Is Special Education Improving? Evidence on Segregation, Outcomes, and Spending from New York City

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Abstract

Groundbreaking federal legislation in 1975 promised long-denied equal opportunity for students with disabilities in public schools. Despite some notable gains, many advocates, parents, and students themselves argue that progress to date has been unsatisfying, leaving this promise unfulfilled. Others point out that special education legislation has spurred increased spending, sorely burdening school districts. In this study, we assess progress over the last decade in the nation’s largest school district, New York City. In particular, we examine progress toward the twin legislative goals of integrating students with disabilities with general education students and improving their performance. We also investigate spending on special education services to gain insight into whether, and how, spending has changed over time. We analyze district- and student-level data from the NYC Department of Education on 2.8 million public school students (over 500,000 with disabilities) from 2006-2015. Results reveal that while students with disabilities have made progress on key measures of integration and performance, there remains considerable room for improvement. There is, for example, less segregation of students with and without disabilities across elementary and middle schools, but segregation in high schools has increased. Graduation rates for students with disabilities have roughly doubled since 2006, but remain considerably below that of general education students. Improving outcomes for students is a difficult undertaking and there is little to help us set benchmarks for how quickly progress should or can be made. Our analysis contributes to the limited supply of assessments of system-wide changes in special education, which are essential to evaluating policy efforts and revealing if helpful practices are adding up to progress for all students with disabilities.
I. Introduction

Groundbreaking federal legislation in 1975 promised long-denied equal opportunity for students with disabilities (SWDs) in public schools. Advocates, parents, and SWDs themselves, however, continue to argue that despite early and notable gains in some areas such as inclusion, progress to date has been unsatisfying, leaving the promise unfulfilled. This sentiment was most recently echoed by a unanimous Supreme Court ruling that required schools to set more ambitious goals for SWDs, above and beyond *de minimis* progress that had previously been in place (15 U.S.C.§ 827). Others have argued that SWD reforms to date have spurred increased spending, sorely burdening school districts (Scull & Winkler, 2011). In this study, we assess progress in the nation’s largest school district, New York City (NYC), over the last decade. In particular, we examine progress toward the twin legislative goals of integrating SWDs and general education students (GENs) and improving SWD performance. We also analyze spending on special education services to gain insight into whether – and how – spending has changed over time. While we focus on one large district, the challenges of educating SWDs are faced by a wide swath of districts across the country, suggesting the insights derived may be useful to a broad range of policymakers and practitioners.

A. Background

Prior to the enactment of the federal Individuals with Disabilities Education Act (IDEA) in 1975, guaranteeing SWDs a free appropriate public education, many SWDs were denied entry to public schools altogether. Subsequent reauthorizations strengthened IDEA. In 1997, for example, the ambitions for education of SWDs were heightened by the addition of “… an emphasis on

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1 From 1975 to 1990, this legislation was titled the Education for All Handicapped Children Act (EHA). In 1990, the U.S. Congress changed the title to the Individuals with Disabilities Education Act (IDEA).
2 PL 1080446, Dec, 3, 2004, SEC 101, PART A, SEC 601,(c), (2), (B)
including children with disabilities in state accountability systems, giving these children maximum access to the general education curriculum, and improving their educational results” (National Assessment of IDEA Overview, 2011, p 3). The most recent reauthorization in 2004 brought federal special education law into close alignment with the then-current No Child Left Behind Act’s accountability standards for students in grades three through eight and high school (National Assessment of IDEA Overview, 2011).

Despite 40 years of IDEA, the goals of providing SWDs with equal, appropriate, and effective education have proven difficult to achieve. Nationwide, SWDs have lower academic achievement, lower levels of educational attainment, and higher chronic absenteeism than GENs. Notwithstanding some progress, many SWDs are educated in segregated schools or in segregated classes, with little classroom contact with GENs. Further, spending on special education is high and difficult to control. For example, Scull and Winkler (2010) found that between 1996 and 2005, 40% of new education spending was for special education services.

NYC, the largest public school district in the US, has gone through a particularly litigious implementation period. In 1979, New York State’s (NYS) highest court found in favor of plaintiffs that NYC (and State) had failed to evaluate, place, and provide appropriate services for significant

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3 Academically, almost 65% of eighth-grade SWDs scored below basic on the 2013 National Assessment of Educational Progress in math, as compared to only 21% of GENs (U.S. Department of Education, 2013). SWDs are also more likely than GENs to drop out of school (Blackorby & Wagner, 1996). Behaviorally, SWDs lag behind their GEN counterparts on multiple measures of attainment, such as employment, income, and life satisfaction and, unfortunately, are ahead on negative indicators, such as suspension, expulsion, and delinquency (Blackorby & Wagner, 1996; Phelps & Hanley-Maxwell, 1997; National Longitudinal Transition Study 2, 2006). Finally, “…students with disabilities … are 1.3 times more likely to be chronically absent than students without disabilities.” (http://www2.ed.gov/datastory/chronicabsenteeism.html#intro accessed 7-4-16).

4 While by 2012, 62.1% of SWDs nationwide “were educated inside the regular class 80% or more of the day,’’ an increase of 16.4 percentage points from 1996, still nearly 40% were not. (U.S. Department of Education, 2007, 2015).

5 “Special education spending consumed about 21 percent of all education spending across the nation in 2005 (compared with 18 percent in 1996 and 17 percent in 1991), or a whopping $110 billion in that year alone.” (Scull & Winkler, 2010).
numbers of the City’s SWDs (Jose P. 1979). Citizen groups and lawyers continue to closely monitor NYC’s efforts to place students in timely ways and in appropriate settings.  

**B. Current policy landscape**

In the early 2000’s, NYC and other large city districts began to implement policy changes aimed at placing more SWDs in classrooms with general education peers and at increasing educational outcomes. Moving beyond compliance, in the fall of 2010, the NYC Department of Education (NYCDOE) began a three-year phase-in of a major special education policy reform (*A Shared Path to Success*) with four main overarching goals: (1) provide SWDs with greater exposure to the general education curriculum, (2) provide SWDs with greater exposure to GEN students, (3) build school capacity to support SWDs, and (4) improve the academic performance of SWDs (NYCDOE, 2012). These goals were guided by the principle that “students with disabilities should have access to a range of services and spend as much time as appropriate in a classroom with students without disabilities” (NYCDOE, 2011). In various publications and presentations, the NYCDOE motivated the policy reforms by citing research on the positive effects of educating SWDs together in integrated settings with GENs (e.g., Falvey, 2004; Fisher, et al., 2000; McGregor & Vogelsberg, 1998; Wagner et al., 2006).

Have these policies succeeded? To what extent and for whom? How did the composition of students change, and conditional on this change, has integration with GENs increased and/or disparities in outcomes between SWDs and GENs declined? Has spending continued to grow? We

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6 “Jose P. v. Miles: Jose P. was filed by a group of New York City school children with disabilities over three decades ago to force the [NYC] Department of Education to obey federal laws that require appropriate evaluation, placement and services be provided to all students with disabilities. In 1979 a judgment was issued directing a variety of relief measures. Numerous subsequent orders and so-ordered stipulations have been issued since 1979.”  

7 For example, in 2013, Los Angeles announced its intention to educate more SWDs in neighborhood schools, and recently New Jersey agreed to move SWDs toward more inclusive classroom settings (Samuels, 2013; Samuels, 2014). These are recent examples of larger trends in major districts around the U.S., including Las Vegas (Clark County), Miami Dade, Chicago, and Long Beach (Hehir, 2008).
use longitudinal data on NYC public schools and students to investigate descriptively a decade of change in the integration of SWDs and GENs, outcomes for SWDs, and spending on special education. Specifically, we address three research questions whose answers are key to assessing how NYC is (or is not) delivering on its goals for students with disabilities.

RQ1: Are SWDs increasingly enrolled in integrated schools and services over time, increasing their integration with GENs?

RQ2: Have disparities between SWD and GEN outcomes declined, conditional on changes in the composition of students over the decade?

RQ3: Has spending on special education grown?

Results suggest that while SWDs have made progress on key measures of integration and performance, considerable room for improvement remains. There is, for example, less segregation of SWDs and GENs across elementary and middle schools. More SWDs make it through high school. Indeed, SWD high school graduation rates roughly doubled (to 50%) since 2006. Unfortunately, GEN-SWD segregation in high school has increased, and the SWD graduation rate remains considerably below that of GENs (80%). Moreover, spending continues to rise.

The paper is organized as follows. The second section describes our data, measures, and methods. The third section presents background on special education over a decade in the nation and NYC to assess how the composition of students changed (numbers of students, demographic characteristics, and disability classifications). The fourth section reports results, and the fifth section follows with discussion and conclusions.
II. Data, measures, and methods

A. Data

NYCDOE provided data on NYC public schools, including high school graduation rates, expenditures (from *School Based Expenditure Reports*), and longitudinal, student-level administrative records on grades 1-12 and ungraded students, from 2006 to 2015 (roughly 2.8 million students, with over 500,000 SWDs). The student-level data include demographic variables (gender, race or ethnicity, eligibility for free or reduced price lunch, and native or foreign-born status), Limited English Proficiency (LEP) status, attendance, test scores in mathematics and English Language arts (ELA) for grades 3 through 8, and school attended. These data allow us to distinguish between schools that serve only special education students (termed “District 75” (D75) schools in NYC) and traditional schools that provide both special and general education services.

Importantly, for students with Individualized Education Programs (IEPs), these data identify a student’s disability classification and primary assigned service. An IEP is required for all students served under IDEA, and is the best measure available for identifying SWDs. To be clear, some SWDs are not provided special education services due to a variety of reasons, among them, parental decisions to decline services.

IEPs draw upon 13 federal disability classifications\(^8\) and designate one of four primary assigned services. The primary assigned service is the service provided for the largest proportion of time during the school day. NYCDOE classifies all services in a continuum from “least to most restrictive” (NYCDOE, 2016). The least restrictive, Related Services (RS), includes support services

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such as counseling, hearing services, physical therapy, and speech/language therapy. Special Education Teacher Support Services (SETSS) encompass supplemental instruction that helps SWDs remain in the general education classroom. Integrated Co-Teaching (ICT) is a service through which GENs and SWDs are educated by both a general and special education teacher in the same classroom. Self-Contained (SC) services are provided to SWDs with similar needs and whose services are difficult to administer in the general education setting.

To motivate our study and put NYC in context, we also use national data to examine the growth in the special education population over time in the nation and other large U.S. cities. The national data, spanning the years 2002 through 2014, are publicly available and track the percent of public school students with IEPs for states and the US as a whole (Office of Special Education Programs) or selected cities (National Center for Education Statistics).

B. Measures

Measuring integration. We capture integration of SWDs and GENs with a series of measures showing the share of SWDs in D75 schools, the share in the “most restrictive” SC primary service, and the evenness in the distribution of SWDs across schools, using a dissimilarity index. The dissimilarity index measures the share of SWDs that would need to switch from a school in which SWDs are over-represented to a school in which they are under-represented, in order for all schools to have the same share of SWDs. The index is calculated as follows:

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D = \left(\frac{1}{2}\right) \sum_s \left| \frac{\text{swd}_s}{\text{SWD}} - \frac{\text{gen}_s}{\text{GEN}} \right|
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\]  

More specifically: counseling, school health services, hearing education services, occupational therapy, physical therapy, speech/language therapy, vision education services, orientation and mobility services, and “other support” services. A student’s primary assigned service is designated RS if it is the only service provided by the district.

SETSS are provided at a minimum of three hours a week and a maximum of 50% of the school day. The special education teacher can provide instruction directly (to a single individual or a group no larger than eight SWDs) or indirectly (in collaboration with the student’s general education teacher).

The number of SWDs receiving ICT services in a single classroom may not exceed 40% of total enrollment and at most 12 students.
where \( swds \) is the number of SWDs in school \( s \); \( gen_s \) is the number of GENs in school \( s \); \( SWD \) and \( GEN \) are the total population of SWDs and GENs in the sample. The index ranges from zero (perfect integration) to one (perfect segregation).

**Measuring school outcomes.** We measure changes in educational outcomes over time by showing the gap between SWDs and GENs in grade 3-8 math and ELA test scores (standardized to mean zero and standard deviation of one by grade and year), high school graduation rates, and school attendance rates (measured as number of days present/total days registered in district).

**Measuring expenditures.** We compare three measures of per pupil expenditures: spending per SWD for D75 schools, for full-time special education students in traditional schools (i.e. those receiving ICT services), and spending for GENs. Per pupil expenditures include all direct services to schools (e.g. food and transportation), central support costs that are used to support system-wide functions (e.g. Citywide Special Education district office, human resources), and non-administrative costs (e.g. pension contributions for DOE employees). Pass-through expenses, for example to private schools, are excluded.

C. Methods

We conduct a descriptive analysis, examining the trends in the integration of SWDs and GENs over time; in the GEN-SWD gap in test scores, high school graduation rates, and attendance rates; and finally in spending per pupil for SWDs and GENs. We provide a more nuanced analysis of trends using a Blinder-Oaxaca decomposition technique to parse gaps in SWD integration and schooling outcomes into the contributions of changes in the composition of students (characteristic effects), changes in effects of characteristics (coefficient effects), and changes in the interaction between characteristic and coefficient effects (interaction effects). The Blinder-Oaxaca
decomposition of the change in schooling outcome $Y$ between two time periods 2006 and 2015, for example, is calculated as follows:

$$\bar{Y}_{06} - \bar{Y}_{15} = (\bar{X}_{06} - \bar{X}_{15})'\beta_{15} + \bar{X}_{15}'(\hat{\beta}_{06} - \hat{\beta}_{15}) - (\bar{X}_{06} - \bar{X}_{15})'(\hat{\beta}_{06} - \hat{\beta}_{15})$$  \hspace{1cm} (2)

where $\bar{Y}$ is the average outcome for students in that year, $\bar{X}$ is a vector of average student characteristics that year, and the $\beta$ coefficients are the estimated (regression) relationships between student characteristics and the outcome. The three terms on the right-hand side of equation (2) represent the characteristic $[(\bar{X}_{06} - \bar{X}_{15})'\beta_{15}]$, coefficient $[\bar{X}_{15}'(\hat{\beta}_{06} - \hat{\beta}_{15})]$, and interaction $[(\bar{X}_{06} - \bar{X}_{15})'(\hat{\beta}_{06} - \hat{\beta}_{15})]$ effects.\(^{12}\) Taken together, these analyses shed light on temporal changes over a decade, and identify critical gaps in the integration and academic success of SWDs compared toGENs.

III. NYC in context

We begin with the national context. As shown in Figure 1, the proportion of special education students in the US declined slightly from 2002 to 2014, from 13.7% to 13.5%, but this trend masks much variation across cities. Several cities lie significantly below that average (Dallas and Miami), but several lie strikingly above (DC, Boston, and NYC).\(^{13}\) Currently, Boston and NYC are among the leaders of the nation’s large cities, with close to a fifth of their public school students receiving special education services. While the SWD share was a fairly constant 18% in Boston, NYC’s SWD population grew from around 14% in 2002 to 20% in 2014.

At the same time, the composition of the NYC student body changed in important ways between 2006 and 2015 (see Table 1). The percentage of SWDs (but not GENs) who are Hispanic grew almost five percentage points (ppts) from 43.8% to 48.6%, while the percentage Black fell

\(^{12}\) Standard errors are clustered at the school level for decomposition regressions.

\(^{13}\) The relatively low proportion of SWDs in Dallas may partly reflect the special education enrollment cap (of 8.5%) in Texas.
substantially (for SWDs from 37.7% to 30.8% and for GENs from 32.4% to 24.4%). The percentage of both SWDs and GENs who are limited English Proficient (LEP) increased, while the foreign-born percentage of SWDs and GENs decreased. Thus, the increase in the proportion of LEP students is due to native-born rather than foreign-born increases. Also note the relative stability of both SWDs and GENs who are female (around 33% and 52% respectively), white (around 13% and 14 -16% respectively), and free or reduced price lunch eligible (around 81% - 78% and 72%, respectively). There were also meaningful changes in the composition of schools. The percent of SWDs at the elementary and middle school levels grew by a greater amount (14.8% to 21.8%) than at the high school level (14.1% to 18.4%). The percent of SWDs educated in D75 decreased from 14.5% to 12.8%. Of all these trends, the changes in Hispanic, black, LEP, and foreign-born proportions for both SWDs and GENs are the most dramatic. Adjusting for changing compositions will be important when we analyze trends in integration and performance.

Perhaps most important for our study, while the proportions of students with IEPs grew over time, the distribution of disabilities also changed in important ways. For traditional schools, Figure 2 shows that there was a notable drop over the decade in the share of students with learning disabilities (from 53.6% to 47.3%) and a large increase in the share of students with speech impairments (27.8% to 33.3%). For D75, the situation is considerably different (See Figure 3). In D75, the share of students with autism doubled (from 20.8% to 40.15% of the district) while the share of students with emotional disturbances fell markedly (from 36.5% to 20.9% of the district). Students with some disabilities can be more expensive or more difficult to educate and integrate (Chambers et al., 2004; MacMillan et al. 1996), so these compositional changes will be important to understanding progress that NYC may have made toward integrating SWDs and GENs, improving outcomes, and stabilizing expenditures on special education services.
Finally, three key policy changes during our analysis period (2006-2015) are important to interpreting results on educational outcomes in the paper, in particular on standardized exams and graduation rates. First, in 2009 NYS raised the number of correct answers needed to pass its standardized exams in math and ELA. Second, in 2013 the Common Core Standards were implemented in NYS. Lastly, beginning with the 9th grade cohort of 2008 NYS raised graduation standards for general education students. Specifically, prior to the 9th grade cohort of 2008 (4 year graduation in 2012), all were eligible for a local diploma, which required passing five Regents exams with a score of 55% or higher, or passing other Regents Competency Tests. Beginning with the 9th grade cohort of 2008, however, passing five end-of-subject (Regents) exams with a score of at least 65% was required for graduation for all students, except for SWDs who could still receive a local diploma, with fewer exams passed and/or lower scores.

IV. Results

The results, presented with graphs and tables, and including analyses of trends, provide answers to our three research questions.

A. Are SWDs increasingly enrolled in more integrated schools and services over time, increasing their integration with GENs?

As shown in Figure 4, the percent of SWDs educated in D75 declined over the decade even as the number of special education students increased dramatically. This might point to more integration, but could also mean the composition of students shifted toward classifications that were easier to educate in traditional schools. Investigating this hypothesis using the Blinder-Oaxaca decomposition indicates that this was not the case. Figure 5 plots the actual decline in percentages of students in D75 (solid line) along with lines showing what “would have been” if the composition of the students had remained constant at 2006 levels (narrowly dotted line) or if reliance on D75 had
remained constant at the 2006 level (widely dashed line). For example, in 2015, 12.8% of SWDs attended D75 schools, down from 14.5% in 2006. If students in 2015 had the same characteristics as those in 2006, all else equal, the percent of students in these schools would have been slightly lower at 12.2%. If, however, the propensity of being educated in D75 in 2015 were the same as it was in 2006, all else equal, the percent of students in D75 would have been notably higher (15.6%).

Overall, despite the growing number of students with disabilities and changing composition of students, NYC has made considerable progress educating more SWDs in traditional schools, potentially increasing their exposure to GEN peers.

What happened within the traditional schools? Students were increasingly educated here, but were they really integrated with GENs? Figure 6 reveals an answer by tracing the percent of students by their primary services, which as previously explained, NYCDOE classifies from most (SC) to least (RS) restrictive. Most striking is the large decline in SC as the primary service, from 42.5% in 2006 to 29.8% in 2015, along with the steady and even more pronounced increase in ICT services, from 13.1% to 46.2%. RS declined slightly by the end of the period, and SETSS declined dramatically. Overall, within traditional schools, students were educated less with isolated services and more with their GEN peers, meaning that the change from D75 to traditional schools seen in Figures 4 and 5 was accompanied by more integration within those latter as well.

It is possible that the gains in integration observed above are concentrated in a few schools, or types of schools. Thus, the distribution of SWDs and GENs across schools is important to understanding a more complete story about integration. In Figure 7, we graph the dissimilarity index for elementary-middle and high schools separately because the trends are different and a graph of the two combined hides this difference. Elementary and middle schools show distinct progress in terms

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14 The magnitude and direction of the interaction effect (of characteristics and coefficients) is comparable to that of the characteristic effect and thus small.
of the share of SWDs that would need to change schools in order to have an equal distribution across all, with the index declining from 0.18 in 2006 to 0.16 in 2015. High schools, however, exhibit higher indexes in all years than elementary and middle schools and also increased their segregation in many years, trailing downward slightly in 2015. To put these numbers in context, a dissimilarity index of 0.16 is somewhat higher than a recent estimate of 0.10 for the segregation of all special populations (SWDs, English Language Learners, and economically disadvantaged) across Texas urban public schools, and much higher than the index for SWDs in Texas urban districts (below 0.02) (Vasquez Heilig et al., 2016).

The trend in high schools may, in part, reflect the changing representation of SWDs in high schools of different size. In earlier years, Iatarola et al. (2008) found small high schools had considerably lower percentages of SWDs than large high schools. As shown in Figure 8, by 2010 small high schools had matched larger schools in SWD representation and by 2015 small high schools educated the highest proportions. These differences are consistent with higher dissimilarity indices in high schools and the turndown in dissimilarity in 2015 coincides with a turndown in the proportion of SWDs in small high schools in that same year. High schools have much starker differences in size than elementary-middle schools and small schools, in particular, may be more likely than large schools to vary over time in their representations of SWDs. The observed relationship between school size and dissimilarity warrants additional attention. While previous research has found that new small high schools produce better outcomes for GENs, there is little evidence on their effectiveness for SWDs (Schwartz et al., 2013; Bloom & Unterman, 2014). If better outcomes hold for SWDs, then the current disproportionality could be advantageous. Future work evaluating the success of SWDs in small high schools is clearly warranted.
B. Have disparities between SWD and GEN outcomes declined, conditional on changes in the composition of students over the decade? 

**Math and ELA exams.** As shown in Figure 9, disparities in standardized test scores in grades 3 through 8 in math and ELA declined and then rose again between 2006 and 2015. In Figure 9, the vertical line in 2009 denotes the policy change implementing stricter NYS proficiency requirements and the vertical line in 2013 denotes the start of the Common Core curriculum in NYS. Note that neither change was matched by breaks in the trend lines of GEN-SWD differences – reflecting, perhaps, similar effects of policy changes (if any) on both groups. Separating elementary (3-5) and middle (6-8) grades yields nearly identical trends in ELA, and similar trends in Math, where the gap is roughly 0.1 standard deviations lower. (Results available from authors).

Proficiency varies considerably by student type. For example, over the decade roughly 20%, 30%, and 48% of students with a learning disability, emotional disturbance, and other health impairment, respectively, scored proficient in ELA. Further, there is variation in the trends in proficiency over time. ELA proficiency, for example, declined by 12% for students with a learning disability or emotional disturbance, but by almost 20% for those with other health impairments. Are the trends in gaps (Figure 9) due to changes in the composition of the students (characteristics) or the effects of these characteristics (coefficients)? The Blinder-Oaxaca decompositions shed light on this question. Figures 10A and 10B show the trends in math for GENs and SWDs separately. Note the GEN math average trend is more variable than the SWD trend. For the GENs (Figure 10A), having characteristics of the 2006 students would have lowered their scores for almost all years, meaning that the composition of GENs is more favorable to higher scores in NYC schools in years beyond 2006. If GENs performed similarly to 2006, however, except for 2015, they would have received lower scores. For SWDs in math (Figure 10B), the analysis differs slightly. We see that with 2006 characteristics, SWDs would have performed slightly better, but coefficients from 2006 would have
made the performance worse in later years. Thus NYC schools were doing better improving SWD proficiency (e.g. with the coefficients.)\textsuperscript{15}

Is the decomposition for ELA similar to that of math? For GENs, figure 10C shows that maintaining the 2006 GEN student characteristics would have improved ELA test scores (except for 2008), which is different than for math. Thus, the composition changed to the disadvantage of NYC exhibiting higher scores in ELA for GENs over these years. The coefficients are similar to those for math, however, in that maintaining the 2006 coefficients would have resulted in lower scores. NYC did better with the composition and improved proficiency for GENs in ELA.\textsuperscript{16} For SWDs, the story is similar to math but both the coefficient and characteristic effects are more pronounced (Figure 10D). With 2006 characteristics, SWDs would have performed almost 0.1 standard deviations better, but the 2006 coefficients would have reduced ELA performance by 0.2 standard deviations.

Overall then, NYC schools experienced change in student compositions (characteristics) that made progress on test performance more challenging but, conditional on this change, improved proficiency (coefficients). It is unclear, how or why this occurred. More students were placed in general education schools and services, and perhaps that was beneficial. In combination, these trends led to slight decreases and then increases in gaps, so that while NYC was doing well with the changing composition and in improving performance for SWDs, it was not quite enough to match GEN trends – the GEN “target” moved more.

*High school graduation.* One of the provisions of IDEA requires schools to appropriately prepare SWDs for adulthood, and high school graduation is a key milestone for success. Figure 11 shows the trends in gaps between GEN and SWD four- and five-year high school graduation rates

\textsuperscript{15} Interaction effects are small.

\textsuperscript{16} Again, the interactions effects are small.
from 2006 through 2015 for cohorts who began high school four or five years previously.\textsuperscript{17} The gaps are large, never falling below 32 ppts. Nonetheless, for five-year rates, 2011 marked the beginning of a downward trend in this gap, moving from 43 ppts to 32 ppts. Although not as pronounced, the four-year gap may be declining but that is evident only for one year, from 2013 to 2014. These rates cannot be decomposed into changes in composition of students and changes in propensity to graduate (coefficients) because we do not have individual student graduation outcomes by disability classification. We can, however, further analyze trends by type of high school diploma.

Figures 12A and 12B show the trends in four- and five-year cohort high school graduation rates with Regents and Local diplomas. For GENs (12A), there is a steady increase (decrease) in Regents (Local) diplomas, with 100\% graduating with a Regents diploma in 2012 and after, consistent with the 2008 policy that eliminated the Local diploma option for GENs. For SWDs, however, the trends are less linear, and by 2015, 53\% (47\%) were receiving Regents (Local) diplomas, numbers much less impressive than for GENs. Thus, progress in graduation and in earning the more rigorous Regents diploma, while evident for SWDs, has some distance to go before it is nearly comparable to GENs.

Attendance. Finally, we look at attendance for SWDs and GENs. National attention has recently focused on the amount of school missed by many students, at all ages (Gershenson et al., 2016; Gottfried et al., 2017; Gottfried, 2010, 2013), and the federal government has begun an initiative to cut down on such absenteeism. A number of student subgroups, including SWDs, exhibit unusually high absenteeism (low attendance). In NYC high schools, for example, the attendance rate for SWDs in 2015 was 81\%, about eight ppts below that of GENs. Importantly, as shown in Figure 13, the GEN-SWD gap in attendance persisted over the decade for all students, and

\textsuperscript{17} Graduation rates for SWDs grow from roughly 18\% in 2006 to 48\% in 2015. For GENs they grew from about 60\% to 80\%. \hfill
is particularly high for older students. For high school students, the gain made between 2008-2011 was reversed by 2012, when SWD attendance rates began to decline relative to that of GENs.\textsuperscript{18} Clearly more progress on understanding why attendance is low for SWDs (e.g. school climate) and getting SWDs to attend high school is needed, as the receipt of specialized services to help learning are missed when students are not in school.

Overall then, while some progress is being made on SWD achievements, as witnessed by downward trends in gaps, more can be done to close achievement, graduation, and attendance gaps between SWDs and GENs.

C. Has spending on special education grown?

In NYC, expenditures for public education are high. In fiscal year 2014, NYC spent $21,154 in current education expenditures per pupil, the highest among the 100 largest U.S. school districts. The national median that year was $10,311, broken out to $9,506 in cities, $11,344 in suburbs, $9,546 in towns, and $10,668 in rural areas (Cornman, S.Q., 2017). In this context, we examine total expenditures per pupil (pp) in NYC, broken down by expenditures on students in D75, in full-time (ICT and SC) services in traditional schools, and in general education.

Figure 14 shows the trends in these NYC expenditures. The inflation adjusted amount in D75 grew from almost $61,000 pp in 2002 to roughly $91,000 pp in 2015 (49.5%), while the spending on students in ICT and SC classrooms moved up and down, ending the period at $51,497 pp, just shy of $12,000 over the amount in 2002 (27.8% growth). For GENs, while the spending pp rose less than either of the other two (from around $13,000 to just short of $19,500), percentage-wise it went up 48.7%. Thus general education spending per pupil and D75 spending per pupil rose by roughly similar percentages.

\textsuperscript{18} Results for absolute attendance rates are available from authors.
Why has spending on SWDs in D75 increased so much, compared to SWD spending in traditional schools? Part of the explanation likely lies in compositional changes in D75 students. Note that although more students attended D75 schools in 2015 than 2006, \textit{per pupil} spending will depend critically upon the composition of the students, which changed dramatically. As discussed above and shown in Figure 3, the share of expensive-to-educate students (i.e. Autistic students) jumped, by 19.3 ppts, while less-expensive-to-educate classifications, such as SI and LD, declined (Chambers et al., 2004). Thus, a higher share of expensive-to-educate students (and lower share of less-expensive-to-educate students) could in part explain rising costs in D75.

Moreover, in D75, the largest growth in spending was on related services, which grew by 95% over this period, more than twice the growth of any other component. (Not shown, available from authors.) And while spending on related services in traditional schools grew even more, spending on related services in D75 is almost double the amount in traditional schools. This robust growth in spending in related services is consistent with documented increase in the need for services such as physical and occupational therapy (NYCDOE, 2016). Additionally, since 2006, NYC has had a large drop in its billings to Medicaid for special education services, particularly RS (Smith, 2016). Because the federal government finances a large share of Medicaid, such a reduction would increase NYC education spending (but of course reduce that of the federal government.)

Finally, class sizes are likely lower in D75 schools, since more receive self-contained services, which are on average provided in smaller settings. This might in part explain why spending on SWDs in D75 schools, which are over 90% SC, is notably higher than spending on SWDs in traditional schools, where roughly a third of classrooms are SC. (Analyses available from authors.) Of course, these smaller sizes require more teachers compared to what is required for students
educated with integrated services in traditional schools. Lastly, salaries for special education teachers may have grown faster than for other teachers.

Thus, the trends in special education spending cannot be said to have stabilized yet. The growth may depend crucially on the composition of students, and their individual needs, coming into the system. If these compositions stay the same as they are now, then NYC may well “learn” how to use resources effectively and efficiently to educate the students. But if more expensive students continue to come into the special education population, then per pupil spending will probably continue to grow.

V. Discussion and Conclusions

In this paper, we tracked changes in special education over a decade in NYC, analyzing in particular the integration of SWDs with GENs, school outcomes, and spending. The decade included the beginnings of a major NYC reform in special education policy as well as more accountability requirements for outcomes by IDEA at the federal level. We find that there is progress in terms of SWDs moving from segregated to traditional schools and within those schools out of self-contained services, and that there are better high school graduation rates. But this progress still leaves SWDs far behind their GEN peers, with large disparities in the quality of the high school diploma (Regents are less prevalent and Local are more among SWDs) as well as the rates themselves. Test score disparities also remain large, although SWDs’ propensity to achieve higher scores improved over what it was in 2006. SWD high school students have low attendance rates, absolutely and compared to GENs. Finally, spending in D75 special education schools continues to rise, without signs of stabilizing.

This paper benefited from the use of administrative data on all students in the NYC school district. Use of such data is under-developed and ripe for “big data” analyses in other cities and
districts. Comparisons within NYC between SWDs and GENs are useful, but cross-city comparisons would also be illuminating.

Much research in special education appropriately focuses on evaluations of specific interventions or practices that might help SWDs succeed in school. Such interventions and changes in practice are the on-the-ground daily work that is needed to add up to system-wide changes. Assessment of system-wide change, however, is in short supply, but equally essential to evaluating progress for SWDs and finding out if helpful practices are adding up to progress for all SWDs on average or only helping selected groups. The analyses provided in this paper are an example of the kind of system-wide work that must accompany evaluation studies.

Finally, improving outcomes for SWDs clearly is a difficult undertaking and there is little to help us set benchmarks for how quickly progress should or can be made. Beginning to track indicators over time, as done in this paper, can aid the policy community evaluate changes in the future.
References


Jose P., et al., v. Gordon M. Ambach, 669 F.2d 865 (2d Cir. 1982).


**Figure 1.** Percent of public school students with IEPs

Source: U.S. Department of Education. Enrollment and disability data for the NYC, Boston, Chicago, Dallas, Miami, and Los Angeles school districts are from the National Center for Education Statistic (NCES). Disability data for the U.S. and Washington D.C. are from the Office of Special Education Programs (OSEP) enrollment figures by year and jurisdiction. Includes all students in public schools, ages 3-21.
<table>
<thead>
<tr>
<th></th>
<th>2006 SWD</th>
<th>2006 GEN</th>
<th>2015 SWD</th>
<th>2015 GEN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SWD</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>GEN</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Percentage:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>48.6</td>
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<tr>
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<tr>
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<td>% of sample</td>
<td>14.6</td>
<td>85.5</td>
<td>20.6</td>
<td>79.5</td>
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</tbody>
</table>

**Source:**NYCDOE student level, administrative data

**Notes:** Includes all students in grades 1-12 and ungraded in NYC public schools.
Figure 2. Change in the distribution of the largest disability classifications from 2006-2015, traditional schools

Source: NYCDOE student level, administrative data
Notes: ED is Emotional Disturbance, OH is Other Health Impairment, AU is Autism, LD is Learning Disability, and SI is Speech Impairment. Includes students in all traditional NYC public schools in grades 1-12 and ungraded. Traditional schools exclude special education only schools (D75).
Figure 3. Change in the distribution of the largest disability classifications from 2006 to 2015, special education only (D75)

![Pie charts showing disability distributions in 2006 and 2015]

<table>
<thead>
<tr>
<th>2006</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=18,945</td>
<td>N=23,672</td>
</tr>
</tbody>
</table>

**Percentage point change from 2006 to 2015**
- AU (+19.3)
- ID (+0.8)
- OH (+0.5)
- MH (-0.2)
- SI (-0.3)
- Other (-1.0)
- LD (-3.4)
- ED (-15.6)

Source: NYCDOE student level, administrative data

Notes: ED is Emotional Disturbance, OH is Other Health Impairment, AU is Autism, LD is Learning Disability, SI is Speech Impairment, MH is Multiple Handicap, and ID is Intellectual Disability. Includes students in all NYC special education only schools (D75) in grades 1-12 and ungraded. Most students (98%) are ungraded.
Figure 4. Percent and number of SWDs in special education only schools (D75)

Source: NYCDOE student level, administrative data
Notes: Includes all students with disabilities in grades 1-12 and ungraded in NYC public schools. Grey portion of the black line denotes a data issue with 2009.
Figure 5. Trend in the percent of SWDs educated in special education schools (D75) if student characteristics and the returns to those characteristics remained at 2006 values

Source: NYCDOE student level, administrative data. Detailed student information for SWDs is unavailable in 2013.
Notes: The solid line is the percent of students with disabilities educated in special education only (D75) schools each year. The dotted line illustrates what the percent would have been if students in 2007-2012 had the characteristics of students in 2006, in terms of race, gender, and disability classification (that is, if the composition had not changed). The dashed line illustrates what the percent would have been if the returns to student characteristics (coefficients) in 2006 were applied to 2007-2015 (that is, if the propensity to be educated in D75 schools had not changed).
**Figure 6.** Distribution of primary assigned service settings

Source: NYCDOE student level, administrative data. Detailed student information for SWDs is unavailable in 2013. Notes: Includes all students with disabilities in grades 1-12 and ungraded in traditional public schools. RS is Related Services, SETSS is Special Education Teacher Support Services, ICT is Integrated Co-Teaching, and SC is Self-Contained.

**Figure 7.** Dissimilarity index across traditional schools between SWDs and GENs

Source: NYCDOE student level, administrative data. Notes: The dissimilarity index measures the share of SWDs that would need to switch schools in order for all schools to have the same share of SWDs. Includes all students with disabilities in grades 1-12 and ungraded in NYC traditional public schools.
**Figure 8.** Percent SWD by high school size

*Source:* NYCDOE student level, administrative data.

*Notes:* The figures above are calculated by first computing percent SWD for each school and then averaging over schools within each of the four size groups, each year. Weighting by pupils within size group shows same trends. Includes all students with disabilities in grades 1-12 and ungraded in NYC traditional public schools.

**Figure 9.** GEN-SWD differences in the test scores on NYS Math and ELA exams, grades 3-8

*Source:* NYCDOE student level, administrative data.

*Notes:* Differences in Math and ELA z-scores. Average Math z-score for GENs and SWDs over this time period is 0.108 and -0.579, respectively. Average ELA z-score for GENs and SWDs over this time period is 0.124 and -0.611, respectively. Over 95% of SWDs and GENs take exams. About 25% of ungraded SWDs are tested (80,000 students). Ungraded SWDs are excluded from this analysis.
**Figure 10A.** GEN math exam scores if students had 2006 characteristics and coefficients, grades 3-8

Source: NYCDOE student level, administrative data.

Notes: The solid line is the average GEN math z-score each year. The dotted line illustrates what the average would have been if GENs in 2007-2012 had the characteristics of GENs in 2006. The dashed line illustrates what the average would have been if the returns to student characteristics (coefficients) in 2006 were applied to 2007-2015.

---

**Figure 10B.** SWD math exam scores if students had 2006 characteristics and coefficients, grades 3-8

Source: NYCDOE student level, administrative data. Detailed student information for SWDs is unavailable in 2013.

Notes: The solid line is the average SWD math z-score each year. The dotted line illustrates what the average would have been if SWDs in 2007-2012 had the characteristics of SWDs in 2006. The dashed line illustrates what the average would have been if the returns to student characteristics (coefficients) in 2006 were applied to 2007-2015.
Figure 10C. GEN ELA exam scores if students had 2006 characteristics and coefficients, grades 3-8

Source: NYCDOE student level, administrative data.

Notes: The solid line is the average GEN ELA z-score each year. The dotted line illustrates what the average would have been if GENs in 2007-2012 had the characteristics of GENs in 2006. The dashed line illustrates what the average would have been if the returns to student characteristics (coefficients) in 2006 were applied to 2007-2015.

Figure 10D. SWD ELA exam scores if students had 2006 characteristics and coefficients, grades 3-8

Source: NYCDOE student level, administrative data. Detailed student information for SWDs is unavailable in 2013.

Notes: The solid line is the average SWD ELA z-score each year. The dotted line illustrates what the average would have been if SWDs in 2007-2012 had the characteristics of SWDs in 2006. The dashed line illustrates what the average would have been if the returns to student characteristics (coefficients) in 2006 were applied to 2007-2015.
Figure 11. GEN-SWD high school graduation gap, 4-year and 5-year

Source: Publically available districtwide data from the NYCDOE.
Notes: Graduation rates includes all students who graduated with a HS diploma (Regents or local) after four (or five) years of first entering the 9th grade, or for ungraded students after four years of becoming 17 years old. Graduation rates exclude IEP diplomas. Results for absolute numbers are available from authors.

Figure 12A. Percent of graduating GENs with Local and Regents diplomas

Source: Publically available districtwide data from the NYCDOE.
Notes: Sample includes students graduating in four years. With the entering class of 2008 (graduating 2012) New York eliminated the Local diploma option for GENs.
Figure 12B. Percent of graduating SWDs with Local and Regents diplomas

Source: Publicly available districtwide data from the NYCDOE.
Notes: Sample includes students graduating in four years.

Figure 13. GEN-SWD difference in attendance rates

Source: NYCDOE student level, administrative data.
Notes: Attendance rates are calculated as the share of the number of days present in school divided by the number of days enrolled.
Figure 14. NYC total per pupil expenditures, by student type

Source: NYC School Based Expenditure Reports.

Notes: Includes all students in NYC school districts. Citywide special education is D75 in NYC. Full-time special education includes students in self-contained and ICT assigned services only and not students with SETSS or RS assigned services. Inflation adjusted to 2015 dollars using the Consumer Price Index.