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Discipline reform and educational outcomes: an analysis of Illinois Senate Bill 100

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Abstract

We examine the impact of an Illinois disciplinary reform policy implemented in 2016, which reduced the use of out-of-school suspensions, on high school graduation rates. Applying a difference-in-differences approach using districts with historically high suspension rates as the treated group, we find an increase in graduation rates. We also find increases in the truancy rate and decreases in teacher retention, suggesting that important tradeoffs are present.

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1 Introduction

Given the critical role education plays in shaping students' lives, understanding how policies aimed at reforming school practices affect student outcomes is of vital importance. In Illinois, one such policy has drawn considerable attention since its passing and implementation in school districts across the state. Illinois Senate Bill 0100[1] (hereafter SB 100) was passed in 2015 and took effect in 2016. Designed primarily to reduce administrators' use of disciplinary exclusion (suspension and expulsion), the bill had an immediate effect on the number of disciplinary incidents occurring in school districts statewide. SB 100 requires data reporting annually to the Illinois School Board of Education (ISBE) on the use of suspension and exclusions. Further, the identity of districts in the top 20% are publicly posted. The legislation's aspiration suggests that "school officials shall limit the number and duration of expulsions and suspensions to the greatest extent practicable". Current guidance from the ISBE[2] states:

> Schools should be safe and supportive environments conducive to teaching and learning for educators and students. On the path to creating this culture, schools should rely less on exclusionary discipline techniques (such as suspensions and expulsions) and instead utilize methods that focus on the social, emotional, and behavioral needs of all students.

We investigate how this change in school disciplinary practices affects outcomes for students across the state. Specifically, we investigate how the implementation of SB 100, reducing the use of out-of-school suspensions, affects one of the most common metrics for student achievement: high school graduation rate.

The policy keeps children in school, which can contribute to school completion. If limiting exclusionary disciplinary practices enhances classroom engagement for students in districts that have historically had high numbers of suspensions, then we hypothesize that measures of academic achievement, such as the graduation rate, will see an increase.

We find strong evidence that SB 100 increased the graduation rate. Using school districts in the top quartile of out-of-school suspensions prior to the policy as the treated group and districts in the lowest quartile as the control group, we find that the high school graduation rate increases by approximately two percentage points. This is consistent with our hypothesis that limiting exclusionary disciplinary practices can improve students' success.

We also consider spillover effects. If mitigation of out-of-school suspensions affects the quality of the educational environment, then one would expect collateral consequences onto other students and their teachers. To this end, we also study the truancy rate and teacher retention rate. We find significant effects here as well. The truancy rate increases substantially and the teacher retention rate decreases. This is consistent with a deterioration in the educational environment.

[1] It is now known as Public Act 99-0456.

[2] `www.isbe.net/discipline`

2 Literature Review

There has been ample research on the use of disciplinary policies and their negative effects on student outcomes. Many previous studies have broadly examined whether suspensions in schools impact academic achievement. Research consistently finds that higher suspension rates correlate with lower academic performance and increased dropout rates. For example, Noltemeyer et al. (9)2015) show an inverse relationship between high suspension rates and educational achievement, as well as a lower dropout rate. Lacoe and Steinberg (2019) estimate that suspensions in Philadelphia school districts negatively impacted math and reading achievement for suspended students and that exposure to suspensions has a small but negative spillover effect on peer achievement. Chu and Ready (2018) found similar evidence of a negative relationship between suspensions and academic outcomes even when accounting for differences in suspended and non-suspended students. Other researchers emphasize the long-term consequences of harsh disciplinary policies, such as economic tradeoffs associated with lower graduation rates (Rumberger and Losen, 2017). Finally, Jabbari and Johnson (2023) find that Black males are disproportionately affected by out-of-school suspensions, leading to negative life outcomes.

Importantly, the impact of high-suspension environments extends beyond suspended students themselves. For example, Perry and Morris (2014) highlight the collateral damage experienced by non-suspended students, who also suffer from lower academic achievement in such settings. Numerous other studies reinforce these trends, linking high suspension rates to decreased academic achievement, increased risk of school dropout, and greater contact with the juvenile justice system (Arcia, 2006; Suh et al., 2007; Cuellar and Markowitz, 2015; Bacher-Hicks et al., 2024).

While there is strong consensus on the harms of exclusionary discipline, the effectiveness of policies aimed at reducing suspensions remains contested. Some researchers argue that suspension policies themselves may not be the root cause of negative outcomes, but rather a reflection of deeper behavioral and structural disparities. For example, Cobb-Clark et al. (2015) question whether suspension policy alone drives academic outcomes, arguing that differences in dispositions between students who are suspended and those who are not may explain some of the observed effects. Other studies highlight the unintended consequences of reforms designed to reduce suspensions. Pope and Zuo (2023) examine a California policy aimed at limiting suspensions and find evidence of tradeoffs: while suspension rates decreased, the policy led to increased student absences, higher teacher turnover, and lower math and English test scores. The only students who saw marginal academic gains were those at the highest risk of being suspended. This study is particularly relevant because it suggests that while disciplinary reform may benefit certain students, it can also create new challenges for educators and peers, complicating the policy landscape. While reducing suspensions is a key goal of reforms like SB 100, research suggests that simply removing exclusionary discipline may not be sufficient to improve student outcomes. Zaff et al. (2017) emphasize that positive school environments, teacher relationships, and extracurricular engagement are critical predictors of high school graduation.

Illinois Senate Bill 100 (SB 100), enacted in the fall of 2016, sought to address disparities and excessive reliance on exclusionary discipline by limiting out-of-school suspensions and expulsions. While similar reforms have been implemented in states like California (Rumberger and Losen, 2017), SB 100 placed a particular emphasis on restorative practices and alternatives to suspension. Despite its significance, little research has been conducted on SB 100's impact on student outcomes. Given the polarized response from school administrators to its implementation (Hale, 2019), this

lack of empirical analysis represents a gap in the literature. We contribute to this literature by studying Illinois' attempt to reduce exclusionary discipline on both its direct and indirect consequences.

3 Methods

3.1 Data

We use district-level data for the 2010-2011 through 2022-2023 school years. Data was collected from the Illinois School Board of Education. The ISBE's Report Card Data Library includes school district information for numerous variables such as total enrollment, student demographics, educational outcomes, and teacher retention. District-level suspension data is collected from the ISBE's End of Year Student Discipline Report.

3.2 Treatment

We used the out-of-school suspension to determine the treatment and control groups. To define the treatment we divided the 2014-15 suspension data into quartiles. We define the lowest quartile as the control group and the greatest quartile as the treated cohort. Districts in the second and third quartiles are excluded. The lower quartile is defined as districts with out-of-school suspension counts less than or equal to 10 incidents per year, while the upper quartile is defined by districts with out-of-school suspension counts greater than or equal to 98 incidents per year.

Our identification strategy treats those school districts with high rates of out-of-school suspensions as those that will be affected by the state's discipline reform greatly. The lowest quartile represents those school districts where the policy will have only negligible impacts. Dropping the middle half of the observations allows us to cleanly distinguish the treatment effect.

3.3 Panel

The ISBE data initially contained observations for 852 school districts in the state. As discussed in the previous subsection, we first partitioned the data into quartiles based on 2014-15 academic year suspensions. The second and third quartiles were removed.

In addition, we further trimmed the sample. We eliminated school districts that don't have high schools, as we are interested primarily in high school graduation. Further, districts that didn't contain observations for graduation rates were excluded as well. The final number of districts for each year is 201 (142 treated and 59 control).

As the data set covers the 13 academic years between 2010-11 and 2022-23 for the 201 districts studied, there are $N = 2613$ observations.

3.4 Variables

The primary outcome variable of interest is the high school graduation rate. The graduation rate is the percentage of students in the district that graduate from high school within four years. We are also interested in how the policy may spill over and affect the truancy rate and the teacher retention

rate. Including the former recognizes that chronic truancy can be both a cause and a consequence of disciplinary actions. The truancy rate indicates systemic challenges such as disengagement, behavioral issues, or poor support systems. The truancy rate is the percentage of students who miss five or more school days within the given school year. The teacher retention rate measures the percentage of teachers in a given year who were employed in the school district in the previous year. It captures job turnover. We take it as a sign of the quality of the work environment. Data on the teacher retention rate are only available since the 2013-14 academic year. These district-level variables capture the key outcomes and characteristics of Illinois school districts before and after the implementation of SB 100. They are chosen to assess the policy's potential impact on students and teachers.

We include several control variables as well. The attendance rate captures student engagement and learning and is defined as the percentage of student attendance in a given school year. We include the percentage of students who are from low-income households. This is defined as those who receive or live in households that receive Supplemental Nutrition Assistance Program or Temporary Assistance to Needy Families; are classified as homeless, migrant, runaway, Head Start, or foster children; or live in a household where the household income meets the U.S. Department of Agriculture income guidelines to receive free or reduced-price meals. SB 100 was intended to reduce the disproportionate amount of disciplinary action toward underprivileged students, so it is a reasonable control variable. Further, we include enrollment which measures the total number of students enrolled within a district in the given school year. Finally, we include the average number of years of teaching experience by the teachers employed in the school district, as well as the average teacher salary. These allow us to account for the supply side of the educational environment.

3.5 Estimation Strategy

We estimate a two-way, fixed-effects, difference-in-differences model (TWFE):

$$Y_{dy} = \beta(Post_y \times Treated_d) + \gamma' X_{dy} + \delta_d + \theta_y + \epsilon_{dy}, \tag{1}$$

where the dependent variable, Y_{dy}, is either the graduation rate, truancy rate, or teacher retention rate for district d in year y. The indicator variable $Post_y$ is post-policy period ($y \geq 2016$). The indicator variable $Treated_d$ is equal to one if district d is in the treated cohort. X_{dy} are control variables for district d in year y.

Further, X_{dy} represents multiple control variables that will be tested. As stated, it is enrollment, attendance, low income status, teacher experience, average teacher salary. Finally, δ_d and θ_y are district and year fixed effects, respectively. We include district fixed effects and year fixed effects to account for time-invariant and year-specific unobserved factors. Controlling for district fixed effects recognizes that there are important attributes to school districts across the state, such as socioeconomics of the region, tax base, and school policies that matter. Controlling for year fixed effects helps isolate the impact of SB 100 from other macroeconomic effects that affect all districts over time, such as broader economic conditions or statewide education reform unrelated to SB 100.

The estimated difference-in-differences (DiD) coefficient, $\widehat{\beta}$, measures how the difference in the outcome variable for treated districts compared to the control group changes after the policy is implemented. It is our estimate of the average treatment effect.

4 Results

4.1 Two-Way, Fixed Effects

We now estimate the TWFE model. Table 1 presents the results.

Table 1: Two-Way, Fixed Effects

	Graduation Rate		Truancy Rate		Teacher Retention Rate	
	(1)	(2)	(3)	(4)	(5)	(6)
Post x Treated	1.882 **	2.259 **	6.406 ***	5.218 ***	-1.315 *	-1.626 **
	(0.764)	(0.767)	(0.778)	(0.663)	(0.783)	(0.778)
Controls?	No	Yes	No	Yes	No	Yes
District FEs?	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs?	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.659	0.694	0.707	0.804	0.673	0.677
AIC	15851.0	11815.2	16944.1	12534.8	10815.4	10796.6
N	2613	2010	2613	2010	1608	1608
DV μ	86.03	86.30	8.59	9.69	88.01	88.01
DV σ	8.56	8.21	11.38	12.26	6.13	6.13

Results from a difference-in-differences estimation presented. Control variables are: student enrollment, attendance rate, proportion of students with low incomes, average tenure of teachers, and average teacher salary. With the controls, the panel is unbalanced due to occasional missing observations. An interpolation is used to fill in occasional missing values for the truancy rate. Standard errors are clustered at the school district level (201 clusters); *** 1%, ** 5%, * 10% level of significance.

We vary specifications by whether the control variables are included. The results strongly suggest that SB 100 significantly impacted Illinois schools. The graduation rate increased by approximately two percentage points. This is approximately one-fourth of a standard deviation increase. Thus, it is economically significant as well.

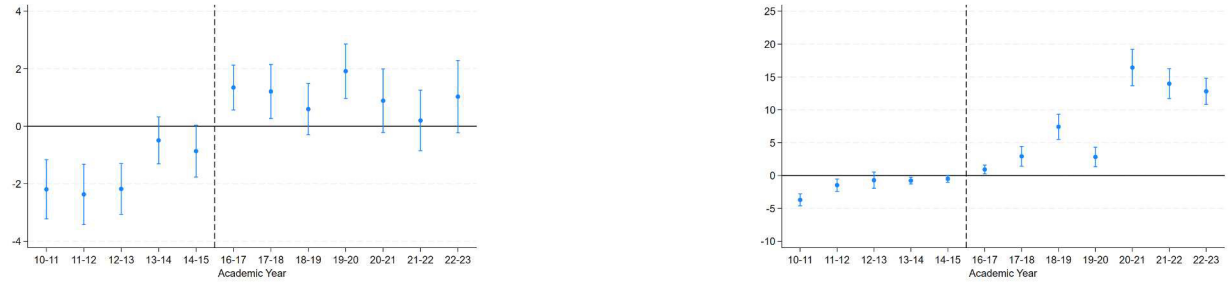
There are other important spillover effects. First, from columns (3) and (4) of Table 1, the truancy rate also increases. The reduction in out-of-school suspensions led to fewer students coming to school. It is unclear to what extent it is the student engaging in the behavioral problem who is the one not coming to school, or the deteriorated environment created, that is leading to increased truancy. The rise in the truancy rate is approximately one-half of a standard deviation signifying a rather sizeable increase.

Correspondingly, the teacher retention rate drops. This is consistent with the hypothesis that retaining behaviorally-troubled youth in school deteriorates the environment lowering the quality of the teacher's work life. Turnover grew. The increases's magnitude is approximately one-fourth of a standard deviation, or rather, the retention rate dropped by approximately two percent. Taken together, these results suggest important, negative collateral consequences.

4.2 Event Study

Next, we explore the timing of these effects in an event study analysis. Here we created separate indicator variables measuring the time until and the time since SB 100 was implemented. Thus, $y = 2016 - 17$ is the first year of the policy. Only the treated school districts are considered and period $t = -1$, the year just before implementation, is the omitted reference period. Figure 1 graphically depicts the coefficient estimates and the 95% confidence intervals.

Figure 1: Event Studies



(a) Graduation Rate

(b) Truancy Rate

Observations from the treated districts considered; $N = 1846$. Standard errors are clustered at the school district level (# clusters = 142). The coefficient estimates and the 95% confidence intervals are depicted.

Regarding the graduation rate, we observe that the effect is delayed a year, which is justifiable given that the policy is unlikely to have as big of an effect on those entering their senior year of high school. Further, the effect is consistently positive after the policy, suggesting a level shift in the improvement.

Regarding the truancy rate, the effect is, again, delayed and grows over time. We do not present the event study for the teacher retention rate as the number of pre-policy time periods is small.

4.3 Synthetic Difference-in-Differences

Another important observation arises in the event studies. For both outcome variables, the coefficient estimates are negative and statistically significant in 2010-11 and 2011-12 and begin to rise as it gets closer to the policy's implementation. This suggests that the treated school districts were experiencing improving graduation rates and worsening truancy rates *prior* to SB 100. This opens up the possibility that we are not measuring the policy's effect on these schools but, rather, are capturing the pre-existing time trend.

Arkhangelsky et al. (2021) provide a solution for the trends problem in DiD analysis. Their method, known as Synthetic Difference-in-Differences (SDiD), adds cross-sectional and time weights to construct a (weighted) control group that trends similarly to the treated cohort in the years prior to policy implementation. This creates parallel trends and improves confidence that expansion in the gap between the treated and control groups after the policy is implemented is due, in fact, to the policy and not divergent trends.

Applying their estimation technique, Table 2 presents the results.

The results are essentially unaffected by this correction. Thus, we have confidence that we are estimating the policy's causal effects.

Table 2: Synthetic Difference-in-Differences

	Graduation Rate		Truancy Rate		Teacher Retention Rate	
	(1)	(2)	(3)	(4)	(5)	(6)
Post x Treated	2.238 ***	2.228 ***	6.540 ***	6.532 ***	-0.768	-0.772
	(0.632)	(0.630)	(0.942)	(0.936)	(0.640)	(0.638)
Controls?	No	Yes	No	Yes	No	Yes
District FEs?	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs?	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.659	0.694	0.707	0.804	0.673	0.677
AIC	15851.0	11815.2	16944.1	12534.8	10815.4	10796.6
N	2613	2010	2613	2010	2010	2010
DV μ	86.03	86.30	8.59	9.69	88.01	88.01
DV σ	8.56	8.21	11.38	12.26	6.13	6.13

Results from a synthetic difference-in-differences estimation presented. The total enrollment and percentage low income are used as controls. The other controls have missing observations and, hence, cannot be used in the SDiD estimation. An interpolation is used to fill in occasional missing values for the truancy rate. Standard errors are calculated using a bootstrapping method; *** 1%, ** 5%, * 10% level of significance.

5 Conclusion

We investigate the effects of SB 100, a sweeping disciplinary policy reform, on high school graduation rates in the state of Illinois. Using a difference-in-differences identification strategy, we find strong evidence suggesting that SB 100 positively impacted high school graduation rates. The treatment effect is statistically significant and is an increase of approximately two percentage points. Thus, it is economically significant as well.

We further explore the effects on truancy rates and teacher retention rates, two important metrics of quality of the educational environment. We find significant increases in truancy and decreases in teacher retention. These suggest deteriorated school environments as a collateral consequence. The findings have important implications for policymakers, educators, and administrators. By demonstrating the potential of statewide disciplinary reforms to improve academic outcomes, this study adds to the evidence supporting the need to reduce exclusionary disciplinary practices in schools. While SB 100 appears to have had a positive impact on graduation rates, the unintended consequences of such policies, such as increased pressure on teachers or resource constraints in certain districts, should be given full consideration.

Interviews confirm our observations. Zaleski (2024) conducted a qualitative study with educators in the state. A representative quote from one teacher highlights the diminished work environment:

> New state laws have made it more difficult to teach, because there is no discipline in schools anymore. Students can throw tantrums, physcially assault their teachers and classmates, destroy the resources that we pay for with our own money, and nothing happens. They come back to school day after day and do it all over again.

Other teachers interviewed made comments such as "students are running the building", "teachers do not feel safe", and "teachers are getting burnt out". Our quantitative analysis, using teacher retention rates as a viable metric, supports these reactions.

Similarly, other students are being affected. One teacher noted that "aggressive and violent behavior amongst students towards each other has increased". Also, the "majority of the student body does not feel safe and cannot focus on learning". Again, this coincides with our finding of increased truancy.

There are limitations to our work worth recognizes. For one, data on teacher retention rates are only available to us starting in the 2013-14 academic year. More data would allow us to better account for any differences in time trends prior to the policy's implementation. Also, we are forced to remove school districts from the analysis due to poor data reporting. This opens up the possibility of selection bias affecting our results. Additionally, we use those school districts in the lowest quartile of out-of-school suspension usage prior to the act as the control group. While their use is suspensions is minimal (0.25 suspensions per year per 100 students enrolled in 2014-15), they too will be affected by the policy. Thus, our estimated effect can be under-estimating the treatment effect. Finally, the act was implemented simultaneously across the state. That opens up the possibility that other school policies or socio-economic factors, correlated with use of exclusionary discipline, that change around 2016 could be influencing our results. Nevertheless, we document an important relationship between this policy and educational outcomes.

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