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Leah R. Clark

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VERSION: December 2024

Suggested citation: Clark, Leah R.. (2024). The Differential Sorting of Disadvantaged Students in the Competitive K-12 Market. (EdWorkingPaper: 24 -1111). Retrieved from Annenberg Institute at Brown University: <https://doi.org/10.26300/y4y1-7a89>

# **The Differential Sorting of Disadvantaged Students in the Competitive K-12 Market**

Leah R. Clark

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## **Abstract**

School choice options offer potential educational gains for disadvantaged students, but do they take advantage of such options? I study the sorting patterns of students with prior child welfare reports (12 percent of incoming kindergartners) across traditional public, magnet, charter, and private schools in a mid-sized city. These students are significantly less likely to opt out of traditional public schools and enroll in schools of choice than other students. Disparities persist after adjustment for race, socioeconomic status, and neighborhood. In contrast, low socioeconomic status students enroll in charter and magnet schools at similar rates as non-disadvantaged students.

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<sup>1</sup> Any opinions and conclusions expressed herein are those of the author and do not reflect the views of the U.S. Census Bureau or the U.S. Department of Education. The research reported here was supported, in whole or in part, by the Institute for Education Sciences, U.S. Department of Education, through grant R305B150008 to Carnegie Mellon University.

Central to the economic case for publicly-funded alternatives to traditional neighborhood public schools is the theory that competing for student enrollments will cause all schools to improve, lifting the tide even for students who do not get seats in choice schools. However, students applying to choice schools are not representative of all students (Cohodes & Parham 2021, Lankford & Wyckoff 2001). If there is a segment of students who are systematically left out of the school choice market, they may not benefit from the effects of competition. Moreover, if these students have high educational needs, their disproportionate concentration in traditional public schools may make it harder for traditional public schools to compete with choice schools.

Overcoming the barriers to school choice might be more difficult for parents facing hardship and disadvantage. While explicit barriers, such as entrance exams and tuition, are disallowed in the rapidly growing charter school sector, parents must expend effort and time to learn about and evaluate alternative schools, apply, and complete enrollment steps. Once enrolled, they must navigate transportation options and supplemental child care needs that may differ from the more familiar neighborhood public school. All parents confront these costs, but they may be insurmountable for some parents facing hardships, such as substance abuse or unstable housing.

Child welfare reports flag families facing the sorts of hardships that might preclude their engagement with school choice options. Some reports allege child abuse, but many revolve around non-abuse allegations, including parental substance use, inadequate shelter or supervision, parental mental health issues, and intimate partner violence (Pennsylvania Department of Human Services 2015). Approximately 3 percent of children nationally are reported to and screened by local child protective services agencies each year, and nearly 12 percent of incoming kindergartners in the city under study have a prior child welfare report (U.S. Department of Health & Human Services 2017). While most reports are not ultimately substantiated—a legally consequential determination in the course of the investigation—children linked to unsubstantiated reports still have high developmental needs and poor educational outcomes (Fantuzzo et al. 2011, Stahmer et al. 2005, Ryan et al. 2018). If children with prior child welfare reports lack access to school choice options, not only might they miss out on educational opportunities, but traditional public schools will enroll a disproportionately high-need population.

Are children with previous child welfare reports as likely to enroll in choice schools for kindergarten as other children? To answer this, I document the sorting of incoming kindergartners in Pittsburgh, Pennsylvania across traditional public, magnet, charter, and private schools, and by

child welfare history along with several other measures of student disadvantage that are typically unobserved. Specifically, I model kindergarten enrollment in each school type as a function of early child welfare exposure adjusting for socioeconomic status (SES), race, gender, and residential neighborhood. I further examine the interaction of child welfare involvement, SES, and race. By studying kindergarten and using measures of disadvantage exogenous to schools, this study provides new insight into widespread school enrollment disparities that likely arise without school intervention. By observing enrollments in all four major school types, this study offers a uniquely comprehensive snapshot of sorting patterns.

While several recent studies examine the educational experiences of children reported to child welfare and, in particular, those placed in foster care, no studies have extensively documented their access to school choice options. The broader literature on selection into choice schools has highlighted the possibility that low-SES students may not access choice options as often as their higher status counterparts, even in the absence of direct costs (Goldring & Hausman 1999, Ladd et al. 2017, Butler et al 2013, Hart & Figlio 2015). Low-SES students certainly do not access private schools as often as high-SES students (Murnane & Reardon 2018). Notably, these studies use survey data or unique sources of administrative data to measure socioeconomic status, since typical K-12 administrative data offer little insight into students' circumstances outside of school.

Inferring students' fundamental educational needs from typical K-12 administrative data is problematic because relevant proxies, such as special education and free and reduced-price lunch enrollment, are endogenous to schools (Domina et al. 2018, Rhim & Ahearn 2017). Variation in identifying students in these categories may be particularly severe across school types. For example, charter schools, compared to traditional public schools, have lower rates of special needs identification and tend to deidentify students who transfer in from traditional public schools (Setren 2019, Winters 2015). Existing studies of selection into choice schools sidestep this endogeneity issue by focusing on transfer students and using school fixed effects. In a study unique for its evaluation of all major school types, Berends & Waddington (2018) find that students transferring from traditional public schools to magnet or charter schools are more likely to be low-income or special needs than those staying put, but those transferring to private schools are less likely to be low-income or special needs. However, transfer students are not representative of the full student population.

The centerpiece of this study is a dataset that merges two sources of microdata: indicators of child involvement with human services from a county department of human services with K-12 administrative data from the central city school district. The resulting data is unique both in its information on students' early childhood circumstances and its breadth in capturing charter and private school enrollments in addition to traditional public and magnet enrollments. Because the human services indicators go back until birth and cover the wider region, I can construct student-level measures of child welfare involvement and socioeconomic status that are exogenous to schools. Thanks to this exogeneity and the breadth of the data, I identify true enrollment disparities for the entire population of kindergartners in the city, advancing the literature on selection in choice schools which often focuses only on transfer students at later grades. Patterns of school enrollment at kindergarten entry are revealing because schools have little opportunity to screen or push-out students at this early point, making observed enrollment patterns primarily reflective of parents' preferences and their success in navigating the school choice system (Lareau et al. 2017).

This study is the first to document the extent to which students with prior child welfare involvement enroll in alternatives to traditional public schools. I find that kindergartners previously reported to child welfare are considerably less likely to enroll in magnet, charter, or private schools than their grade-mates who were never previously referred. They are much more likely to enroll in traditional public school. These patterns persist after adjusting for socioeconomic status, race, and residential neighborhood. Since students with a prior report to child welfare are disproportionately likely to be low-income and have high developmental needs, their concentration in traditional public schools is particularly consequential (Johnson-Reid et al. 2009, Stahmer et al. 2005). They may require more educational resources, and they may miss out on educational settings that would benefit them, in particular (Angrist et al. 2013, Walters 2018, Hasting et al. 2012).

## **I. Data & Background**

The data stem from a partnership between Allegheny County Department of Human Services and Pittsburgh Public Schools. The dataset is comprised of kindergartners living in Pittsburgh during the 2013-14, 2014-15, or 2016-17 school years.<sup>2</sup> Specifically, I observe the first

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<sup>2</sup> Data from the 2015-16 school year are available but reflect end-of-year (not start-of-year) enrollments, so they are unsuitable for this study.

school in which students enroll for kindergarten, as well as race and gender indicators. The data tracks enrollments in traditional public, magnet, charter, and private schools for students who live in Pittsburgh.<sup>3</sup> Pittsburgh Public Schools provides busing for all of these students, assuming they live within city limits.

Incoming kindergartners are matched to their county human services records. Geographically, Pittsburgh is located at the center of Allegheny County with more than 40 surrounding suburbs contained within county limits. Assuming a student resided in Pittsburgh or the surrounding suburbs prior to kindergarten,<sup>4</sup> I observe a summary of their human services history. This summary includes indicators – for each year from birth through kindergarten – for child welfare reports and Medicaid enrollment. For the year prior to kindergarten entry, I also observe receipt of public housing supports.

Subsequently, I describe the key variables drawn from the human services data, and provide a discussion of the potential sources of selection for each variable.

*Child welfare* is an indicator variable for whether a student was ever reported to child welfare based on concerns of abuse and/or neglect prior to kindergarten entry. Participation in a child welfare investigation is involuntarily. Typically, reports are made when someone contacts a hotline to detail their concerns of abuse or neglect concerning a particular child. A report can occur at any age, though more than half of students with child welfare reports studied here are linked to their first report before their second birthday. Children who live with reported children are also flagged and included in the investigation. Many professionals who work with children (e.g., doctors, teachers) are mandated reporters – that is, the law requires them to report suspicions of abuse or neglect within a strict time window.

Child welfare reports do not necessarily indicate a history of abuse or neglect, as most reports are not, ultimately, substantiated.<sup>5</sup> In rare cases, having a prior child welfare report could

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<sup>3</sup> I drop approximately 2% of kindergartners in the administrative sample who enroll in less common schooling options like homeschooling, cyber schools, and schools for the blind or deaf.

<sup>4</sup> Cross-county migration rates for children under five are fairly low. According to five-year estimates from the American Community Survey for 2013 and 2016, approximately 4% of children ages 1-4 in Allegheny County resided in a different county, state, or country the year prior (Table B07001 “Geographical mobility in the past year by age for current residence in the United States”). If migrating children attend school in the city of Pittsburgh for kindergarten, they are in my sample and potentially misclassified, especially if they arrive just before kindergarten. Some are deemed not to have a history of service use when, in fact, they do.

<sup>5</sup> According to the Pennsylvania Department of Human Services, in Allegheny County in 2015, 1.2 percent of children were linked to abuse reports, but just 0.05 percent were linked to substantiated abuse. 2.3 percent of

indicate a child who has suffered physical abuse, sexual abuse, or serious physical neglect, but more commonly it reflects non-abuse allegations, often related to parental substance abuse, mental health concerns, or domestic violence.<sup>6</sup>

The practical implications of reports for children and families vary. The investigation following a report determines whether the evidence supports substantiating the allegations. The investigation itself could be traumatic for a child, as could subsequent removal, if that happens. Approximately one-in-five kindergartners reported to child welfare in the data have also experienced a foster care placement, including placements with relatives. Not all substantiated cases lead to removal, though; often, children remain at home while they and their family receive supports or services.

Not being able to identify substantiated cases is a shortcoming of the data, but children reported to child welfare on allegations that are not ultimately substantiated are also at elevated risk for adverse outcomes. Studies show they have similar developmental needs and early educational outcomes when compared to children linked to confirmed reports (Fantuzzo et al. 2011, Stahmer et al. 2005, Ryan et al. 2018). Ultimately, substantiation reflects whether investigators find evidence to support abuse and neglect allegations, but the lack of substantiation does not mean children's circumstances raise no concerns.

While the involuntary nature of child welfare reports rules out the possibility that parents are selecting their families into child welfare, there is the potential for bias on the part of the reporter. Some children experiencing abuse or neglect are not reported, while some children are reported when they should not be. Concerns over racial bias have led to a number of studies investigating why Black children are reported to child welfare at much higher rates than White children. Looking at Allegheny County, Maloney et al. (2017) use birth records linked to child welfare reports and find that differences in marital status and maternal age fully explain the racial gap in reports. This does not rule out the potential role of bias – perhaps bias is strongest against

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children were assessed for non-abuse allegations, and 1.1 percent were linked to validated non-abuse reports (Pennsylvania Department of Human Services 2015).

<sup>6</sup> In Pennsylvania in 2015, the most frequent valid non-abuse allegations for children under 5 were parent substance abuse (29 percent), conduct by parent that places child at risk (10 percent), inadequate shelter (9 percent), lack of supervision (9 percent), parent mental health concerns (6 percent), and domestic violence (6 percent) (Pennsylvania Department of Human Services 2015). Among children under age one, 12 percent of valid allegations involved being born affected by illegal substance abuse or experiencing withdrawal symptoms due to prenatal drug exposure. As with inadequate shelter, several other common allegation types are likely tied to poverty, including homelessness or inadequate food, clothing, hygiene, or health care.

young Black single mothers – and it offers a reminder that other unobserved variables may lurk behind the child welfare indicator used here. The most literal interpretation of the indicator is that at some point early in a child’s life, someone expressed concern that they might be suffering abuse or neglect, and a subsequent investigation may have caused both benefits and harm. This paper makes no attempt to causally attribute school enrollment choices to child welfare reports. Rather, I argue that child welfare reports flag hardship not typically captured in administrative data. To account for the possibility that the nature of reports—perhaps due to bias on the part of reporters and screeners—vary by race, I also examine the relationship between child welfare and school selection within racial subgroups.

The *socioeconomic status* (SES) variable is a categorical variable with levels defined from most socioeconomically disadvantaged to least as follows:

- Received public housing supports in the year prior to kindergarten enrollment (low SES);
- Continuously enrolled in Medicaid from birth through kindergarten enrollment, but did not receive public housing supports in prior year (low SES);
- Occasionally enrolled in Medicaid from birth through kindergarten enrollment, but did not receive public housing supports in prior year (middle SES); or
- Did not enroll in Medicaid before kindergarten and did not receive public housing supports in prior year (high SES).

Public housing residence is treated as the strongest indicator of socioeconomic disadvantage because means-testing for public housing is more stringent than for Medicaid. Similarly, continuous Medicaid enrollment indicates a more sustained low level of family income than occasional Medicaid enrollment (akin to Michelsmore & Dynarski 2017).

As with using free/reduced-price lunch as a proxy for SES, measures that rely on public housing and Medicaid enrollment suffer from potential selection—for example, children in families who receive public housing assistance may be better off than some low-income children who do not. Still, proxies of economic disadvantage based on participation in public benefits programs with high take-up like Medicaid are more reliable than free/reduced-price lunch enrollment flags, especially after the introduction of universal free lunch in many districts in the 2010s (Kenney et al. 2012, Spiegel et al. 2024). Importantly here, the constructed SES measure is not endogenous to school practices, since these programs are administered on the city/county level regardless of which school students attend. In fact, free/reduced-price lunch enrollment is not



reliably reported in the data on hand for charter and private schools. Additionally, the SES measure permits comparison across multiple levels of SES.

Sample demographics are depicted in the first column of Table 1. On average, roughly 2,500 children in the city enroll in kindergarten for the first time each year. Over 11 percent have a prior child welfare report. In terms of socioeconomic status, 46 percent are low SES, with 16 percent receiving public housing supports in the previous year and an additional 30 percent continuously enrolled in Medicaid since birth. Just over one-third have no history of Medicaid enrollment or public housing and comprise the high SES subgroup. Pittsburgh's kindergartners are predominantly Black (44 percent) or White (40 percent), with an additional 8.5 percent of students identifying as Multiracial. Asian, Hispanic, and Native American populations are small, and the educational data reports very few English Language Learners. Overall, 54 percent of incoming kindergartners enroll in traditional public schools, 20 percent in the district's magnet schools, 9 percent in non-district-affiliated public charter schools, and 17 percent in private schools. Private school enrollment patterns offer a useful validation of the SES measure, rising across SES levels, with more than one-third of high SES students attending private schools.

## **II. Methodology**

The goal of this paper is to understand whether students with prior child welfare reports enroll in choice schools at the same rates as other students. The data on hand address three key barriers that have prevented previous studies from answering this question.

First, I observe school enrollments across all major school types at the point of kindergarten entry. By observing all four major school types, I can analyze the population of kindergartners broadly. By capturing first enrollment, I can freeze the enrollment choices of parents at a point in which schools have had little-to-no opportunity to push students out, and students have not had in-school experiences that may prompt parents to pull them. Thus, this initial enrollment should reflect some combination of parents' preferences, information, and constraints as their child begins kindergarten. While observed enrollment does not necessarily reveal parents' most preferred school, it still offers insight into the extent to which a group of parents surpass the barriers to choice school entry, on average.<sup>7</sup>

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<sup>7</sup> Oversubscribed choice options typically require applications more than six months prior to the start of school, but some choice schools admit students through the start of the school year. Testing is not typically used at the point of

	All (column %)	Traditional public (row %)	Magnet	Charter	Private
All	100.0	54.4	20.0	8.9	16.7
<i>Child welfare</i>					
Prior child welfare report	11.5	75.6	14.3	6.7	3.5
No prior child welfare report	88.5	51.7	20.7	9.1	18.5
<i>Socioeconomic status</i>					
Public housing in prior year (low)	15.9	60.9	24.7	12.1	2.3
Continuous Medicaid enrollment (low)	30.1	66.7	18.4	8.7	6.2
Occasional Medicaid enrollment (middle)	18.3	56.2	22.7	8.5	12.7
No Medicaid or public housing (high)	35.7	40.3	17.9	7.7	34.1
<i>Race/ethnicity</i>					
Black	44.2	59.3	26.2	10.6	3.9
White	40.4	46.5	14.2	7.7	31.6
Multiracial	8.5	58.6	19.2	9.3	12.9
Asian, Hispanic, or Native American	6.9	64.5	15.5	3.3	16.7
<i>Residential region</i>					
East side	41.8	39.2	27.7	7.5	25.6
North side	22.6	53.8	23.3	12.4	10.5
South side	35.6	72.7	8.9	8.1	10.3

Note: N=7526; sample restricted to first kindergarten enrollment in the 2013-14, 2014-15, or 2016-17 school years. The 2015-16 school year is excluded due to censored enrollment data. Approximately 2% of kindergartners enrolled in other school types (e.g., homeschooling, schools for the blind or deaf) are dropped from the sample.

**Table 1: Percentage of students enrolling in each school type**

Second, I observe, for virtually all students, attributes that are not determined by schools. This exogeneity is critical for accurately identifying the enrollment disparity associated with a given attribute, and an important difference from existing studies that have relied on school-derived measures of student need such as special education or free/reduced-price lunch enrollment. There is no risk of reverse causality such that enrollment in a particular school type determines students' attributes.

Third, these attributes capture dimensions of disadvantage not typically observed in education data. Schools rarely observe information about student disadvantage prior to school entry, and they do not learn about prior interactions with systems like child welfare and Medicaid

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kindergarten entry in the city studied, but some schools may have additional requirements for parents to enroll, e.g., attending information sessions.

systematically.<sup>8</sup> Even if free/reduced-price lunch eligibility were consistently measured throughout the student population, it is still a simple binary indicator of whether families have income below 185 percent of the federal poverty line. Ideally, I would observe family income directly, but the four-category SES measure used here permits deeper analysis than is standard.

Because the data are the fundamental contribution of this study, the raw enrollment patterns broken out by student attributes in Table 1 offer an initial answer to the research question: students with a prior child welfare report are less likely to enroll in magnet, charter, or private schools than students without a prior report. These disparities result in a traditional public school enrollment rate of 76 percent for students with a prior child welfare report compared to 52 percent for students without a prior report. In contrast, the enrollment patterns in magnet and charter schools shown in Table 1 do not indicate that low-SES students are left behind by magnet and charter schools. In fact, low-SES students who live in public housing are disproportionately likely to enroll in magnet and charter schools, despite being quite unlikely to access private schools. A similar pattern appears for Black students, who are overrepresented in charter and magnet schools but extremely underrepresented in private schools.

That child welfare students are less likely to enroll in charter and magnet schools despite being disproportionately low-SES and Black suggests that this indicator captures a dimension of school selection missed by studies that consider SES and race alone. Of course, I can use OLS to examine this directly, while also accounting for residential location, which is itself an important predictor.

The regression model for this analysis is as follows

$$OptTrad_i = \beta_0 + \beta_1 ChildWelfare_i + X_i'\gamma + \alpha_{zip} + \lambda_{year} + \epsilon_i$$

where  $OptTrad_i$  indicates whether student  $i$  enrolls in a traditional public school. The vector  $X_i$  contains indicator variables for SES, sex, and race. Residential zip code fixed effects capture the association between residential location and opt-in, while school year fixed effects capture changes across years in overall enrollment propensities.  $\beta_1$  estimates the difference in the probability of enrolling in traditional public schools for students with a history of child welfare reports compared to those without, adjusting for socioeconomic status, race, sex, and neighborhood.

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<sup>8</sup> The National School Lunch Program's direct certification process provides schools with information about whether students are enrolled in specific public benefits that make them categorically eligible for free lunch. At the time of this study, Medicaid was not widely used in direct certification, but that has changed (Spiegel et al. 2024a).

	(1) Traditional public	(2) Magnet	(3) Charter	(4) Private
Prior child welfare report	0.156*** (0.018)	-0.074*** (0.013)	-0.035*** (0.011)	-0.047*** (0.005)
Occasional Medicaid enrollment (middle)	0.090*** (0.019)	0.046** (0.017)	0.001 (0.008)	-0.138*** (0.016)
Continuous Medicaid enrollment (low)	0.168*** (0.013)	-0.016 (0.012)	0.003 (0.008)	-0.155*** (0.014)
Public housing in prior year (low)	0.122*** (0.018)	0.013 (0.016)	0.025 (0.016)	-0.160*** (0.014)
White	-0.133*** (0.038)	-0.068*** (0.021)	-0.005 (0.013)	0.207*** (0.037)
Multiracial	-0.042 (0.030)	-0.020 (0.025)	-0.004 (0.017)	0.066** (0.024)
Asian, Hispanic, or Native American	0.073 (0.045)	-0.063 (0.041)	-0.051*** (0.017)	0.042 (0.034)
Female	-0.002 (0.009)	-0.005 (0.009)	0.002 (0.005)	0.004 (0.007)
Constant	0.528*** (0.025)	0.221*** (0.015)	0.079*** (0.013)	0.172*** (0.018)
N	7525	7525	7525	7525
R-sq	0.201	0.151	0.033	0.229

Note: Standard errors in parentheses, clustered by residential zip code. All specifications include school year and residential zip code fixed effects. Reference category is Black male students with no prior child welfare report and no Medicaid or public housing. \*\*\* p<0.01, \*\* p<0.05

**Table 2: OLS, Probability of enrolling in each school type over all alternatives**

The same model is run on the rest of the enrollment outcomes: enrolling in magnet schools, charter schools, or private schools. These estimates characterize whether each alternative choice attracts a particular group of students compared to other three alternatives. The coefficient estimates are not directly comparable across specifications since the alternative choices differ in each specification, but the signs can be compared to understand which school types disproportionately enroll (or do not enroll) which populations.

Finally, the intersections of child welfare with socioeconomic status and race potentially demark important subgroups, because child welfare reports disproportionately occur among low SES and Black children. Thus, I run the above models interacting child welfare with socioeconomic status and race, and then predict the enrollment disparities for child-welfare-by-SES and child-welfare-by-race subgroups within each school type.

### III. Results

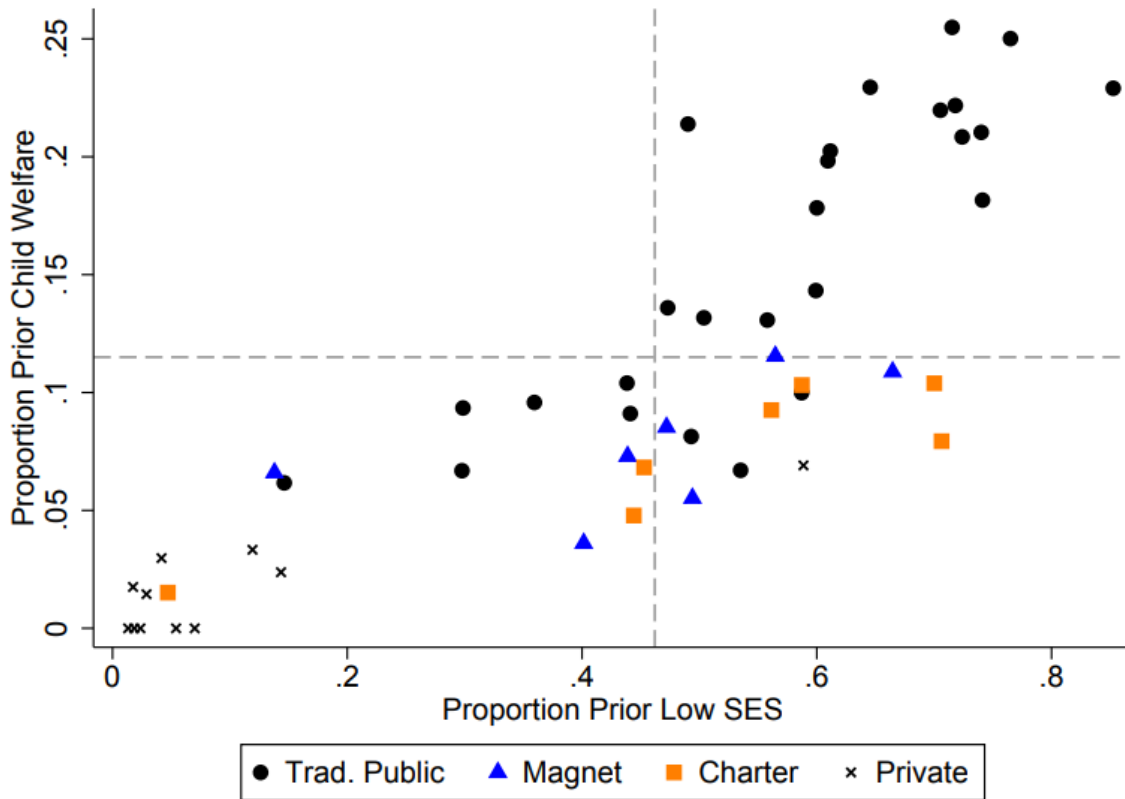
Students with prior child welfare reports are considerably less likely to enroll in magnet, charter, or private schools than students without prior child welfare reports, even after adjusting for race, SES, and neighborhood. The regression reported in column 1 of Table 2 estimates the probability of enrolling in traditional public school for kindergarten.<sup>9</sup> Students with prior child welfare reports are 15.6 percentage points more likely to enroll in traditional public school over the alternatives than students without child welfare histories. Columns 2 and 3 of Table 2, respectively, estimate the probability of enrolling in magnet or charter schools for kindergarten over all other alternatives. Relative to overall enrollment rates of 20 percent for magnet schools and 9 percent for charter schools, students with a prior child welfare report experience an enrollment disparity of more than one-third (-7.4 ppts, -3.5 ppts) at both magnet and charter schools. The child welfare enrollment disparity at private schools, shown in column 4, is slightly less than one-third. All of these disparities are statistically significant at the one-percent level.

It is particularly informative to contrast the disparities associated with child welfare with those for SES. Low and middle SES students are significantly less likely to opt out of traditional public school than high SES students (the omitted category), but this is almost entirely attributable to the private school enrollment gap. Low SES students are equally likely to enroll in magnet or charter schools as high SES students – in fact, students in public housing are slightly more likely than high SES students to enroll in magnet and charter schools, though the difference is not statistically significant. Middle SES students are significantly more likely to pick magnet schools than high SES or low SES students. Broadly speaking, SES is not associated with enrollment disparities in tuition-free choice schools, in contrast to child welfare.

These selection patterns manifest in substantially different incoming kindergarten cohorts across schools. Each point in Figure 1 reflects the average proportion of incoming kindergartners with a prior child welfare report (on the vertical axis) and with prior low-SES indicators (on the horizontal axis) in each of the city's schools. The dashed lines show the population-level mean the respective characteristics. Every school that has a disproportionate share of students with a history

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<sup>9</sup> If one reverses the sign on these coefficients, the regression can be interpreted as modeling the probability of opting out of traditional public school. With the sign reversed, the coefficients on the remaining models shown in Table 2 sum to the coefficients on the traditional public school opt-out model.



**Figure 1: School-level demographics of incoming kindergarten cohorts**

of child welfare is a traditional public school. In contrast, most traditional public, charter, and magnet schools enroll a high proportion of low-SES students.

Though child welfare referrals occur more frequently for Black and/or low-SES children, the inclusion of the child welfare and SES controls have no impact on the traditional public school enrollment difference between Black and White students. Adjusting for disadvantage and residential location, White students are 13 percentage points less likely than Black students to enroll in traditional public school, and 21 percentage points more likely to enroll in private schools. Black students are 7 percentage points more likely to enroll in magnet schools,<sup>10</sup> but there is no Black-White gap for charter schools.

The intersection of child welfare with SES and race deserves more careful inspection. Though child welfare enrollment disparities persist after adjusting for SES and race, it is possible

<sup>10</sup> Historically, Pittsburgh’s magnet schools explicitly pursued racially balanced enrollment, but the district ended this practice in 2010 after the Supreme Court ruling on *Parents Involved in Community Schools v. Seattle School District No. 1*. Subsequently, white enrollment in magnet schools fell dramatically (Chute 2013).

	<i>I. Socioeconomic Status</i>				<i>II. Race</i>		
	No Medicaid or public housing (high)	Occasional Medicaid enrollment (medium)	Continuous Medicaid enrollment (low)	Public housing in prior year (low)	Black	White	Multiracial
<i>A. Traditional public school</i>							
Prior child welfare report	<b>0.227***</b> ( <b>0.051</b> )	<b>0.214***</b> ( <b>0.036</b> )	<b>0.307***</b> ( <b>0.022</b> )	<b>0.320***</b> ( <b>0.037</b> )	<b>0.171***</b> ( <b>0.020</b> )	<b>-0.031</b> ( <b>0.032</b> )	0.055 (0.050)
No prior child welfare report	0 (-)	0.096*** (0.019)	0.177*** (0.013)	0.118*** (0.018)	0 (-)	-0.130*** (0.040)	-0.031 (0.030)
<i>B. Magnet school</i>							
Prior child welfare report	-0.057 (0.043)	<b>0.018</b> ( <b>0.027</b> )	<b>-0.080***</b> ( <b>0.017</b> )	<b>-0.095***</b> ( <b>0.030</b> )	<b>-0.112***</b> ( <b>0.017</b> )	-0.103*** (0.020)	-0.032 (0.045)
No prior child welfare report	0 (-)	0.046** (0.018)	-0.017 (0.014)	0.021 (0.017)	0 (-)	-0.081*** (0.024)	-0.037 (0.027)
<i>C. Charter school</i>							
Prior child welfare report	0.000 (0.034)	-0.012 (0.021)	<b>-0.027**</b> ( <b>0.012</b> )	<b>-0.041</b> ( <b>0.026</b> )	<b>-0.047***</b> ( <b>0.014</b> )	-0.023 (0.019)	-0.035 (0.028)
No prior child welfare report	0 (-)	0.001 (0.009)	0.004 (0.009)	0.034* (0.017)	0 (-)	-0.010 (0.014)	-0.007 (0.017)
<i>D. Private school</i>							
Prior child welfare report	<b>-0.171***</b> ( <b>0.023</b> )	<b>-0.184***</b> ( <b>0.017</b> )	<b>-0.200***</b> ( <b>0.015</b> )	-0.185*** (0.023)	<b>-0.012**</b> ( <b>0.006</b> )	<b>0.095***</b> ( <b>0.028</b> )	<b>0.012</b> ( <b>0.017</b> )
No prior child welfare report	0 (-)	-0.143*** (0.016)	-0.163*** (0.014)	-0.173*** (0.015)	0 (-)	0.220*** (0.038)	0.074*** (0.026)

Note: Each panel reflects linear predictions from a different regression of enrolling in the given school choice on student characteristics. Asian, Hispanic, and Native American racial categories suppressed due to insufficient population size. All regressions include covariates and school year and zip code fixed effects. Standard errors in parentheses clustered at zip code level. \*p<0.10, \*\*p<0.05, \*\*\*p<0.01. Differences between coefficients in bold and coefficients directly below them are significant with p<0.05.

**Table 3: Linear predictions, Relative probabilities of enrolling in each school type**

that the meaning of child welfare reports varies across subgroups. Poverty can give rise to circumstances that might prompt a child welfare report directly (e.g., lack of adequate housing, supervision, or food) changing the composition of unobserved report types across different SES groups. Racial bias in reports (e.g., flagging an issue for a Black parent, but excusing it for a White parent) could similarly change the composition of unobserved report types across racial subgroups.

Panel I of Table 3 displays the relative probability of enrolling in different school types by both child welfare involvement and SES. These probabilities are derived from a model similar to that estimated in Table 2, but child welfare and SES indicators are fully interacted, allowing probabilities to vary for each potential pairing. There are two useful comparisons documented in this panel: first, how enrollment differs for each child welfare-by-SES subgroup compared to the least disadvantaged subgroup (students with no child welfare history that are high SES), and, second, the association between child welfare and enrollment within each SES subgroup.

Not surprisingly, students with a prior child welfare report who are low SES are most likely to enroll in traditional public school: they are more than 30 percentage points more likely to enroll in traditional public school for kindergarten than high SES students without a prior child welfare report. They have the largest negative enrollment disparities for charter, magnet, and private schools, as well. Child welfare involvement also corresponds to large gaps for middle or high SES students in terms of opting into traditional public school. However, for middle/high SES students enrolling in charter or magnet schools, child welfare does not predict an enrollment disparity relative to high SES students without child welfare. This means that for middle SES students, child welfare diminishes the magnet school enrollment advantage over high SES students. Private school enrollment patterns are particularly notable: private school enrollment remains unlikely for anyone who is not high SES, but high SES students with child welfare histories exhibit a private school enrollment disparity similar to their low SES counterparts. For the majority of schooling options, the enrollment disparity associated with a given SES group is larger for members of that group linked to child welfare, and that difference is statistically significant in almost all cases.

Panel II of Table 3 predicts the relative probability of enrolling in each school type by race and child welfare history compared to Black students with no prior child welfare report. As with panel I, two key questions are analyzed: how enrollment differs for each child welfare-by-race subgroup, and how child welfare predicts enrollment within each racial subgroup.

Black students with a prior child welfare report are 17 percentage points more likely to enroll in traditional public school than Black students without a prior report. They are also 11 percentage points less likely to enroll in magnet schools and 5 percentage points less likely to enroll in charter schools. They are 1.2 percentage points less likely to enroll in private school, which is a sizable disparity since, overall, just 4 percent of Black kindergartners enroll in private school.

White students with child welfare histories remain less likely than Black students without prior child welfare to enroll in traditional public, magnet, or charter schools, and more likely to enroll in private school. However, compared to White students without a prior child welfare report, having a prior report is associated with a reduced likelihood of enrolling in private school and an increased likelihood of enrolling in traditional public school. They also see a reduced likelihood of charter and magnet enrollment, though the difference is not statistically significant. The story



is similar for Multiracial students, who lose their private school enrollment advantage relative to Black students when they have prior child welfare reports.

#### **IV. Discussion**

Using a unique linked dataset, I document disparities in access to charter, magnet, and private schools for kindergartners previously reported to child welfare. I do not claim that a child welfare report causes enrollment disparities, but, rather, I offer an empirical test of whether a school choice system leaves certain students behind at the start of kindergarten, using measures of early childhood circumstances exogenous to schools. Disparities are not explained by selection on the basis of SES, race, or residential location. However, the findings do not suggest intentional exclusion of students with child welfare histories from charter and magnet schools, since sorting is captured at the point of kindergarten entry, and past involvement with the child welfare system is not typically observed by schools. Rather, I contend that lower enrollment rates associated with child welfare involvement are driven by lower rates of parental engagement with and success in completing choice school enrollment steps, potentially due to the hardships faced by the family. Charter and magnet schools enroll students from a diverse array of backgrounds, but a sizable portion of high-need students do not experience the same access and, potentially, opportunity.

As a consequence, traditional public schools enroll a disproportionate share of child welfare students, who likely have high educational needs. In a kindergarten class of 20 students, a traditional public school enrolls four students with a prior child welfare report, a charter or magnet school enrolls two such students, and a private school enrolls less than one, on average. Even without the tuition barrier, charter and magnet schools are not enrolling the same number of high-need students as traditional public schools.

Though this study vindicates long-standing concerns that students with particularly high educational needs lack equal access to choice schools (e.g., Lacireno-Pacquet et al 2003), it also reveals that commonly available proxies for student disadvantage or educational need are unlikely to reveal the sorts of students who might miss out on school choice. Notably, I find that the SES composition of magnet and charter schools resembles the incoming kindergarten cohort broadly when using SES measures based on levels of public benefits usage. Richer measures of early childhood disadvantage than coarse income proxies are needed to understand the degree to which students with high educational needs are concentrated in particular schools.

While child welfare reports have proven a useful data source in this study, it is possible that data on less sensitive and more concrete parental and family attributes would capture some of the selection patterns shown in this paper. For example, Hart & Figlio (2015) use SES proxies derived from birth certificates—including mother’s educational attainment and age at birth—to show that low-SES parents are less responsive to new information on school quality, and Maloney et al. (2017) find that similar characteristics predict child welfare reports. It is possible that accessing magnet and charter schools is particularly difficult for young parents—a logical result if these parents have fewer resources and experiences navigating systems like school choice. Surveys of choice systems, like those used in Goldring and Hausman (1999) and Fleming et al. (2015), also can provide insight into selection, especially if expanded to capture family hardships beyond SES.

This study focuses on a single city at a single point in time, limiting its external validity, but several features speak to the potential of these results to generalize more broadly. First, child welfare is common everywhere: for example, in Michigan, 18% of third graders have a prior child welfare referral (Ryan et al. 2018). Second, Pittsburgh offers universal busing, meaning that the observed selection patterns arise in the absence of a commonly-cited barrier to choice school access. Though busing does not ameliorate transportation concerns for parents, in the absence of busing, selection may be more extreme (Goldring & Hausman 1999). However, Pittsburgh, at the time studied, did not offer a single centralized school choice system, as have become increasingly common in cities. In Denver, the switch to a common application for choice schools increased enrollment for minority, low-income, and English language learners (Winters 2015). Perhaps such a system would lower barriers for children with prior child welfare reports, though, if my speculation is correct that these families face serious hardship that interferes with educational engagement, more proactive support services may be necessary, or, at a further extreme, a system that largely sidesteps parental engagement by randomly offering all age-eligible students spots in magnet and charter schools.

My findings raise two major concerns for studies on the causal effects of charter and magnet schools: first, whether the positive treatment effects of charter schools (see Cohodes & Parham 2021 for an overview) extend to the non-applying population broadly; and, second, whether positive effects among disadvantaged students, in particular (e.g., Angrist et al. 2013, Walters 2018, Hastings et al. 2012), generalize to students who systematically miss out on school choice. If we assume that students with prior child welfare reports are similar to the economically

disadvantaged students already shown to benefit disproportionately from choice schools, then this is potentially a population that would enjoy substantial gains in the charter/magnet school environment. Thus, beyond the implications for research, concerns over equity and efficiency in school choice systems persist.

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