that are often detected before school entry (e.g., CI and the seven disabilities included in our “other” grouping). There are several potential explanations for these differences in classification. For example, some disabilities (e.g., hearing impairments, vision impairments, CI) have clearer diagnostic criteria and do not require instruction for a diagnosis, and, thus, could have been identified outside of the educational environment even during the pandemic. Other disabilities, like autism, rely on behavioral criteria that may allow for initial identification in a clinical or medical setting, which may then provide parents and schools with preliminary data to pursue an IEP rather than waiting for data to appear in the educational environment. Potentially due to this, we see a more muted change in autism classification rates relative to other disabilities. An alternative explanation is that autism classification is primarily behaviorally based, includes impairments in reciprocal social interactions and communication, as well as a restricted range of interests or repetitive behavior, and must adversely affect educational performance in academic, behavioral, or social domains. Thus, rather than relying solely on the impact on academic performance, the expanded ability to also consider behavioral and social performance may have facilitated the evaluation team’s ability to classify a student with autism within the restrictive pandemic environment.

Alternatively, disabilities like SLI and SLD rely on the evaluation of academic performance which was severely disrupted for all students during the pandemic. Furthermore, SLD has less clear criteria than other disabilities; the criteria to qualify for SLD is not the same across schools and interpretation of the criteria “unexpected low achievement” would necessarily change in the context of disrupted schooling. The combination of no standardized criteria and uncertainty about what constitutes unexpected low achievement likely exacerbated variability in diagnosis. Given the universal disruption, it was likely more difficult for schools to identify those

students who truly had a SLI/SLD versus those students who were struggling because of the change in learning modality.

The diagnosis of SLD is further compounded by the inability of some popular SEED diagnostic procedures to detect SLD before grade 3 (Miciak & Fletcher, 2020). Research suggests that some students who are diagnosed with SLD in later elementary grades (3 through 5) are often initially diagnosed with SLI in early elementary grades (K through 2) because the SLI diagnostic criteria are 'easier' to meet (Georgan et al., 2023). In the current study, the greater recovery rate of SLI in grades K through 2 combined with the greater recovery rates of SLD in grades 3 through 5 provide some correlational evidence that schools are attempting to provide some services to SWDs more rapidly. The current analysis does not provide causal evidence for this interpretation and future research is needed in this area. However, it does provide consistent policy implications that states and SEED stakeholders consider the limitations of diagnostic criteria that delays identification of SLD to later elementary grades (i.e., patterns of strengths and weaknesses) and adopt processes that allow for earlier detection of SLD in early elementary grades (i.e., response to intervention and hybrid models) (Miciak & Fletcher, 2020). Improving policy that identifies SLD in earlier grade levels fits with other policy initiatives in Michigan and other States to identify dyslexia (one of the categories of SLD) in earlier grades where research shows that instruction is most effective (e.g., Hall et al., 2022).

Critically, the delays in classification also differed by several key student variables (e.g., race/ethnicity, economically disadvantaged status, instructional modality), demonstrating the intersectionality of disability with other disadvantaged groups. Black students, in particular, experienced considerably larger reductions in classifications during the first two pandemic-impacted school years relative to their White, Latino, and Asian peers. We also found no indication that the recovery was any faster for Black students. We find similar results for

economically disadvantaged students relative to their more advantaged peers. While we do not know why classifications fell more for these groups, it is nonetheless consistent with other evidence that marginalized groups have suffered more during the pandemic in terms of health and achievement (Goldhaber et al., 2022; Kilbride et al., 2022; Kuhfeld & Lewis 2022).

Finally, we consider how delays in classification vary with the extent to which districts offered in-person schooling during the 2020-21 school year. As noted above, evaluations for many conditions require in-person assessments, and remote instruction likely constrained educators' abilities to administer and interpret such assessments. Further, even if in-person evaluations are not strictly required for a classification, teachers in remote or hybrid settings were likely hampered in their ability to observe potential disabilities and refer students. On the other hand, parents may have had better insights into their own children's learning behaviors when they were learning at home relative to inside a school building, providing them with greater opportunity to raise their concerns to their schools. Though we stress that these estimates are not causal, given the choice of a district to return to in-person education is likely related to many other factors, we nonetheless find that students in districts that were remote for a majority of the 2020-21 school year were three times less likely to be classified with a disability during that year relative to their peers in districts that were in person for the majority of the school year. In 2021-22, classifications for previously remote districts (all districts in Michigan returned to in person- instruction in 2021-22) reverted to trend but it does not appear that the entire backlog has been addressed. Thus, it is possible that if classifications do not accelerate in 2022-23, some of these students may remain permanently unclassified.

Given these findings, it is important that policymakers are cognizant of students whose classifications may have been delayed or missed altogether. In order to ensure that these students receive the services they need to address their disabilities, districts will need resources to expand

their screening efforts, expand the quality of their prereferral instruction, and update SLD identification practices to make sure that instruction to SWDs accounts for the time lost from the delayed classifications. Further research should investigate how the recovery in special education classification rates progresses over the next few years and what interventions can be applied.

In particular, given the discrepancies in classification rates across students by race/ethnicity and economic disadvantage status, it will be imperative for school districts and state agencies to pay particular attention to students who were more at risk for delayed or missed identification. Since late identification can lead to academic and behavioral challenges in schooling, other policies adjacent to but not specifically about special education should be considered in light of the increased probability that lower income and Black students were less likely to be identified for necessary services on time. For instance, educators and policymakers may wish to consider changes to discipline policies and to programs that aid with socioemotional learning to address what may be increased behavioral challenges among groups of students who were inadequately served during the pandemic.

In conclusion, the pandemic impacted students along many different dimensions. SWDs were at particularly high risk of poor outcomes from the educational disruption that resulted. Using data from Michigan, we are able to show that many students were delayed in their access to special education services through new classifications and IEPs and through discontinuation to general education. While this analysis looks at a key input into these students' educational progress, it is likely that the sharp reductions in classifications during the pandemic – which created a backlog that as of 2021-22 has not been fully worked through –impacted academic and behavioral development. It is incumbent upon future research to investigate the impacts on these outcomes.

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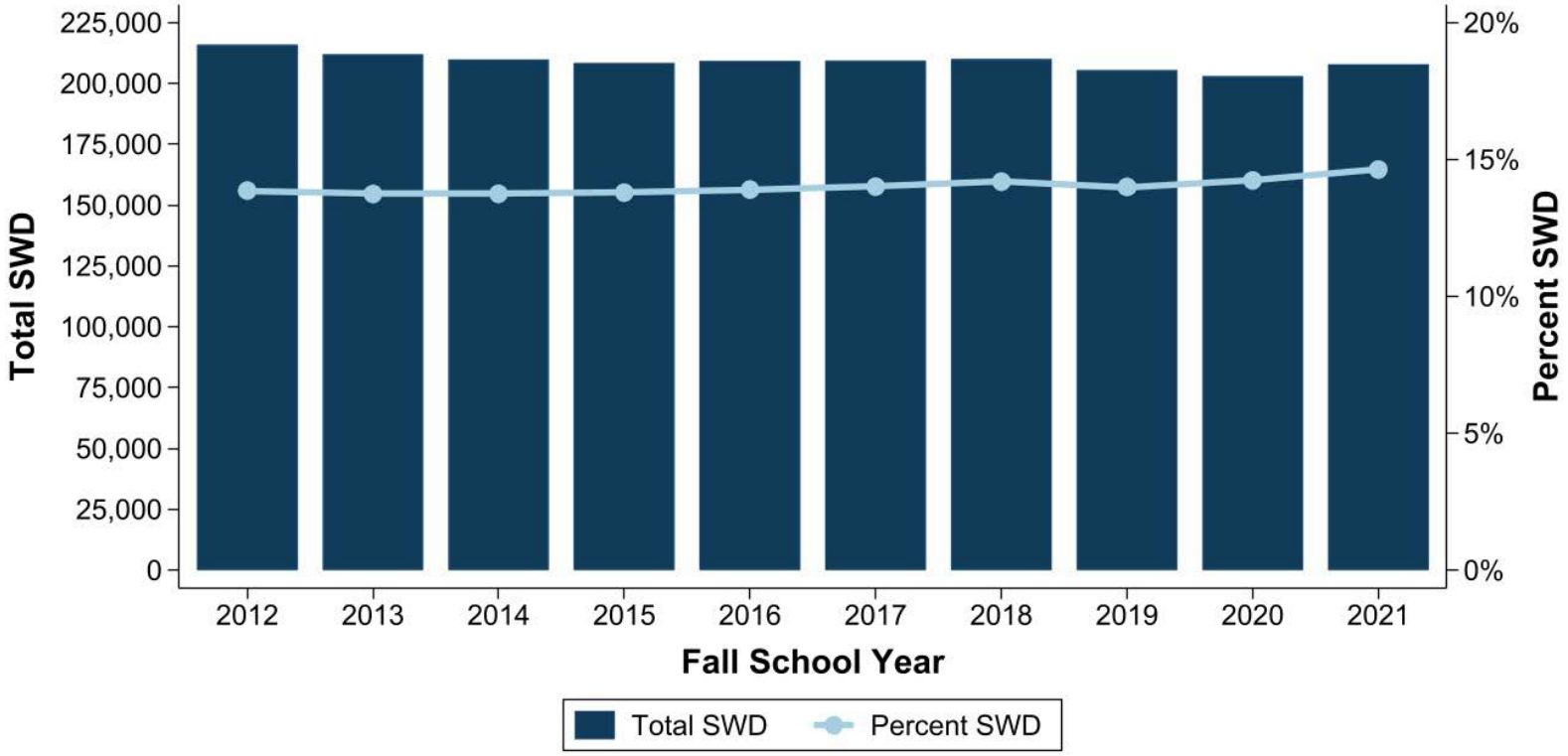
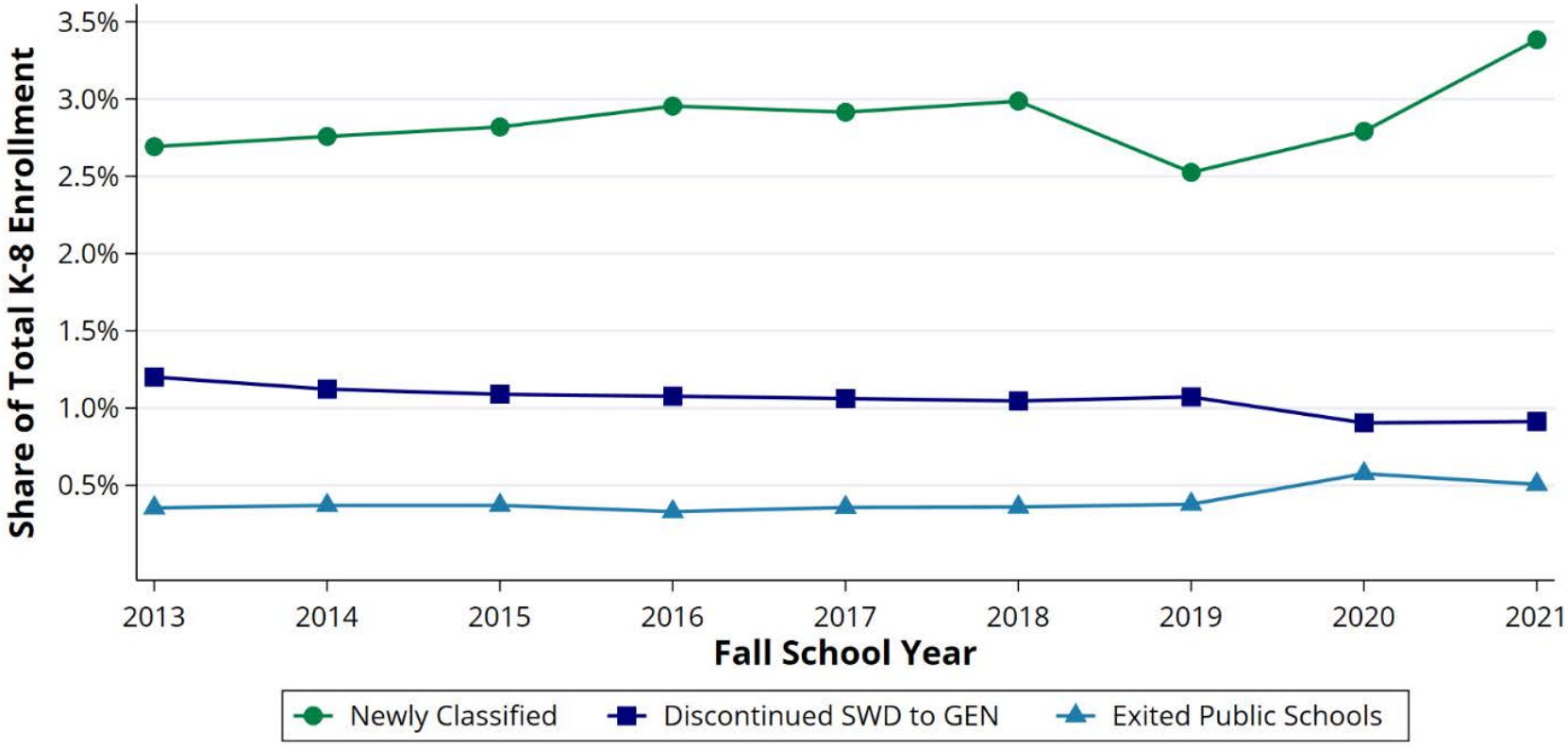
Figure 1: Trends in Michigan SWD Population, Grades K-12, 2012-13 through 2021-22



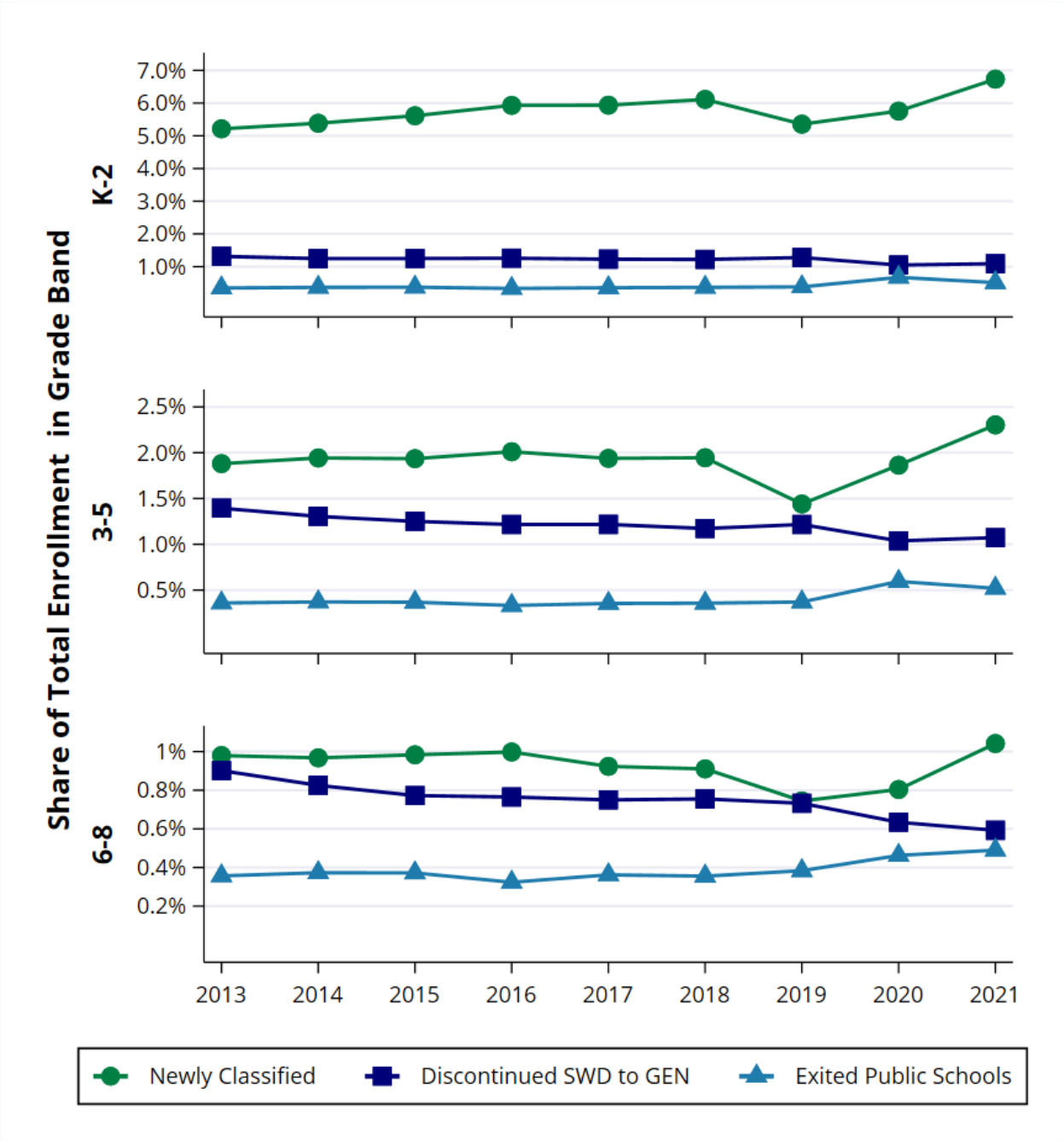
Notes: Sample includes all MI K-12 public school students between SY2012-13 and SY2021-22.

Figure 2: Classification, Discontinuation, and Exit Trends in Michigan SWD Population, Grades K-8, 2013-14 through 2021-22



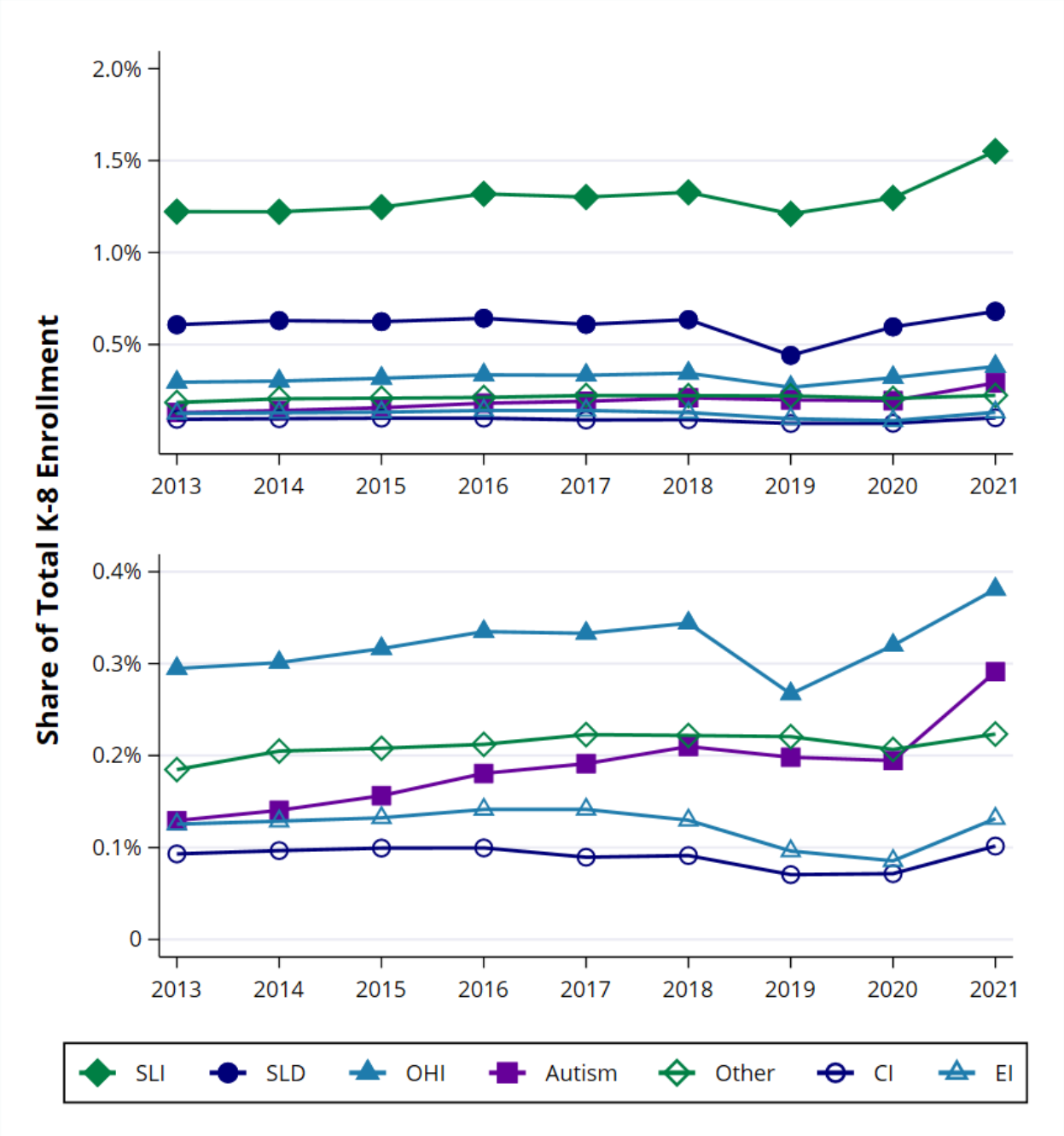
Notes: Sample includes all MI K-8 public school students between SY2013-14 and SY2021-22. "Newly Classified" students are identified by the first year they received special education services. Students who were "discontinued SWD to GEN" remained in the MI public school system but were no longer classified as special education. Students who "exited public schools" were classified as special education in the last school year when they attended a MI public school.

Figure 3: Classification, Discontinuation, and Exit Trends in Michigan SWD Population by Grade Band, 2013-14 through 2021-22



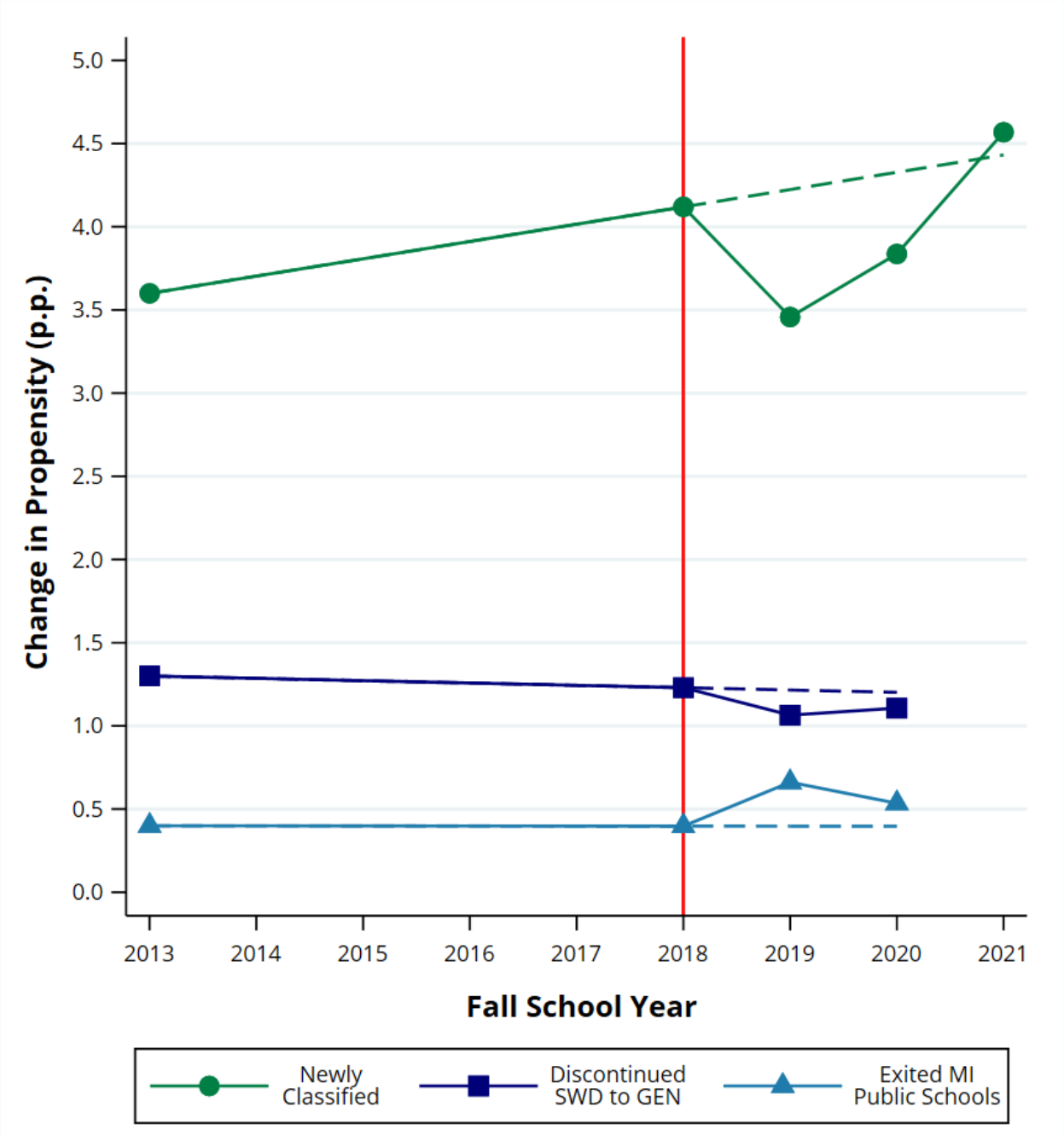
Notes: Sample includes all MI K-8 public school students between SY2013-14 and SY2021-22. "Newly classified" students are identified by the first year they received special education services. Students who were "discontinued from SWD to GEN" remained in the MI public school system but were no longer classified as special education. Students who "exited public schools" were classified as special education in the last school year when they attended a MI public school.

Figure 4: Classification Trends in Michigan SWD Population by Disability Classification, Grades K-8; 2013-14 through 2021-22



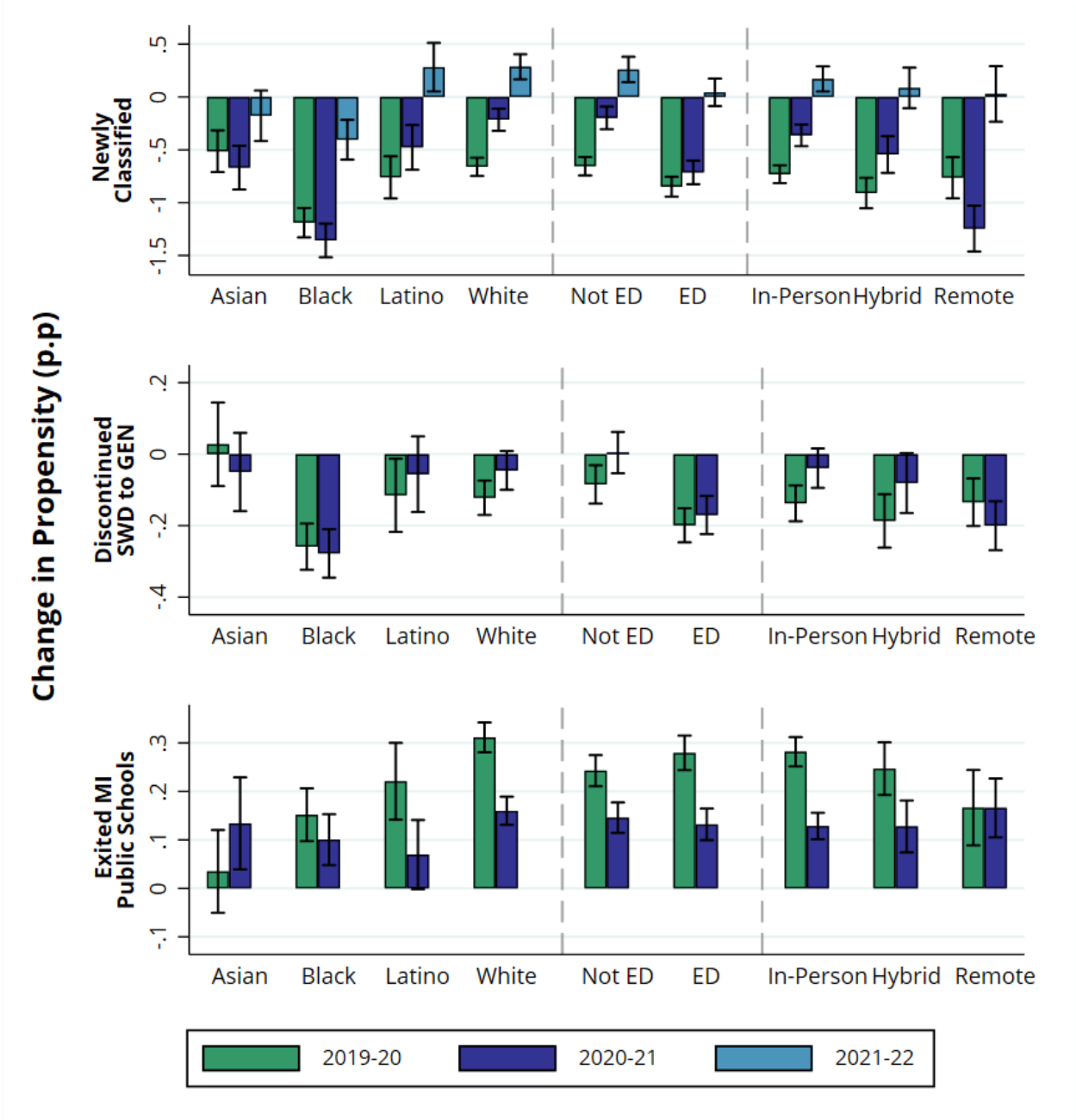
Notes: Sample includes all MI K-8 public school students between SY2013-14 and SY2021-22. Disabilities include speech and language impairment (SLI), specific learning disability (SLD), other health impairment (OHI), autism, cognitive impairment (CI), and emotional impairment (EI). The “Other” grouping includes students identified with a hearing impairment, physical impairment, early childhood developmental delay, visual impairment, deaf-blindness, severe multiple impairment, or traumatic brain injury. "Newly classified” students are identified by the first year they received special education services.

Figure 5: SWD Classification, Discontinuation, and Exit Before and During the COVID-19 Pandemic; ITS Estimates, Grades K-5, 2013-14 through 2021-22



Notes: The figure includes ITS estimates that include all controls and school fixed effects. Estimates can be found in columns 1 through 3 of Appendix Table A1. "Newly Classified" students are identified by the first year they received special education services. Students who were "discontinued SWD to GEN" remained in the MI public school system but were no longer classified as special education. Students who "exited public schools" were classified as special education in the last school year when they attended a MI public school.

Figure 6: SWD Classification, Discontinuation, and Exit Before and During the COVID-19 Pandemic by Student Characteristics and Instructional Modality; ITS Estimates, Grades K-5, 2013-14 through 2021-22



Notes: The figure includes ITS estimates that include all controls and school fixed effects. Estimates can be found in columns 1 through 3 of Appendix Tables A2 through A4. "Newly Classified" students are identified by the first year they received special education services. Students who were "discontinued SWD to GEN" remained in the MI public school system but were no longer classified as special education. Students who "exited public schools" were classified as special education in the last school year when they attended a MI public school. "Hybrid" and "remote" students attended school in a district that offered hybrid or remote instruction for at least half (5 months) of the 2020-21 school year, respectively.

Table 1: Descriptive Statistics for Analytic Sample; Grades K-5; 2013-14, 2018-19, and 2020-21

	School Year (Fall Semester)		
	2013	2018	2020
Dependent Variables (N)			
Total Students	688,482	653,353	624,160
Students with a Disability (SWD)	94,630	97,129	93,479
SWD Percent of Total Enrollment (%)	13.7	14.9	15.0
Newly Classified SWDs	24,574	26,575	23,925
Newly Classified SWDs Percent of Total Enrollment (%)	3.6	4.1	3.8
Discontinued SWDs	8,781	8,165	6,753
Discontinued SWDs Percent of Total Enrollment (%)	1.3	1.2	1.1
SWDs Exiting Public Schools	2,543	2,459	3,222
SWDs Exiting Percent of Total Enrollment (%)	0.4	0.4	0.5
Student Disability Types (% of SWDs)			
Speech or Language Impairment	43.4	41.7	43.9
Specific Learning Disability	21.9	21.0	19.2
Other Health Impairment	9.9	11.2	11.0
Autism	7.5	9.3	10.3
Cognitive Impairment	6.4	5.6	5.4
Emotional Impairment	4.0	4.2	3.6
Other Disabilities	7.0	6.9	6.6
Student Characteristics (% of all students)			
Female	48.5	48.5	48.6
Asian	3.2	3.6	3.7
Black	18.2	18.5	18.5
Latino	7.9	5.8	8.7
Other Race	4.6	5.8	6.0
Economically Disadvantaged	55.1	56.6	56.8
English Learner	7.7	8.9	8.4
School Characteristics (School-level %)			
Average Enrollment (N)	329	319	308
Female	46.8	47.1	47.5
Asian	2.6	2.9	3.0
Black	18.3	19.0	18.6
Latino	7.5	8.2	8.3
Other Race	5.1	6.1	6.4
Economically Disadvantaged	58.0	60.0	59.7
English Learner	6.5	7.6	7.3

Notes: The "other race" category includes students who identified as "American Indian or Alaskan Native," "Native Hawaiian or Pacific Islander," and "two or more races."

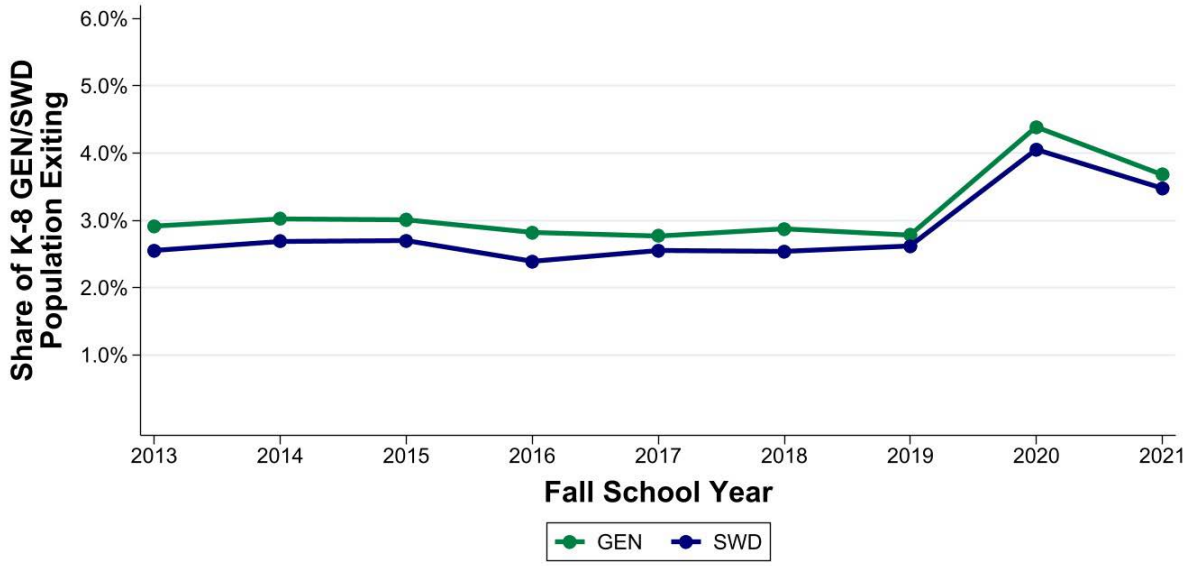
Table 2: SWD Classification During the COVID-19 Pandemic by Selected Disability Type, All New SWD Classifications; 2013-2014 through 2021-2022

	(1) SLI	(2) SLD	(3) OHI	(4) Autism
Trend (β_1)	0.046***	0.012**	0.016***	0.023***
	(0.007)	(0.004)	(0.002)	(0.002)
2019-20 (β_2)	-0.246***	-0.271***	-0.111***	-0.035***
	(0.028)	(0.016)	(0.011)	(0.010)
2020-21 (β_3)	-0.150***	-0.055**	-0.066***	-0.067***
	(0.033)	(0.021)	(0.013)	(0.012)
2021-22 (β_4)	0.144***	0.030	-0.008	0.041**
	(0.039)	(0.025)	(0.015)	(0.015)
Female	-1.062***	-0.071***	-0.240***	-0.284***
	(0.018)	(0.008)	(0.006)	(0.008)
Asian	-0.564***	-0.401***	-0.199***	0.151***
	(0.037)	(0.019)	(0.012)	(0.021)
Black	-0.128***	0.332***	0.014	-0.011
	(0.031)	(0.021)	(0.013)	(0.013)
Latino	0.010	0.132***	-0.044***	0.038***
	(0.029)	(0.018)	(0.011)	(0.011)
Other Race	0.003	0.093***	0.054***	0.014
	(0.029)	(0.018)	(0.014)	(0.011)
Econ. Disad.	0.641***	0.525***	0.196***	0.012+
	(0.020)	(0.013)	(0.007)	(0.007)
English Learner	-0.370***	0.059**	-0.175***	-0.101***
	(0.039)	(0.020)	(0.011)	(0.016)
Log School Size	-0.447***	-0.132**	-0.068*	-0.060
	(0.116)	(0.046)	(0.028)	(0.037)
Percent Female	-0.856*	0.378	0.163	-0.333*
	(0.426)	(0.231)	(0.142)	(0.166)
Percent Asian	-0.671	-0.375	-0.202	-0.430
	(0.651)	(0.322)	(0.226)	(0.343)
Percent Black	-1.534**	-0.399	-0.031	0.291+
	(0.513)	(0.269)	(0.145)	(0.162)
Percent Latino	-0.616	-0.602+	-0.030	-0.086
	(0.619)	(0.325)	(0.209)	(0.192)
Percent Other Race	1.255+	-0.321	-0.068	0.303
	(0.746)	(0.395)	(0.255)	(0.261)
Percent ED	-0.673**	-0.145	-0.306***	-0.086
	(0.221)	(0.123)	(0.074)	(0.091)
Percent EL	-0.205	-0.189	0.047	0.319+
	(0.379)	(0.210)	(0.132)	(0.178)
Rural	0.067	-0.045	0.030	0.001
	(0.158)	(0.086)	(0.048)	(0.043)
Suburban/Town	0.021	-0.033	0.007	-0.001
	(0.141)	(0.074)	(0.042)	(0.038)
$\beta_2 + \beta_3$	-0.396	-0.326	-0.177	-0.102
School Fixed Effects	Y	Y	Y	Y
Observations	5924438	5924438	5924438	5924438
Total Students	1632552	1632552	1632552	1632552
Total Schools	2429	2429	2429	2429
2018-19 Classification Rate (%)	2.00	0.77	0.40	0.30

Notes: "Newly classified" students are identified by the first year they received special education services. "Trend" counts the number of school years since the 2012-13 school year. "Other Race" includes students who identified as "American Indian or Alaskan Native," "Native Hawaiian or Pacific Islander," and "two or more races." Robust standard errors in parentheses.
$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

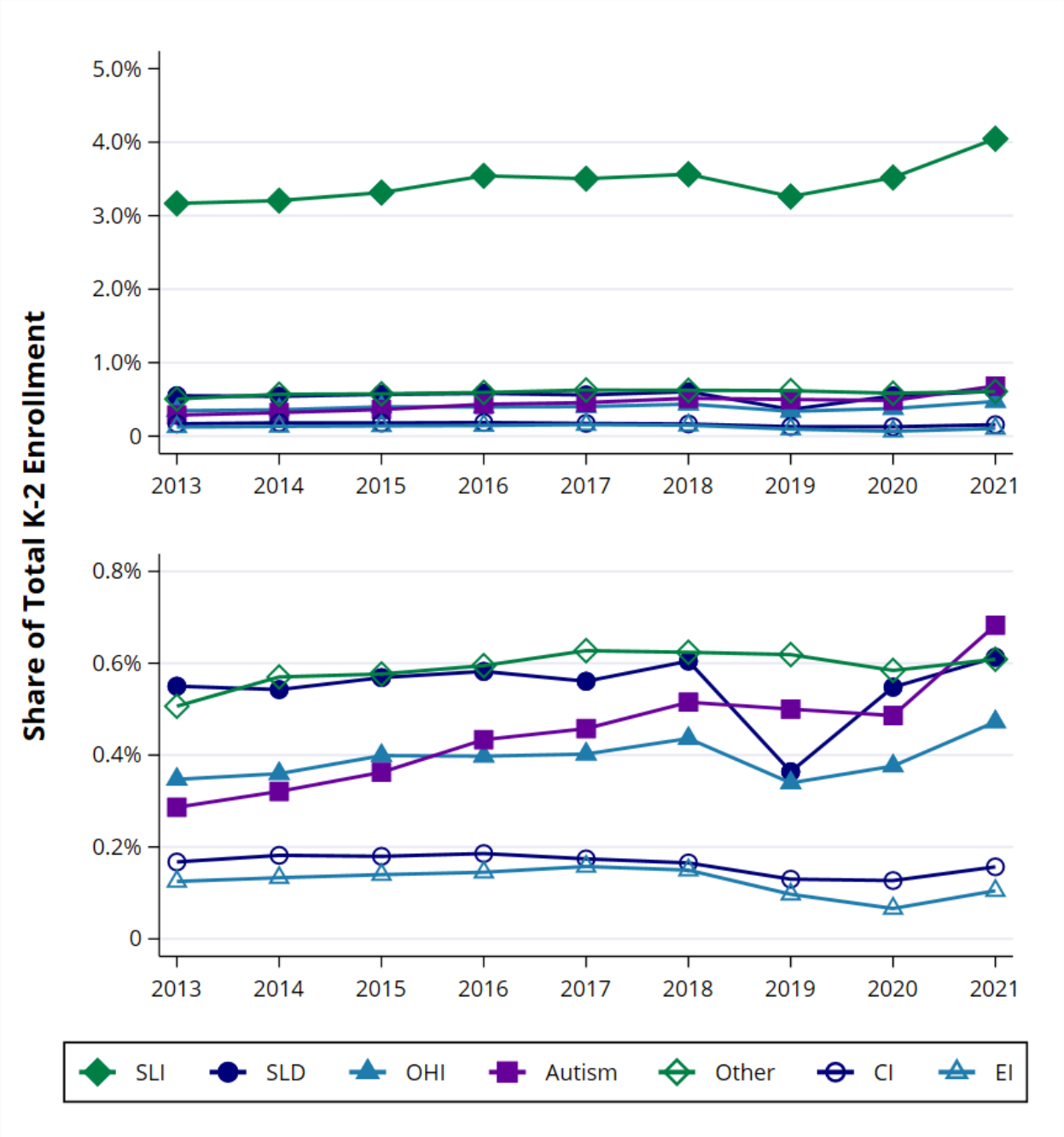
Appendix

Figure A1: Exit Trends in Michigan GEN and SWD Population, Grades K-8, 2013-14 through 2021-22



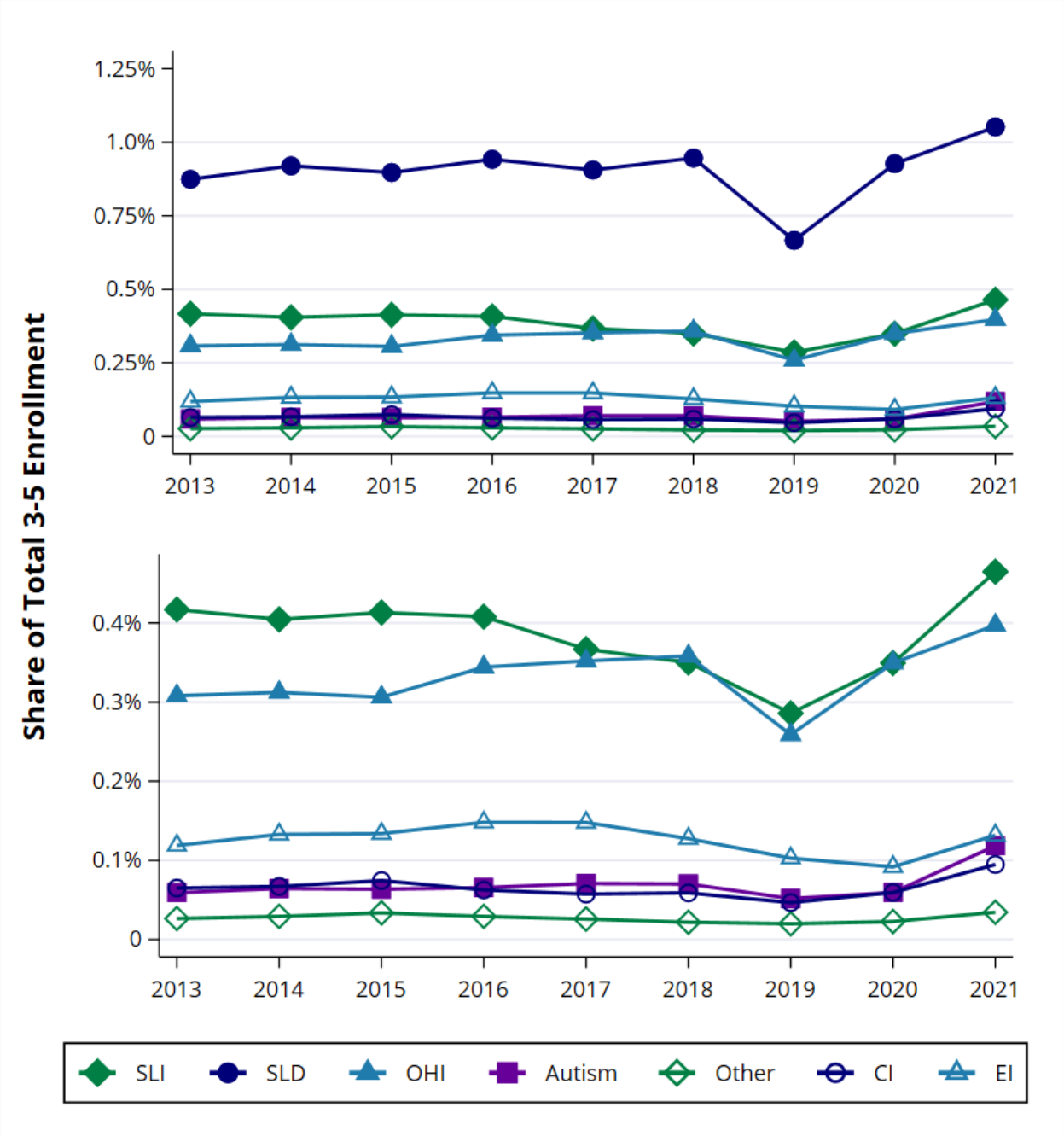
Notes: Sample includes all MI K-8 public school students between SY2013-14 and SY2021-22. "GEN" represents the share of general education students who exited public schools, and SWD represents the share of SWDs who exited public schools.

Figure A2: Classification Trends in Michigan SWD Population by Disability Classification, Grades K-2, 2013-14 through 2021-22



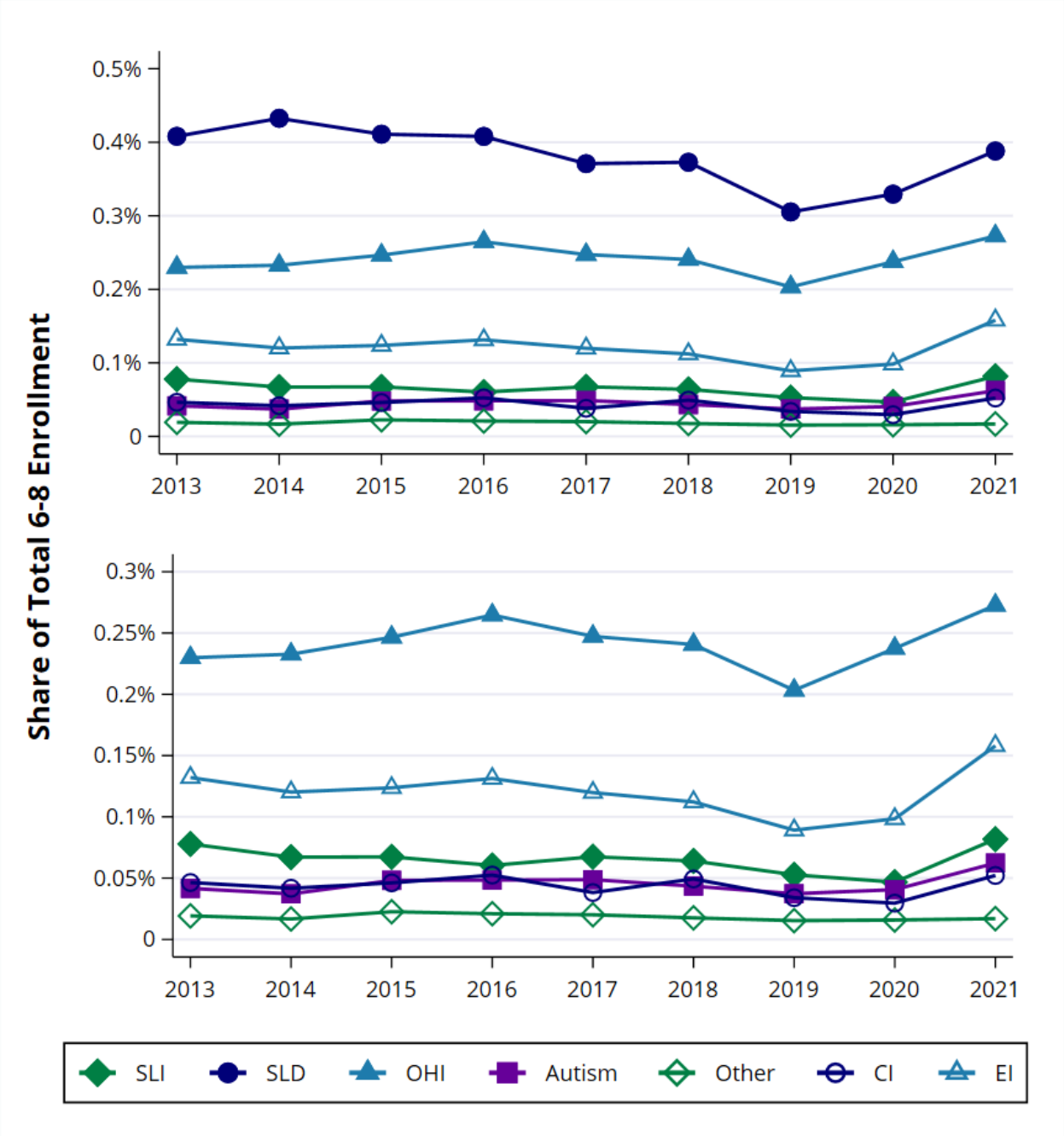
Notes: Sample includes all MI K-5 public school students between SY2013-14 and SY2021-22. Disabilities include speech and language impairment (SLI), specific learning disability (SLD), other health impairment (OHI), autism, cognitive impairment (CI), and emotional impairment (EI). The “Other” grouping includes students identified with a hearing impairment, physical impairment, early childhood developmental delay, visual impairment, deaf-blindness, severe multiple impairment, or traumatic brain injury. "Newly Classified” students are identified by the first year they received special education services.

Figure A3: Classification Trends in Michigan SWD Population by Disability Classification, Grades 3-5, 2013-14 through 2021-22



Notes: Sample includes all MI K-5 public school students between SY2013-14 and SY2021-22. Disabilities include speech and language impairment (SLI), specific learning disability (SLD), other health impairment (OHI), autism, cognitive impairment (CI), and emotional impairment (EI). The “Other” grouping includes students identified with a hearing impairment, physical impairment, early childhood developmental delay, visual impairment, deaf-blindness, severe multiple impairment, or traumatic brain injury. "Newly Classified” students are identified by the first year they received special education services.

Figure A4: Classification Trends in Michigan SWD Population by Disability Classification, Grades 6-8, 2013-14 through 2021-22



Notes: Sample includes all MI K-5 public school students between SY2013-14 and SY2021-22. Disabilities include speech and language impairment (SLI), specific learning disability (SLD), other health impairment (OHI), autism, cognitive impairment (CI), and emotional impairment (EI). The “Other” grouping includes students identified with a hearing impairment, physical impairment, early childhood developmental delay, visual impairment, deaf-blindness, severe multiple impairment, or traumatic brain injury. "Newly Classified” students are identified by the first year they received special education services.

Table A1: SWD and 504 Classification, Discontinuation, and Exit Trends Before and During the COVID-19 Pandemic, Grades K-5, 2013-14 through 2021-22

	Entries	SWD to GEN	SWD Exit Schools	504 Entries	504 to GEN	504 Exit Schools	504 to SWD
Trend	0.104***	-0.014***	0.000	0.061***	0.015***	0.004***	0.001***
	(0.009)	(0.004)	(0.002)	(0.004)	(0.001)	(0.000)	(0.000)
2019-20	-0.766***	-0.151***	0.264***	-0.124***	-0.025**	0.037***	0.000
	(0.038)	(0.021)	(0.013)	(0.020)	(0.008)	(0.004)	(0.002)
2020-21	-0.491***	-0.095***	0.138***	-0.206***	-0.043***	0.002	-0.002
	(0.048)	(0.024)	(0.013)	(0.023)	(0.009)	(0.003)	(0.002)
2021-22	0.137*			-0.099***			-0.002
	(0.056)			(0.027)			(0.002)
Female	-2.003***	-0.660***	-0.246***	-0.233***	-0.060***	-0.016***	-0.004***
	(0.026)	(0.010)	(0.006)	(0.008)	(0.003)	(0.001)	(0.001)
Asian	-1.049***	-0.369***	-0.008	-0.411***	-0.056***	-0.019***	-0.004***
	(0.054)	(0.025)	(0.018)	(0.026)	(0.007)	(0.005)	(0.001)
Black	0.340***	-0.315***	0.072***	-0.130***	-0.009	-0.007*	0.002
	(0.050)	(0.019)	(0.016)	(0.013)	(0.007)	(0.003)	(0.002)
Latino	0.098*	-0.167***	0.089***	-0.078***	-0.011+	0.001	0.001
	(0.044)	(0.021)	(0.014)	(0.012)	(0.006)	(0.003)	(0.001)
Other Race	0.207***	-0.133***	0.023	-0.013	0.010	0.005	0.004*
	(0.044)	(0.023)	(0.015)	(0.016)	(0.007)	(0.004)	(0.002)
Econ. Disad.	1.741***	0.196***	0.158***	-0.041***	0.026***	-0.001	0.004***
	(0.033)	(0.012)	(0.008)	(0.008)	(0.004)	(0.002)	(0.001)
English Learner	-0.708***	-0.349***	-0.037*	-0.246***	-0.059***	-0.015***	-0.003**
	(0.062)	(0.021)	(0.015)	(0.013)	(0.005)	(0.003)	(0.001)
Log School Size	-0.914***	0.002	-0.023	0.080+	0.019	0.008	0.003
	(0.164)	(0.058)	(0.034)	(0.044)	(0.018)	(0.007)	(0.004)
Percent Female	-1.013+	-0.447	-0.394*	0.317	0.018	0.035	-0.015
	(0.608)	(0.288)	(0.167)	(0.229)	(0.101)	(0.034)	(0.017)
Percent Asian	-1.657	0.432	0.013	0.239	0.335**	0.147*	0.025
	(1.220)	(0.363)	(0.213)	(0.375)	(0.126)	(0.062)	(0.028)
Percent Black	-1.504*	-0.175	0.153	-0.260	0.002	-0.067+	-0.004
	(0.717)	(0.290)	(0.146)	(0.247)	(0.089)	(0.037)	(0.016)
Percent Latino	-0.983	0.450	0.150	0.154	-0.096	0.037	0.002
	(0.864)	(0.433)	(0.198)	(0.324)	(0.113)	(0.049)	(0.020)
Percent Other Race	2.291*	-0.795	-0.066	-0.467	-0.455+	-0.057	-0.057*
	(1.040)	(0.502)	(0.263)	(0.414)	(0.268)	(0.065)	(0.028)
Percent ED	-1.446***	0.044	0.135	-0.095	0.025	-0.002	-0.002
	(0.318)	(0.144)	(0.084)	(0.120)	(0.046)	(0.019)	(0.008)
Percent ELL	0.082	0.090	-0.134	-0.004	0.046	-0.011	0.022
	(0.555)	(0.269)	(0.135)	(0.192)	(0.059)	(0.027)	(0.014)
Rural	0.078	0.054	0.008	-0.171*	-0.160	0.013	0.000
	(0.239)	(0.105)	(0.063)	(0.082)	(0.196)	(0.011)	(0.009)
Suburban/Town	0.016	0.072	-0.036	-0.144*	-0.187	0.006	-0.001
	(0.219)	(0.094)	(0.061)	(0.073)	(0.199)	(0.010)	(0.009)
$\beta_2 + \beta_3$	-1.257	-0.246	0.402	-0.330	-0.068	0.039	-0.002
School FE	Y	Y	Y	Y	Y	Y	Y
Observations	5,924,438	5,989,427	5,989,427	5,924,438	5,989,427	5,989,427	5,924,438
Total Students	1,632,552	1,641,253	1,641,253	1,632,552	1,641,253	1,641,253	1,632,552
Total Schools	2,429	2,473	2,473	2,429	2,473	2,473	2,429

Notes: "Newly classified" students are identified by the first year they received special education services. Students who were "discontinued SWD to GEN" remained in the MI public school system but were no longer classified as special education. Students who "exit schools" were classified as special education in the last school year when they attended a MI public school. "Trend" counts the number of school years since the 2012-13 school year. "Other Race" includes students who identified as "American Indian or Alaskan Native," "Native Hawaiian or Pacific Islander," and "two or more races." Robust standard errors in parentheses. $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A2: SWD and 504 Classification, Discontinuation, and Exit Trends Before and During the COVID-19 Pandemic by Race/Ethnicity, Grades K-5, 2013-2014 through 2021-2022

	Entries	SWD to GEN	SWD Exit Schools	504 Entries	504 to GEN	504 Exit Schools	504 to SWD
Trend	0.103***	-0.014***	0.000	0.061***	0.014***	0.004***	0.001***
	(0.009)	(0.004)	(0.002)	(0.004)	(0.001)	(0.000)	(0.000)
2019-20	-0.661***	-0.122***	0.311***	-0.117***	-0.015+	0.050***	0.001
	(0.044)	(0.025)	(0.016)	(0.024)	(0.009)	(0.006)	(0.002)
2020-21	-0.215***	-0.046+	0.160***	-0.181***	-0.041***	0.004	-0.003+
	(0.053)	(0.028)	(0.015)	(0.026)	(0.010)	(0.004)	(0.002)
2021-22	0.285***			-0.035			-0.003
	(0.060)			(0.031)			(0.002)
Asian*2019-20	0.148	0.150*	-0.276***	-0.142***	-0.053***	-0.060***	-0.005**
	(0.105)	(0.061)	(0.045)	(0.035)	(0.016)	(0.013)	(0.002)
Asian*2020-21	-0.453***	-0.004	-0.026	-0.135***	-0.024	-0.010	-0.002
	(0.107)	(0.058)	(0.048)	(0.036)	(0.019)	(0.013)	(0.002)
Asian*2021-22	-0.463***			-0.276***			-0.003+
	(0.121)			(0.046)			(0.002)
Black*2019-20	-0.528***	-0.137***	-0.160***	-0.014	-0.020	-0.051***	-0.006*
	(0.076)	(0.037)	(0.031)	(0.028)	(0.013)	(0.007)	(0.003)
Black*2020-21	-1.142***	-0.232***	-0.060*	-0.058*	-0.022+	-0.015*	0.001
	(0.085)	(0.037)	(0.028)	(0.030)	(0.013)	(0.006)	(0.003)
Black*2021-22	-0.690***			-0.223***			0.000
	(0.097)			(0.030)			(0.003)
Latino*2019-20	-0.099	0.007	-0.090*	-0.012	-0.032*	-0.022+	-0.001
	(0.103)	(0.054)	(0.042)	(0.033)	(0.014)	(0.012)	(0.004)
Latino*2020-21	-0.261*	-0.010	-0.090*	-0.073*	0.019	0.009	-0.001
	(0.108)	(0.054)	(0.038)	(0.031)	(0.018)	(0.011)	(0.003)
Latino*2021-22	-0.004			-0.127**			0.005
	(0.113)			(0.039)			(0.005)
Other*2019-20	-0.066	-0.150*	0.003	0.043	-0.013	-0.002	0.006
	(0.118)	(0.059)	(0.050)	(0.047)	(0.022)	(0.017)	(0.007)
Other*2020-21	-0.404***	-0.084	-0.037	-0.052	0.019	-0.003	0.013
	(0.118)	(0.064)	(0.044)	(0.044)	(0.024)	(0.013)	(0.008)
Other*2021-22	-0.056			-0.031			0.000
	(0.130)			(0.055)			(0.006)
Asian	-1.236***	-0.516***	0.012	-0.444***	-0.069***	-0.017***	-0.004***
	(0.057)	(0.028)	(0.018)	(0.026)	(0.008)	(0.004)	(0.001)
Black	0.646***	-0.250***	0.098***	-0.081***	0.000	0.001	0.002
	(0.055)	(0.021)	(0.016)	(0.014)	(0.007)	(0.003)	(0.002)
Latino	-0.048	-0.258***	0.098***	-0.118***	-0.025***	-0.002	-0.000
	(0.050)	(0.023)	(0.015)	(0.014)	(0.006)	(0.003)	(0.001)
Other	0.285***	-0.094***	0.027+	-0.002	0.011	0.006	0.002
	(0.052)	(0.027)	(0.015)	(0.018)	(0.008)	(0.004)	(0.002)
Student Controls	Y	Y	Y	Y	Y	Y	Y
School Controls	Y	Y	Y	Y	Y	Y	Y
School FE	Y	Y	Y	Y	Y	Y	Y
Observations	5,924,438	5,989,427	5,989,427	5,924,438	5,989,427	5,989,427	5,924,438
Total Students	1,632,552	1,641,253	1,641,253	1,632,552	1,641,253	1,641,253	1,632,552
Total Schools	2,429	2,473	2,473	2,429	2,473	2,473	2,429

Notes: "Newly classified" students are identified by the first year they received special education services. Students who were "discontinued SWD to GEN" remained in the MI public school system but were no longer classified as special education. Students who "exit schools" were classified as special education in the last school year when they attended a MI public school. "Trend" counts the number of school years since the 2012-13 school year. Robust standard errors in parentheses.

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A3: SWD and 504 Classification, Discontinuation, and Exit Trends Before and During the COVID-19 Pandemic by Economically Disadvantaged Status, Grades K-5, 2013-2014 through 2021-2022

	Entries	SWD to GEN	SWD Exit Schools	504 Entries	504 to GEN	504 Exit Schools	504 to SWD
Trend	0.104***	-0.014***	0.000	0.061***	0.015***	0.004***	0.001***
	(0.009)	(0.004)	(0.002)	(0.004)	(0.001)	(0.000)	(0.000)
2019-20	-0.656***	-0.085**	0.243***	-0.137***	-0.029**	0.057***	0.001
	(0.044)	(0.027)	(0.016)	(0.026)	(0.010)	(0.007)	(0.002)
2020-21	-0.198***	0.004	0.146***	-0.175***	-0.036***	0.008+	-0.004*
	(0.055)	(0.029)	(0.016)	(0.028)	(0.011)	(0.005)	(0.002)
2021-22	0.260***			-0.009			-0.001
	(0.061)			(0.034)			(0.002)
ED*2019-20	-0.193***	-0.114***	0.037	0.024	0.008	-0.036***	-0.002
	(0.053)	(0.031)	(0.023)	(0.023)	(0.010)	(0.008)	(0.002)
ED*2020-21	-0.516***	-0.175***	-0.014	-0.055*	-0.012	-0.012*	0.003
	(0.060)	(0.031)	(0.020)	(0.024)	(0.011)	(0.006)	(0.002)
ED*2021-22	-0.217***			-0.158***			-0.002
	(0.064)			(0.028)			(0.002)
Econ. Disad.	1.812***	0.213***	0.154***	-0.031**	0.024***	0.003+	0.004***
	(0.035)	(0.013)	(0.008)	(0.009)	(0.004)	(0.002)	(0.001)
Student Controls	Y	Y	Y	Y	Y	Y	Y
School Controls	Y	Y	Y	Y	Y	Y	Y
School FE	Y	Y	Y	Y	Y	Y	Y
Observations	5,924,438	5,989,427	5,989,427	5,924,438	5,989,427	5,989,427	5,924,438
Total Students	1,632,552	1,641,253	1,641,253	1,632,552	1,641,253	1,641,253	1,632,552
Total Schools	2,429	2,473	2,473	2,429	2,473	2,473	2,429

Notes: "Newly classified" students are identified by the first year they received special education services. Students who were "discontinued SWD to GEN" remained in the MI public school system but were no longer classified as special education. Students who "exit schools" were classified as special education in the last school year when they attended a MI public school. "Trend" counts the number of school years since the 2012-13 school year. Robust standard errors in parentheses.
$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A4: SWD and 504 Classification, Discontinuation, and Exit Trends Before and During the COVID-19 Pandemic by 2020-21 Instructional Modality (Majority of the Year), Grades K-5, 2013-2014 through 2021-2022

	Entries	SWD to GEN	SWD Exit Schools	504 Entries	504 to GEN	504 Exit Schools	504 to SWD
Trend	0.105***	-0.015***	-0.000	0.062***	0.015***	0.004***	0.001***
	(0.009)	(0.004)	(0.002)	(0.004)	(0.001)	(0.000)	(0.000)
2019-20	-0.731***	-0.145***	0.282***	-0.112***	-0.020*	0.036***	0.002
	(0.043)	(0.024)	(0.015)	(0.022)	(0.008)	(0.005)	(0.002)
2020-21	-0.363***	-0.044	0.129***	-0.166***	-0.039***	0.001	-0.001
	(0.052)	(0.027)	(0.014)	(0.025)	(0.009)	(0.004)	(0.002)
2021-22	0.171**			-0.054+			-0.001
	(0.061)			(0.030)			(0.002)
Hybrid*2019-20	-0.178*	-0.027	-0.035	-0.107**	-0.006	0.021+	-0.005+
	(0.079)	(0.045)	(0.031)	(0.040)	(0.017)	(0.012)	(0.003)
Hybrid*2020-21	-0.182*	-0.115*	-0.001	-0.145***	-0.029+	0.009	-0.001
	(0.091)	(0.047)	(0.029)	(0.043)	(0.016)	(0.009)	(0.003)
Hybrid*2021-22	-0.085			-0.134**			-0.006*
	(0.098)			(0.050)			(0.003)
Remote*2019-20	-0.033	0.020	-0.115**	-0.008	-0.034*	-0.035***	-0.005
	(0.104)	(0.049)	(0.042)	(0.046)	(0.016)	(0.010)	(0.003)
Remote *2020-21	-0.883***	-0.245***	0.037	-0.192***	-0.017	-0.008	-0.001
	(0.116)	(0.048)	(0.033)	(0.041)	(0.018)	(0.007)	(0.003)
Remote*2021-22	-0.142			-0.256***			0.004
	(0.138)			(0.046)			(0.004)
Student Controls	Y	Y	Y	Y	Y	Y	Y
School Controls	Y	Y	Y	Y	Y	Y	Y
School FE	Y	Y	Y	Y	Y	Y	Y
Observations	5,841,241	5,903,712	5,903,712	5,841,241	5,903,712	5,903,712	5,841,241
Total Students	1,632,552	1,641,253	1,641,253	1,632,552	1,641,253	1,641,253	1,632,552
Total Schools	2,429	2,473	2,473	2,429	2,473	2,473	2,429

Notes: "Newly classified" students are identified by the first year they received special education services. Students who were "discontinued SWD to GEN" remained in the MI public school system but were no longer classified as special education. Students who "exit schools" were classified as special education in the last school year when they attended a MI public school. "Trend" counts the number of school years since the 2012-13 school year. Robust standard errors in parentheses. "Hybrid" and "remote" students attended school in a district that offered hybrid or remote instruction for at least half (5 months) of the 2020-21 school year, respectively. $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A5: SWD and 504 Classification, Discontinuation, and Exit Trends Before and During the COVID-19 Pandemic, Grades K-5, Students who enter a MI public school and remain through 5th grade, 2013-14 through 2021-22

	Classification	SWD to GEN	504 Classification	504 to GEN	504 to SWD
Trend	0.095***	-0.018***	0.061***	0.021***	0.001***
	(0.009)	(0.005)	(0.004)	(0.002)	(0.000)
2019-20	-0.686***	-0.189***	-0.130***	0.004	-0.000
	(0.039)	(0.031)	(0.020)	(0.014)	(0.002)
2020-21	-0.357***	-0.063	-0.204***	0.007	-0.002
	(0.048)	(0.044)	(0.023)	(0.019)	(0.002)
2021-22	0.205***		-0.113***		-0.002
	(0.056)		(0.027)		(0.002)
Female	-1.907***	-0.717***	-0.233***	-0.068***	-0.004***
	(0.026)	(0.012)	(0.008)	(0.004)	(0.001)
Asian	-1.036***	-0.381***	-0.416***	-0.061***	-0.005***
	(0.055)	(0.032)	(0.026)	(0.009)	(0.001)
Black	0.370***	-0.304***	-0.130***	-0.011	0.001
	(0.049)	(0.023)	(0.014)	(0.009)	(0.002)
Latino	0.055	-0.163***	-0.082***	-0.017*	0.001
	(0.043)	(0.026)	(0.013)	(0.008)	(0.001)
Other Race	0.202***	-0.124***	-0.015	-0.000	0.004+
	(0.043)	(0.029)	(0.016)	(0.009)	(0.002)
Econ. Disad.	1.710***	0.218***	-0.045***	0.026***	0.004***
	(0.033)	(0.015)	(0.008)	(0.005)	(0.001)
English Learner	-0.610***	-0.349***	-0.240***	-0.065***	-0.003**
	(0.061)	(0.026)	(0.013)	(0.007)	(0.001)
Log School Size	-0.946***	-0.059	0.087+	0.037	0.003
	(0.173)	(0.083)	(0.045)	(0.027)	(0.005)
Percent Female	-1.022+	-0.127	0.324	0.051	-0.017
	(0.610)	(0.381)	(0.234)	(0.155)	(0.017)
Percent Asian	-1.620	0.689	0.236	0.394*	0.031
	(1.241)	(0.457)	(0.381)	(0.172)	(0.030)
Percent Black	-1.808*	0.288	-0.254	0.028	-0.007
	(0.732)	(0.399)	(0.245)	(0.126)	(0.017)
Percent Latino	-1.087	0.692	0.127	0.012	0.001
	(0.869)	(0.535)	(0.330)	(0.162)	(0.021)
Percent Other Race	2.096*	-0.122	-0.369	-0.507	-0.057*
	(1.057)	(0.659)	(0.420)	(0.361)	(0.029)
Percent ED	-1.389***	0.047	-0.102	0.134*	-0.001
	(0.319)	(0.172)	(0.123)	(0.061)	(0.008)
Percent ELL	-0.051	0.174	-0.003	-0.035	0.016
	(0.560)	(0.298)	(0.195)	(0.077)	(0.015)
Rural	0.079	-0.023	-0.166*	-0.182	-0.003
	(0.237)	(0.145)	(0.082)	(0.234)	(0.008)
Suburban/Town	0.013	0.021	-0.142+	-0.212	-0.004
	(0.215)	(0.136)	(0.073)	(0.237)	(0.008)
$\beta_2 + \beta_3$	-1.043	-0.252	-0.334	0.011	-0.002
School FE	Y	Y	Y	Y	Y
Observations	5568980	4075984	5568980	4075984	5568980
Total Students	1487605	981005	1487605	981005	1487605
Total Schools	2409	2421	2409	2421	2409

Notes: "Newly classified" students are identified by the first year they received special education services. Students who were "discontinued SWD to GEN" remained in the MI public school system but were no longer classified as special education. "Trend" counts the number of school years since the 2012-13 school year. "Other Race" includes students who identified as "American Indian or Alaskan Native," "Native Hawaiian or Pacific Islander," and "two or more races." Robust standard errors in parentheses.
$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A6: SWD and 504 Classification, Discontinuation, and Exit Trends Before and During the COVID-19 Pandemic by Race/Ethnicity, Grades K-5, Students who enter a MI public school and remain through 5th grade, 2013-2014 through 2021-2022

	Classification	SWD to GEN	504 Classification	504 to GEN	504 to SWD
Trend	0.093***	-0.018***	0.060***	0.021***	0.001***
	(0.009)	(0.005)	(0.004)	(0.002)	(0.000)
2019-20	-0.568***	-0.155***	-0.123***	0.028	0.001
	(0.045)	(0.038)	(0.025)	(0.018)	(0.002)
2020-21	-0.075	-0.027	-0.181***	0.014	-0.003+
	(0.053)	(0.053)	(0.026)	(0.024)	(0.002)
2021-22	0.352***		-0.054+		-0.003
	(0.061)		(0.031)		(0.002)
Asian*2019-20	0.042	0.172+	-0.143***	-0.105**	-0.004*
	(0.107)	(0.104)	(0.037)	(0.035)	(0.002)
Asian*2020-21	-0.515***	-0.120	-0.138***	-0.045	-0.001
	(0.110)	(0.128)	(0.038)	(0.066)	(0.001)
Asian*2021-22	-0.469***		-0.267***		-0.003
	(0.123)		(0.046)		(0.002)
Black*2019-20	-0.554***	-0.139*	-0.005	-0.038	-0.006*
	(0.077)	(0.057)	(0.029)	(0.029)	(0.003)
Black*2020-21	-1.178***	-0.229**	-0.051+	-0.037	0.002
	(0.086)	(0.081)	(0.030)	(0.039)	(0.003)
Black*2021-22	-0.709***		-0.206***		0.000
	(0.097)		(0.030)		(0.003)
Latino*2019-20	-0.132	-0.065	-0.030	-0.110***	0.000
	(0.105)	(0.084)	(0.033)	(0.028)	(0.004)
Latino*2020-21	-0.260*	0.205	-0.071*	-0.013	-0.001
	(0.110)	(0.135)	(0.032)	(0.053)	(0.003)
Latino*2021-22	0.049		-0.118**		0.005
	(0.113)		(0.039)		(0.005)
Other*2019-20	-0.109	-0.119	0.023	-0.074+	0.006
	(0.121)	(0.103)	(0.048)	(0.044)	(0.007)
Other*2020-21	-0.421***	-0.036	-0.037	0.061	0.014+
	(0.121)	(0.148)	(0.046)	(0.082)	(0.008)
Other*2021-22	-0.058		-0.028		0.002
	(0.129)		(0.054)		(0.006)
Asian	-1.151***	-0.502***	-0.439***	-0.075***	-0.005***
	(0.058)	(0.033)	(0.026)	(0.010)	(0.001)
Black	0.685***	-0.264***	-0.083***	-0.003	0.002
	(0.054)	(0.024)	(0.015)	(0.008)	(0.002)
Latino	-0.066	-0.258***	-0.119***	-0.028***	-0.001
	(0.050)	(0.026)	(0.014)	(0.008)	(0.001)
Other	0.285***	-0.106***	-0.003	0.004	0.001
	(0.052)	(0.030)	(0.018)	(0.009)	(0.002)
Student Controls	Y	Y	Y	Y	Y
School Controls	Y	Y	Y	Y	Y
School FE	Y	Y	Y	Y	Y
Observations	5568980	4075984	5568980	4075984	5568980
Total Students	1487605	981005	1487605	981005	1487605
Total Schools	2409	2421	2409	2421	2409

Notes: "Newly classified" students are identified by the first year they received special education services. Students who were "discontinued SWD to GEN" remained in the MI public school system but were no longer classified as special education. "Trend" counts the number of school years since the 2012-13 school year. "Other Race" includes students who identified as "American Indian or Alaskan Native," "Native Hawaiian or Pacific Islander," and "two or more races." Robust standard errors in parentheses.
$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A7: SWD and 504 Classification and Discontinuation Trends Before and During the COVID-19 Pandemic by Economically Disadvantaged Status, Grades K-5, Students who enter a MI public school and remain through 5th grade, 2013-2014 through 2021-2022

	Classification	SWD to GEN	504 Classification	504 to GEN	504 to SWD
Trend	0.094***	-0.019***	0.061***	0.021***	0.001***
	(0.009)	(0.005)	(0.004)	(0.002)	(0.000)
2019-20	-0.567***	-0.054	-0.146***	-0.005	0.002
	(0.045)	(0.043)	(0.027)	(0.019)	(0.002)
2020-21	-0.085	0.096	-0.170***	0.034	-0.004*
	(0.055)	(0.061)	(0.029)	(0.028)	(0.002)
2021-22	0.336***		-0.030		-0.001
	(0.061)		(0.034)		(0.002)
ED*2019-20	-0.208***	-0.234***	0.027	0.015	-0.003
	(0.055)	(0.052)	(0.024)	(0.022)	(0.003)
ED*2020-21	-0.480***	-0.276***	-0.060*	-0.047	0.003
	(0.061)	(0.071)	(0.024)	(0.033)	(0.002)
ED*2021-22	-0.231***		-0.147***		-0.002
	(0.063)		(0.028)		(0.003)
Econ. Disad.	1.785***	0.223***	-0.035***	0.024***	0.004***
	(0.035)	(0.015)	(0.010)	(0.004)	(0.001)
Student Controls	Y	Y	Y	Y	Y
School Controls	Y	Y	Y	Y	Y
School FE	Y	Y	Y	Y	Y
Observations	5568980	4075984	5568980	4075984	5568980
Total Students	1487605	981005	1487605	981005	1487605
Total Schools	2409	2421	2409	2421	2409

Notes: "Newly classified" students are identified by the first year they received special education services. Students who were "discontinued SWD to GEN" remained in the MI public school system but were no longer classified as special education. "Trend" counts the number of school years since the 2012-13 school year. "Other Race" includes students who identified as "American Indian or Alaskan Native," "Native Hawaiian or Pacific Islander," and "two or more races." Robust standard errors in parentheses.
$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A8: SWD and 504 Classification, Discontinuation, and Exit Trends Before and During the COVID-19 Pandemic by 2020-21 Instructional Modality (Majority of the Year), Grades K-5, Students who enter a MI public school and remain through 5th grade, 2013-2014 through 2021-2022

	Classification	SWD to GEN	504 Classification	504 to GEN	504 to SWD
Trend	0.096***	-0.019***	0.062***	0.022***	0.001***
	(0.009)	(0.005)	(0.004)	(0.002)	(0.000)
2019-20	-0.647***	-0.164***	-0.114***	0.015	0.002
	(0.044)	(0.037)	(0.023)	(0.016)	(0.002)
2020-21	-0.226***	-0.007	-0.163***	0.014	-0.001
	(0.053)	(0.052)	(0.026)	(0.023)	(0.002)
2021-22	0.245***		-0.067*		-0.001
	(0.061)		(0.030)		(0.002)
Hybrid*2019-20	-0.205*	-0.146*	-0.118**	-0.022	-0.005+
	(0.080)	(0.068)	(0.040)	(0.033)	(0.003)
Hybrid*2020-21	-0.184*	-0.133	-0.146***	-0.027	-0.002
	(0.093)	(0.104)	(0.043)	(0.047)	(0.003)
Hybrid*2021-22	-0.107		-0.139**		-0.006*
	(0.099)		(0.050)		(0.003)
Remote*2019-20	-0.055	0.051	-0.011	-0.078*	-0.006+
	(0.106)	(0.077)	(0.046)	(0.032)	(0.003)
Remote *2020-21	-0.943***	-0.217*	-0.195***	-0.067	-0.001
	(0.117)	(0.105)	(0.041)	(0.046)	(0.003)
Remote*2021-22	-0.193		-0.250***		0.004
	(0.139)		(0.046)		(0.004)
Student Controls	Y	Y	Y	Y	Y
School Controls	Y	Y	Y	Y	Y
School FE	Y	Y	Y	Y	Y
Observations	5496472	4016481	5496472	4016481	5496472
Total Students	1487605	981005	1487605	981005	1487605
Total Schools	2409	2421	2409	2421	2409

Notes: "Newly classified" students are identified by the first year they received special education services. Students who were "discontinued SWD to GEN" remained in the MI public school system but were no longer classified as special education. "Trend" counts the number of school years since the 2012-13 school year. "Other Race" includes students who identified as "American Indian or Alaskan Native," "Native Hawaiian or Pacific Islander," and "two or more races." Robust standard errors in parentheses.
$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$