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Falling Below the Line: Minimum Subgroup Size and Special Education Enrollment

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Abstract

The No Child Left Behind Act of 2001 (NCLB) brought high-stakes accountability testing into every American public school with the goal of 100 percent proficiency for all students. Making annual yearly progress (AYP) toward this proficiency goal for the total student population as well as at-risk subgroups was required in order for schools to avoid possible sanctions, such as school restructuring. In implementing NCLB, states had flexibility to determine the minimum size of these subgroups as to provide statistical reliability and accountability for as many schools as possible. If a school did not meet the state's minimum subgroup size, the proficiency of the students in the group were not calculated as part of AYP. The subjectivity of identification along with the lack of reliability in test score results makes manipulating the subgroup of students with disabilities possible and advantageous to schools. Using data from over 1,000 Arkansas schools for the years 2004-05 to 2013-14, school-level fixed effects analyses show that falling below the minimum subgroup cutoff of 40 is associated with a 1.5 percentage point decrease in students with disabilities at the school. For every student a school is above the cutoff, there is an increase of 0.09 percentage points in special education enrollment. Possible implications are discussed.

Keywords: education, special education, accountability, incentives, disability, assessment

Introduction

With the passage of the All Handicapped Children Act of 1975, Americans with Disabilities Act of 1990, and finally the Individuals with Disabilities in Education Act (IDEA) in 1997 and renewed in 2004, guaranteeing a free and appropriate education (FAPE) for students with disabilities in public schools, special education enrollment has continued to grow across the country. The No Child Left Behind Act of 2001 (NCLB) mandated the inclusion of students with disabilities in the attainment of 100 percent proficiency and progress on annual measureable objectives (AMOs) for schools to make annual yearly progress (AYP) and avoid sanctions. For statistical reliability, each state determined a minimum subgroup size for the calculation of progress toward subgroup AMOs. Schools without a sufficiently large number of students in a subgroup were not held accountable for the progress of those students in the determination of AYP. The academic challenges encountered by students with disabilities may lead schools to have an incentive to manipulate the number of students in this subgroup in order to fall below the minimum subgroup size and avoid including these students in AYP.

Identification of Students

The decision to identify a student as having a disability begins primarily with a student's school or parent. Either party can request that a student be assessed for special education services with proper reasoning. The assessment process is completed, typically, by the school psychologist and a special educator, though this varies based on the type of disability and expertise needed. Medical professionals are also involved, particularly for physical disabilities. Assessment results alone do not determine a student's eligibility. An Individual Education Program (IEP) team composed of the student's parent, a general educator, special educator, and administrator meet to review the results of the assessment and make a final determination.

Controversy over the process of identifying a student as having a disability and qualifying for special education services primarily surrounds "fuzzy" disabilities. These are disabilities such as specific learning disabilities, speech or language impairments, other health impairments, emotional disturbance, and sometimes even mental retardation. For these students, the IEP team exercises its discretion over students who may be on the margin of qualifying for special education. For example, the qualification used for a specific learning disability is based on a 1.5 standard deviation discrepancy between a student's cognitive ability and academic achievement assessments. While this seems to be a very clear line between eligibility and not, the members of the IEP team still make a determination that a student receive services, particularly if the student's scores sit on the margin of this qualification. In his book *Distinguishing Disability*, Colin Dean documents the way in which levels of wealth and education of parents creates a divide in the amount of power parents hold on an IEP team, particularly in these eligibility decisions. Chambers, Parrish, & Hikido (1996) interviewed special education directors in Pennsylvania, finding that they felt that the lack of rigidity in the regulations for determining eligibility for special education services resulted in an increased number of parental requests for services. The discretion available in this identification process provides the opportunity for manipulation if incentives exist for one of the parties to do so.

Competing Incentives

NCLB was the first federal law to mandate the accountability of schools through standardized testing with a goal of 100 percent of students reaching proficiency by the year 2014. Some states had previously implemented high stakes accountability systems independently (Hanushek & Raymond, 2005), and the special education community responded with the 1997 and 2004 reauthorization of the Individuals with Disabilities Act (IDEA) requiring the inclusion

of students with disabilities in state assessments to the same extent as their non-disabled peers.[1] NCLB, unlike many of the state systems, included in it the accountability of schools to specific subgroups, including students with disabilities, in its calculations for whether a school has made annual yearly progress (AYP) on measurable objectives (No Child Left Behind Act, 2001). The special education subgroup, however, is composed only of students identified as such through the IEP process (Harr-Robbins et al, 2013).

Accordingly, the Act allowed for states to individually determine aspects of the implementation of NCLB, such as the minimum size of subgroups included in calculating AYP. These subgroups sizes had to be determined in a way that the results will be statistically reliable and not reveal personally identifiable information.[2] In determining the size, states had to balance achieving statistical reliability with holding as many schools accountable for their subgroups as possible (Rouse & McLaughlin, 2007). On average, most states chose a minimum subgroup size of 30 or 40 students necessary for the calculation of proficiency for AYP (Harr-Robbins et al, 2013). Some states created higher minimum subgroup sizes (e.g. California) for students with disabilities in order to compensate for the statistical reliability concerns surrounding the group's heterogeneity (Erpenbach, Forte-Fast, & Potts, 2003). If schools did not have sufficient students with disabilities based on the minimum subgroup size for AYP calculation, they were not held accountable for this subgroup. In 2009-10, only 35 percent of public schools were held accountable for the subgroup of students with disabilities though this varies by elementary (32 percent), middle (62 percent), and high school (23 percent) (Harr-Robbins et al, 2013). Because the minimum subgroup is determined as a raw number rather than percentage, there is a high

[1] 34 CFR § 300.157
[2] 20 USC § 6311 (b)(2)(C)

correlation between a school's overall student enrollment and number of subgroups it is accountable for to make AYP (Kiplinger, 2008; Porter, Linn, & Trimble, 2005).

For those schools that are accountable for the subgroup of students with disabilities, the expectation, using annual measureable objectives (AMOs), is that this subgroup makes proportional progress to other subgroups despite evidence found by Eckes and Wando (2009) that their gains are substantially smaller. This is likely the reason that schools with a subgroup of students with disabilities to include them fail to make AYP. Moreover, NCLB's requirement for 100 percent proficiency for each subgroup is particularly difficult for students with disabilities who, on average, start at a lower proficiency rate, making their annual targets much larger and less attainable than their non-disabled peers (Harr-Robbins et al, 2013). These increased challenges for students with disabilities to meet their AMOs may exacerbate the principal-agent problem in schools and create an incentive for the manipulation the subgroup composition.[3]

IEP teams are given several options for test taking for students with disabilities under NCLB. Students can take the regular assessment with or without accommodations, a modified assessment, or an alternative assessment. There are no limits on which students can take the regular assessment, and all accommodations are determined by the IEP team in consult with authorized accommodations for the assessment taken.[4] A temporary policy was put into place in May 2005 for schools that did not meet AYP solely due to the achievement of students with

[3] Cullen and Reback (2006) outline the way in which gaming through student status labeling may occur when educators perceive an accountability system as "unfair." To compensate for this unfairness, teachers may strategically "teach to the test" or explicitly cheat. Manipulation of classification statuses may also occur when certain groups receive exemptions or benefits in testing.

[4] The Smarter Balance Assessment Consortium provides a detailed document describing the various times of accommodations that are available. They delineate them as "universal tools," "designed supports," and "accommodations" based on individual's eligibility to receive them. http://www.smarterbalanced.org/wordpress/wp-content/uploads/2014/08/SmarterBalanced_Guidelines.pdf

disabilities and could still show evidence of progress of students with disabilities in the state (Elledge, Le Floch, Taylor & Anderson, 2009). The policy allowed schools to determine a "proxy" of the percentage of students with disabilities based on 2 percent of all assessed students. This proxy was then applied to the number of students with disabilities who were proficient for the purposes of meeting AYP.

While this "proxy" was utilized by many states, other states implemented the option to create an assessment based on modified achievement standards for 2 percent of test takers in the school. Many of the states that chose this approach had a larger number of schools missing AYP due to the subgroup of students with disabilities, thus demonstrating that the need for the development of such an assessment had to be high enough to warrant the investment in its creation (Elledge et al, 2009). Finally, NCLB required that all states create an alternative assessment based on alternative achievement standards for 1 percent of students with the most significant cognitive impairments. In a U.S. Department of Education study on the implementation of these options, Elledge et al. (2009) found that the use of alternative calculations of proficiency for the subgroup of students with disabilities significantly decreased the number of schools not meeting AYP due solely to this subgroup.

These various means for assessing students with disabilities under NCLB were attempts to increase accessibility and inclusion of students with disabilities in accountability systems. They may eliminate some of the incentives that existed under other accountability systems to identify low achieving or poorly behaved students as having a disability in order to exclude them from accountability (Figlio & Getzler, 2002; Cullen & Reback, 2006). Nevertheless, the ability to provide accommodations on assessments may still play a role in these decisions.

Funding

Funding formulas may also interact with the flexibility of an IEP team in determining whether a student qualifies for special education services and may create financial incentives to identify new students as having a disability. While parents are incentivized by their desire for their student to receive the help and support they need from their school, the cost of those services is not typically their focus (Dhuey & Lipscomb, 2011). School personnel, on the other hand, may be highly unmotivated to qualify a student for special education services if their funding system provides a finite amount of money to them for students with disabilities despite a shift in total special education enrollment. If, however, a student only marginally needs services, and the school will receive additional money for a change in one student's eligibility, there is an incentive to qualify that student even if he or she would be just as well served without the new identification. Arkansas, however, allocates special education funding along with all other funds without a clear consideration for the schools actual disability rate. As a result, there should not be a monetary incentive for schools to identify marginal students as needing special education.

Prior Literature

Accountability Incentives

Several studies have looked at the impact that implementing an accountability system has on special education enrollment rates. Figlio and Getzler (2002) analyzed student level data in Florida and found that students who were lower performing and lower income prior to the implementation of an accountability system were identified as having a disability at higher rates once the new system was put in place. They particularly found this to be true at lower income and lower performing schools that were likely at risk of being labeled as a failing school under the new accountability system (Figlio & Getzler, 2002). This research seems to indicate that

schools react to incentives created by other types of school policies in which they may benefit from identifying students as having a disability. In this case, it was to exclude at-risk students from the accountability system. Hanushek and Raymond (2005) analyzed the relationship between high-stakes accountability systems and special education enrollment without statistically significant findings. Similarly, Greene and Forster (2002) included a variable for measuring the effect of state accountability systems on special education enrollment in their analysis without statistically significant findings as well. Dhuey and Lipscomb (2011) also included an accountability variable based on Hanushek and Raymond's (2005) study, likewise, finding null effects.

Minimum Subgroup Size

Little empirical research exists on the actual effect that a state's minimum subgroup size may have on students with disabilities. When using a regression discontinuity design to analyze the effect of the introduction of school accountability for the subgroup of students with disabilities in California, Wei (2012b) did not find any evidence of improved achievement for these students. In Florida, however, schools were more likely to identify low income and low achieving students as having a disability with the introduction of the state's accountability system. In particular, schools who were closer to being considered a failing school participated more heavily in these practices (Figlio & Getzler, 2002). Similarly, Cullen and Reback (2006) found that schools that had higher incentives to improve test scores on a state achievement tests were significantly more likely to identify students as in an exempt group, such as students with disabilities, for test taking purposes. In regards to the influence of minimum subgroups, Wei (2012a) found that the use of more stringent accountability pressures, including a lower minimum subgroup size, resulted in increased achievement for only Hispanic students.

While No Child Left Behind (NCLB) allowed for flexibility by states in the implementation around specific components of the law, differences in state failure rates were strongly related to achievement targets and other variations in NCLB implementation determined by the states (Davidson, Reback, Rockoff, & Schwartz, 2013). Davidson et al. (2013) looked at these variations finding that schools were more likely to fail in states with a larger percent of schools held accountable for the students with disabilities subgroup (Davidson et al, 2013, Harr-Robbins et al, 2013). States mitigated some of these effects by increasing their confidence intervals when they had high rates of students in special education. In a closer look at this issue, Cronin, Dahlin, Xiang, and McCahon (2009) analyzed both elementary and middle schools, finding that only 6 percent of elementary and 3 percent of middle schools met their Annual Measureable Objectives (AMOs) for their special education subgroups. Accordingly, elementary schools were far more likely (49 percent) to have the special education subgroup too small to be included in annual yearly progress (AYP) than middles schools (18 percent). There seem to be clear incentives for states to alter minimum subgroup requirements as well as schools to change their identification practices in order to avoid the high probability that their school will fail to make AYP due to the special education subgroup.

Funding Incentives

The first quantitative research to analyze special education funding system differences across states by Greene and Forster (2002) categorized systems as either a "bounty" or "lump-sum" funding system. They found that over a ten year period, a state with a "lump-sum" system saw a 1.24 percentage point increase in special education enrollment (Greene & Forster, 2002). Mahitivanichcha and Parrish (2005) re-analyzed Greene and Forster's study and found similar results when replicating their model. They also used a second model with a poverty measure and

found that the effect of a census system on special education enrollment was somewhat weaker than the prior analyses (Mahitivanichcha & Parrish, 2005).

The most recent study to quantitatively analyze the relationship between a state's special education funding system and the enrollment of students in special education was published in 2011 by Dhuey and Lipscomb. They employed a state level fixed effects model utilizing states that changed from one system to another during the period of 1991-2000. This research found about a 1.24 percentage point decrease in special education enrollment when states switched from a prospective to a capitation system.

Applying the methodology and theory behind prior research, the current study fills the gap in literature around the identification practices of students with disabilities based on the minimum subgroup size used for AYP.

Research Methodology

Data Description

All data utilized were obtained for the years 2004-05 to 2013-14 through two publicly accessible sources, the Arkansas Department of Education (ADE) Data Center and the Office of Education Policy at the University of Arkansas.[5] The number of students who were limited English proficient (LEP), male, free and reduced lunch, special education, gifted and talented, and had a 504 plan were obtained from the ADE Data Center. School-level percentages were then calculated based on the school's total enrollment. School-level (elementary, middle, high school) and type (magnet, alternative, or neither) were also obtained from the ADE Data Center.

[5] Data from the Office of Education Policy is obtained from the publicly available data through the ADE Data Center. For ease of calculation and formatting, this source was utilized instead of directly from the ADE.

The percent of students in each racial category, percent of students scoring proficient or advanced on state assessment by subject, school Poverty Index,[6] and region in the state were obtained from the Office of Education Policy. Arkansas administered Benchmark exams in math and literacy to grade 3-8 and End of Course (EOC) assessments in algebra, biology, geometry, and literacy (11^{the} grade only) to students in high school. Algebra and geometry proficiency and advanced rates were aggregated to create a math percent proficient and advanced. Biology results were not utilized in this analysis. Data from both the ADE Data Center and Office of Education Policy were matched to schools using school identification numbers.

Sample

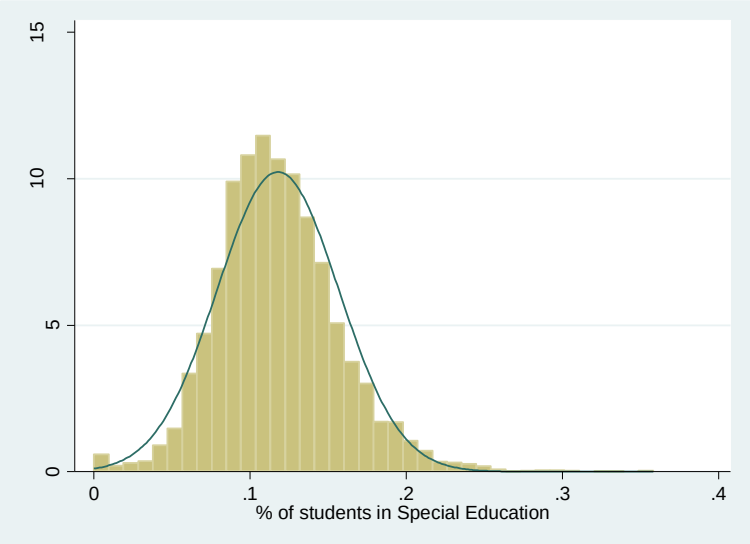
A total of 1,340 schools in Arkansas enrolled over 11,500 from 2004-05 to 2013-14 in the sample. Approximately one third of schools are located in the northwest region of the state with another quarter in the northeast and central regions. The remaining 20 percent of schools were located in the southwest (13 percent) and southeast (7 percent) of the state. As expected, most of the schools are elementary schools (60 percent). A quarter of the schools are middle schools and the final 15 percent are high schools. Across all schools, over two-thirds of students are white, with African American students making up the largest minority at about 20 percent. The average percent of students receiving free or reduced lunch in schools was over 60 percent in the sample years, which is quite a bit higher than the national average.[7] Proficiency in math and literacy in schools averaged almost 70 percent over the nine periods studied.

[6]The Poverty Index is a sum of 2 times the number of students at a school receiving free lunch and the number of students receiving reduced priced lunch all divided by total school enrollment.

[7] The Digest of Educational Statistics reports about 42 to 48 percent of students as free or reduced price lunch eligible during this time period. https://nces.ed.gov/programs/digest/d12/tables/dt12_046.asp

The average rate of students in special education across schools in the state continued to be lower than the national average and showed a decline over the study period. The average for all schools was at a high in 2004 just below 13 percent and dropped to about 11.5 percent by 2013. Figure 1 depicts the distribution of the percent of students with disabilities enrolled in

Figure 1: Distribution of Percent of Students with Disabilities in Schools from 2004-05 to 2013-14



Arkansas public schools. This trend is the opposite of the national trend toward continued increases in the rate of students with disabilities (Dhuey & Lipscomb, 2011).

As other studies have found, our sample also shows a strong relationship between the total enrollment of a school and the number of students with disabilities enrolled (see Figure 2). This is likely to impact the probability of larger schools having a large enough special education subgroup to include them in the calculation of annual yearly progress (AYP). On average, schools in Arkansas had a special education enrollment of about 46 students. As a result, the majority of schools should be expected to be accountable for the achievement of the subgroup of students with disabilities. With an average enrollment relatively close to the subgroup minimum cutoff, there may be a substantial number of schools that have an incentive to ensure that students with disabilities are not included in the school's calculation of AYP. Figure 3, depicts a

positive relationship between the distance a school's special education enrollment is from the 40 student cutoff and the percent of students with disabilities enrolled in the school.

Figure 3: Total Enrollment's Relationship to Special Education Enrollment

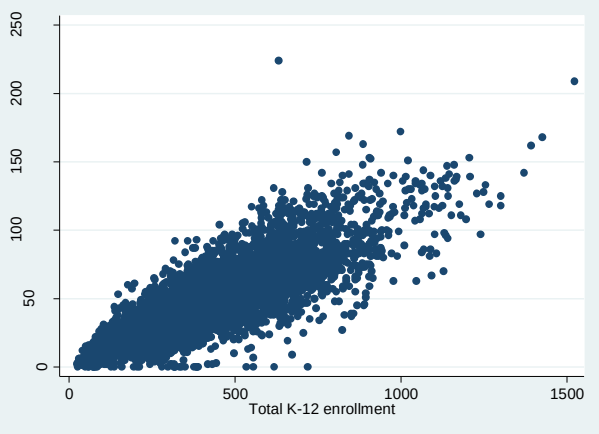
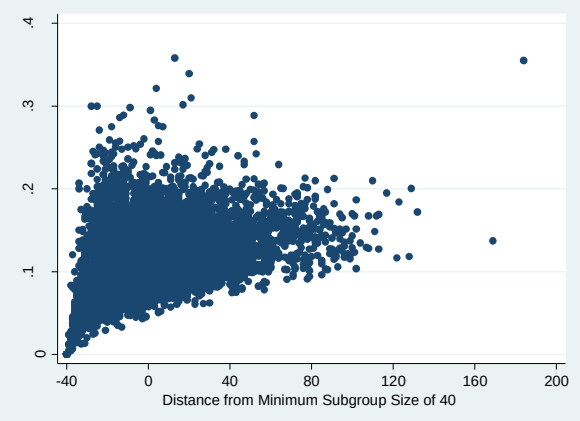


Figure 2: School Distance from Subgroup Cutoff and Percent in Special Education



Analytic Strategy

The incentive to avoid the inclusion of students with disabilities as a subgroup should theoretically cause schools to cluster directly below the 40 student cutoff and very few schools should have special education enrollment just over the cutoff. Figure 4 illustrates the theoretical distribution of enrollment of students with disabilities by schools. Reality, however, is depicted by Figure 5, showing a positively skewed distribution with a large number of schools at about

Figure 4: Theoretical Distribution of Schools Enrollment of Student with Disabilities

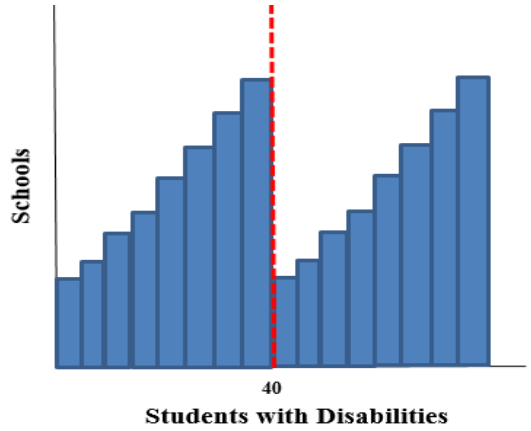
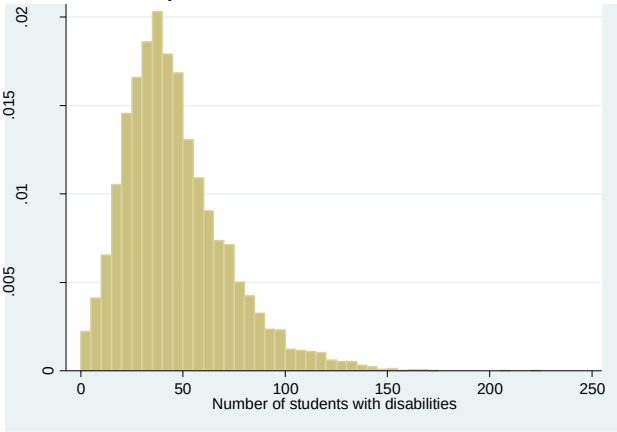


Figure 5: Arkansas Distribution of School Enrollment of Students with Disabilities



the 40 student mark but no clear cliff after the cutoff. Instead, there is a gradual decline from 40 students to about 100 students with disabilities.

Table 1: Frequency of Schools Switching Above to Below the Minimum Subgroup Size

Total Switches	N Schools	Percent of Sample
1	791	59.0%
2	211	15.7%
3	159	11.9%
4	76	5.7%
5	67	5.0%
6	16	1.2%
7	15	1.1%
8	5	0.4%

Nevertheless, a significant portion of the schools in the sample switch from being above to below the 40 student cutoff and back again over the period analyzed. Table 1 describes the number of schools and the frequency in which they switched from being above to below the cutoff and vise versa.[8] For analyses, a school level fixed-effects model utilizes the variation in rates of students with disabilities to compare the same school as its subgroup size falls above and below the cutoff. Furthermore, the fixed-effects estimator allows each school to have a different intercept, which should limit the bias that may exist based on the many time-invariant school characteristics that may affect results (Kennedy, 2008). The following basic model will be utilized for analysis:

$$ENROLL_{st} = \ \propto + \beta_2 BELOW_{st-1} + \beta_3 MATH_{st-1} + \beta_4 LIT_{st-1} + \beta_5 YEAR + \beta_6 X_{st} + \mu_s + \ \varepsilon_{st}$$

with the dependent variable of special education enrollment as a percent of total enrollment. The variable of interest, BELOW, is a dummy variable taking a value of 1 if a school was below the

[8] See Appendix Table 1 for differences between schools with one and more than one switch over the study period.

minimum subgroup size the prior year. Similarly, one year lagged math and literacy percentages for school s are identified by β_3 and β_4. The variable, YEAR, allows for a year time-trend that should account for changing rates of students with disabilities as descriptive statistics indicate. The variable X_{st} is a matrix of school level time varying covariates such as percent of students eligible for free or reduced priced lunch, racial make-up, and limited English proficient. School-level fixed effects are represented by μ_s, eliminating any bias from time-invariant factors within the school. Finally, idiosyncratic error in the model is contained within ε_{st}.

A subsequent model is utilized with an interaction term between falling below the cutoff and the distance from the cutoff. Furthermore, to accommodate for the possible non-linear nature of the distance from the cutoff for special education enrollment, a quadratic distance variable is also included in the model.

Results

The basic model used simply looks at the difference in percent of students with disabilities between schools when they fall above and below the cutoff. Table 2 shows the results of the school level-fixed effects regression of falling below the cutoff the prior year on the percent of students with disabilities at the school. The results in Column 1, without controlling for any school level factors, illustrate that schools decreased their percent of students with disabilities by 1.6 percentage points if they fell below the cutoff the prior year. When including prior year proficient/advanced rates for math and literacy (Column 2), the coefficient on being below the cutoff decreases slightly to -1.53 percentage points. This relationship decreases further when accounting for the time varying school factors (Column 3), though again, not by much. It should be acknowledged that the R-squared's for these models are incredibly small, between 0.05 and 0.07. The explanatory power of this model is quite weak and signals the

existence of other factors that are impacting the percent of students with disabilities in these schools.

Table 2: Relationship between falling below the minimum subgroup and the percent of students with disabilities

	(1)	(2)	(3)
Below Cutoff	-0.0160***	-0.0153***	-0.0151***
	(0.00124)	(0.00122)	(0.00120)
Math Proficiency		-0.0351***	-0.0340***
		(0.00683)	(0.00684)
Lit Proficiency		0.0135*	0.0175**
		(0.00746)	(0.00755)
% Male			0.0827***
			(0.0165)
FRL			0.0251***
			(0.00889)
LEP			-0.0159
			(0.0195)
Hispanic			0.0128
			(0.0243)
Black			0.0239
			(0.0202)
Other race			0.0258
			(0.0211)
Constant	0.129***	0.137***	0.0739***
	(0.00114)	(0.00391)	(0.0124)
Observations	7,543	7,543	7,543
R-squared	0.052	0.058	0.070
# of schools	1,052	1,052	1,052

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

Note: Robust standard errors in parentheses are clustered at the school level. Schools were considered below the cutoff if their special education enrollment was 39 students or less the prior year. Math and literacy proficiency are each the combined percent of students scoring advanced or proficient on the state Benchmark or End-of Course examination the prior year. For high school, the percent of students scoring at least proficient in algebra and geometry were aggregated.

The results from the basic model indicate a negative trend in the percent of students with disabilities at a school when schools fall below the minimum subgroup cutoff the previous year.

Table 3: Relationship between falling below and distance from the minimum subgroup and the percent of students with disabilities

	(1)	(2)	(3)
Below Cutoff	0.000387	0.000678	0.00250**
	(0.00132)	(0.00131)	(0.00120)
Below*Distance	0.000609***	-0.000791***	-0.000290**
	(6.77e-05)	(0.000121)	(0.000130)
Distance	-0.00200***	0.000597***	0.000942***
	(0.000117)	(6.77e-05)	(6.37e-05)
Distance squared			-4.17e-06***
			(8.58e-07)
Math Proficiency		-0.0270***	-0.0263***
		(0.00624)	(0.00620)
Lit Proficiency		0.0164**	0.0207***
		(0.00661)	(0.00663)
FRL			0.0219***
			(0.00787)
LEP			-0.0119
			(0.0159)
Hispanic			0.00560
			(0.0210)
Black			0.0159
			(0.0177)
Other race			0.00878
			(0.0191)
Constant	0.133***	0.125***	0.0653***
	(0.00109)	(0.00366)	(0.0109)
Observations	7,543	7,543	7,543
R-squared	0.109	0.158	0.175
# of schools	1,052	1,052	1,052

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

Note: Robust standard errors in parentheses are clustered at the school level. Schools were considered below the cutoff if their special education enrollment was 39 students or less the prior year. Distance is measured by the number of students greater or less than the cutoff of 40 enrolled by the school each year. Math and literacy proficiency are each the combined percent of students scoring advanced or proficient on the state Benchmark or End-of Course examination in the prior year. For high school, the percent of students scoring at least proficient in algebra and geometry were aggregated.

In addition to simply falling below, there is considerable variation in the number of students from the cutoff for schools, and this distance may result in differential incentives. Table 3

displays the results for the more complex analysis utilizing an interaction between the distance from the cutoff and falling above or below that cutoff. Schools that fall below the minimum subgroup size cutoff decrease the percent of students with disabilities enrolled in the school. The rate in which this decline occurs is quite small, only 0.03 percentage points for every one student in special education below the cutoff. On the other hand, as schools fall further above the cutoff, the percent of students with disabilities increases 0.09 percentage points, which is three times larger than the rate of the decrease for those below the cutoff. This pattern is relatively consistent once controls for school characteristics are added.

Both, the basic and more specific models, show evidence of some relationship between the minimum subgroup size and the percent of students with disabilities enrolled in the school. The results, however, do not have strong predictive power and are not causal in nature. For this reason, further research is necessary to make definitive claims about the potential impact the required subgroup size may have on schools.

Discussion

The results seem of this study indicate some potential evidence of incentives related to the minimum subgroup size needed to include students with disabilities in calculations of annual yearly progress (AYP) in Arkansas. The overall relationship is actually quite large with a 1.5 percentage point decrease over 10 years in the percent of students with disabilities for schools that fall below the minimum subgroup cutoff. The variation based on the distance from the subgroup size of 40 students indicates, as expected, that schools decrease their percent of students with disabilities as they move farther below the cutoff and increase as they move farther above the cutoff.

There is likely a feeling that schools above the cutoff have little hope of changing their situation, and increase their percent of students with disabilities because they can still reap the financial benefits associated with the subgroup. Conversely, schools falling below the cutoff may want to maintain their status and avoid potential consequences associated to the high probability of failure of this subgroup to make their annual measureable goals and thus the school fail to make AYP. This analysis, however, lacks the ability to make any causal claims about the impact that the minimum subgroup size actually has on the percentage of students with disabilities enrolled in Arkansas schools.

As No Child Left Behind (NCLB) was, for many states, a large shift in the education policy enacted in schools, data prior to the enactment of the policy should provide more robust estimates of the change it caused. Furthermore, states varied in the number of students required for the special education and other subgroups to be included in the calculation of AYP. Comparing the different minimum subgroups sizes across states is likely to also increase our understanding that this aspect of the policy had on students with disabilities. Accountability systems will shift in the coming years with the reauthorization of NCLB, but the statistical purpose of the minimum subgroup size will continue to exist as long as we value the disaggregation of data for at-risk groups. For this reason, understanding the unintended incentives this policy can create is essential for properly constructing minimum subgroup sizes that reduce negative consequences for students.

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Appendix

Appendix Table 1: Comparison of schools that switched only once versus mulitple switches above and below the cutoff

	1 Switch	>1 Switch	Difference	p-value	
Enrollment	412.68	389.49	23.189	0.93	
Elementary	44.4%	60.9%	-16.5%	0.00	***
Middle School	23.1%	17.1%	6.0%	0.01	***
High School	32.5%	22.0%	10.5%	0.00	***
Northwest	19.1%	23.2%	-4.1%	0.05	*
Northeast	18.5%	17.3%	1.1%	0.57	
Central	17.3%	19.6%	-2.2%	0.27	
Southwest	10.4%	10.4%	0.0%	0.98	
Southeast	7.2%	5.8%	1.4%	0.27	
Math Proficient/Advanced	62.3%	66.3%	-4.0%	0.00	***
Literacy Proficient/Advanced	64.6%	66.8%	-2.2%	0.02	**
Special Ed.	12.0%	11.7%	0.3%	0.14	
Section 504	2.2%	2.0%	0.2%	0.06	*
GATE	9.1%	8.7%	0.4%	0.30	
Male	51.7%	51.7%	0.1%	0.77	
FRL	59.9%	61.2%	-1.3%	0.25	
Black	24.8%	23.9%	0.9%	0.62	
Hispanic	6.8%	7.4%	-0.6%	0.35	
White	65.6%	66.0%	-0.4%	0.83	
Other	2.8%	2.7%	0.1%	0.71	
LEP	4.5%	5.0%	-0.6%	0.31	