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The Effects of No Pass, No Drive Policies on High
School Education

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Abstract

Since 1987, 27 states have introduced “No Pass, No Drive” laws tying a teenager’s ability to receive and maintain a driver’s license to various school-related outcomes – most commonly, enrollment and attendance. Using state-level data from the National Center for Education Statistics, this study examines how these policies affect dropout rates and four-year graduation rates. No Pass, No Drive policies have negligible effects on dropout rates, but decrease the Averaged Freshman Graduation Rate, one of the most commonly used four-year graduation rate estimates by researchers and policymakers over the past 10 years, by more than one percentage point. However, this lower graduation rate does not stem from a true reduction in the likelihood a student will graduate, but rather from students delaying their dropout decision by up to two years. In turn, these students are retained in the ninth and tenth grades, increasing ninth grade enrollment by 2.8 percent, relative to eighth grade enrollment the year prior, which lowers the graduation rate.

1 Introduction

Over the past 30 years, attempting to lower dropout rates and raise graduation rates have been central focal points of education policy on both the state and national level. At first glance, this increased attention has improved these two educational outcomes – The National Center for Education Statistics’ (NCES) *Trends in High School Dropout and Completion Rates in the United States: 1972–2012* reports that the “status dropout rate”, or the proportion of 16-24 year-olds who are not enrolled in high school and do not have a high school diploma or equivalent certificate, has fallen from 14.6 percent in 1972 to 6.6 percent in 2012. Likewise, the proportion of 18-24 year olds who have completed high school or an equivalent program has risen from 82.8 percent in 1972 to 91.3 percent in 2012. However, studies such as Cameron and Heckman (1993) and Heckman et al. (2011) show that simply completing high school or a GED is not enough to guarantee students’

future success, but rather that *on-time* graduation with a regular high school diploma should be the goal of students aiming to increase their future earnings. In addition, Haney et al. (2004) show that the on-time graduation rate, which they estimate as the ratio of diploma recipients to “graduating” eighth graders four years prior, fell from 79% in the early 1980s to 74.4% in 2000-01. As a result, public policymakers have shifted their focus from ensuring teens complete high school to ensuring teens graduate from high school on time. This study focuses on No Pass, No Drive (NPND) laws – a widespread, low-cost incentive program tying teen drivers’ licenses to their enrollment, attendance, behavior, and/or performance in school – and examines how NPND laws affect dropout rates, on-time graduation rates, and grade enrollment numbers across the country.

I show that No Pass, No Drive laws aimed at preventing dropouts have no significant effects on dropout rates. Instead, these policies cause a 1.3% *reduction* in the Averaged Freshman Graduation Rate (AFGR), an unintuitive result. I investigate two potential mechanisms for this graduation rate decrease. First, this could be caused by a reduction in the true four-year graduation rate. Alternatively, the AFGR could fall as a result of students *delaying* their dropout decisions; a student who would drop out at the age of 16 in the absence of NPND laws may instead drop out at 18 in order to keep his or her drivers’ license. If these delayed dropouts are retained in the 9th and/or 10th grades, then the dropout rate would be unaffected overall, but the denominator of the AFGR would be larger, causing a decline in the AFGR. I find that NPND policies cause a 2.8 percentage point increase in 9th grade enrollment, relative to 8th grade enrollment the year prior, suggesting that NPND policies delay student dropout decisions. I additionally test alternative graduation rate estimates that do not depend on 9th and 10th grade enrollment, and find no evidence to suggest that the true four-year graduation rate is affected by NPND policies. Given the importance of the AFGR in education reporting and policy-making decisions over the past 10 years, my results suggest that NPND policies artificially lower the perceived quality of education in these states, without significantly and directly affecting the true quality of education.

In 1988, West Virginia enacted the first No Pass, No Drive law in response to growing problems

with dropout rates and graduation rates, especially in rural areas. West Virginia, as do most states with NPND policies, mandates that teenagers must be enrolled in and attending school regularly in order to receive and maintain a driver's license. When students fall below a minimum attendance threshold, or withdraw from school entirely, the school contacts the state's licensing office and instructs them to suspend the teen's license. Early anecdotal evidence suggested that NPND policies were successful in their goal of keeping teens in school. In a 1989 New York Times article¹, West Virginia school officials credited the enactment of the state's NPND law with a 1-2 percent reduction in the annual dropout rate (from approximately 5 percent to 3.4 percent). Following the early results in West Virginia, 26 more states enacted their own versions of NPND policies in an effort to recreate the early success of West Virginia's policy. I look at the enactment of these 27 policies, exploiting variation in the timing of their enactment between states, to identify the causal effects of these policies on various educational outcomes.

Krimmel (2000) was the first to perform an empirical study of the effects of No Pass, No Drive policies on educational outcomes. His time-series analysis of a quasi-natural experiment in Kentucky showed that counties that enacted NPND laws saw an 11 percent reduction in the dropout rate, while the comparison group of counties that did not enact NPND laws only saw an 8 percent reduction in the dropout rate. My analysis differs from Krimmel's in a few key dimensions. First, my analysis is on a national level, exploiting timing differences in the enactment of NPND policies to identify their effects, while Krimmel's only identifies the effect of Kentucky's NPND laws. Thus, my results should provide greater external validity in informing policy decisions. Second, Krimmel only investigates the effects of NPND laws on dropout rates, while I am able to identify the effects of NPND laws on four-year graduation rates, individual grade enrollments, and dropout rates. Finally, Krimmel's policy analysis is conflated with the simultaneous enactment of dropout prevention counseling programs in the treatment counties, meaning that Krimmel's results should be interpreted as the effect of NPND laws *in conjunction with* dropout prevention counseling, while my analysis, by examining these policies nationwide and exploiting heterogeneous timing of NPND

¹“West Virginia Reduces Dropouts by Denying them Driver's License.” *The New York Times*, May 21, 1989.

enactment, is able to identify the impact of NPND policies separately and more accurately.

The only other paper, to my knowledge, to empirically study No Pass, No Drive policies is the work of Barua and Vidal-Fernandez (2014). They study NPND policies on a national level, primarily focusing on the effects of NPND policies on student time use, as well as examining educational attainment. They show that NPND policies increase the proportion of 18-24 year-olds who have a high school diploma by approximately 1 percentage point, and demonstrate stronger effects on males (1.5%), blacks (3-4%), and particularly black males (4-7%). They also demonstrate that educational attainment increases by 0.02 to 0.05 years on average, and that students spend approximately 0.2 more hours per week on schoolwork as a result of NPND laws. My results do not necessarily contradict those of Barua and Vidal-Fernandez, as we consider different outcome variables in our analyses. However, while Barua and Vidal-Fernandez show a number of unambiguous positive effects of NPND policies, with no costs to the government other than monitoring costs, I demonstrate that these laws cause a sharp increase in grade retention in 9th and 10th grades, without causing a similarly large increase in the number of graduates. Additionally, even though NPND laws seem to be successful in increasing educational attainment and diploma reciprocity, as demonstrated by Barua and Vidal-Fernandez, I show that these increases come primarily from delayed dropout decisions, not from an increase in on-time graduation.

My analysis of No Pass, No Drive policies consists of three main contributions to the literature on NPND laws, and, more generally, incentive programs and their effects on teen behavior. First, I examine the effects of NPND policies on dropout rates and the Averaged Freshman Graduation Rate, a widely-used estimate of the on-time graduation rate. I find negligible effects on dropout rates, but that NPND policies cause a 1.3 percentage point reduction in the AFGR.

Second, I investigate the mechanism by which NPND policies are unintuitively lowering the AFGR. I show that, rather than reducing the number or rate of graduates, which would contradict the findings of Barua and Vidal-Fernandez, NPND policies increase enrollment in 9th and

10th grade, relative to their expected enrollment given their cohort's 8th grade enrollment. This provides an interesting scenario, where NPND policies do not appear to lower the *true* four-year graduation rate, but significantly lower four-year graduation rate *estimates*. This reduction in the on-time graduation rate estimate is also not unique to the AFGR; any estimate that includes 9th or 10th grade enrollment in the denominator will be negatively affected by NPND policies.

I conclude my analysis by discussing two of the effects that NPND policies have on education, given that they increase grade enrollment and lower the AFGR. First, and perhaps most importantly, the AFGR was the benchmark graduation rate statistic used by the U.S. Department of Education from 2004-2012 under the No Child Left Behind Act (NCLB) to determine Adequate Yearly Progress (AYP). NPND policies, by lowering the AFGR, decreased the likelihood of schools, districts, and states of meeting their respective AYP standards, and likely resulted in a number of schools being designated for "improvement" that, in the absence of NPND policies, would have otherwise met their graduation rate goals. Second, by increasing enrollment in the 9th and 10th grade, NPND policies likely increased negative externalities on those students whose behavior was not changed by these laws. Students who, in the absence of NPND policies, would have dropped out of school at the age of 16 are instead retained in the 9th and 10th grades, and may have behavioral and learning problems that would negatively affect their peers.

The remainder of this paper is organized as follows: Section 2 explains the details of No Pass, No Drive Policies, including lists of each policy across the country, as well as their attributes. Section 3 describes the data sources and estimation strategy employed. Section 4 presents the primary results, explains the forces driving my results, and presents a set of robustness checks to demonstrate validity of my models, as well as show a lack of alternative explanations for my results. Section 5 discusses the impacts No Pass, No Drive policies have on schools, and students in those schools, under No Child Left Behind, and Section 6 provides concluding remarks.

2 The No Pass, No Drive Policy

Starting with West Virginia in 1988, 27 states have passed laws linking student behavior, attendance, and performance to their ability to receive and maintain a drivers' license. Differing from the work of Barua and Vidal-Fernandez, I categorize these policies into groups to more closely examine the effectiveness of the various incentives. For example, the first of these policies, in West Virginia, only allows a license to be held by a student who *“maintains current school enrollment and is making satisfactory academic progress”*.² The policy in Kansas, however, states that *“Whenever a pupil who has attained the age of 13 years has been found in possession of a weapon or illegal drug at school, . . . the division of vehicles immediately shall suspend the pupil’s driver’s license or privilege to operate a motor vehicle.”*³ Clearly, these are two different policies, attempting to curb two different problems, and so examining them as if they were a single policy aimed at reducing dropout rates and raising graduation rates would inaccurately identify the full effect of those policies that do target dropout and graduation rates. To solve this, I classify the policies into two groups – *Enrollment-Based* policies, which directly target high school dropouts, and *Behavior-Based* policies, which do not. These groupings, as well as some unique features of these policies, are shown in Table 1.

Many of the Behavior-Based states have a focus on truants, which, at first glance, appears to have the same intent as the Enrollment-Based states. However, the policies in these states *only* apply to truants, meaning that they do not apply to high school dropouts at all. A student in a “Truants Only” Behavior-Based state that is habitually absent from, but still enrolled in school will lose his or her drivers' license, while a dropout – someone who has withdrawn from enrollment in school altogether – will not. Except for the case of Kentucky (see footnote 5), no NPND policy has ever been repealed; all 27 of these policies are currently ongoing.

²West Virginia Annotated Code, §17B-2-3a(2)(E)

³Kansas Statute Annotated, §72-89c02(a)-(c)

Table 1: No Pass, No Drive Policies in the United States

State Name	Policy Start Year	Hardship/Working Exemption?	GED Exemption?	Other
<i>Enrollment-Based</i>				
Alabama	1993	Yes	No	Teen parents exempt
Arkansas	1989	Yes	No	
Florida	1997	Yes	Yes	
Georgia	1998	No	No	
Idaho	1996	No	No	
Illinois	2007	No	No	
Indiana	1991	Yes	No	
Iowa	1994	No ⁴	No	
Kentucky	1990, 2007 ⁵	Yes	No	
Louisiana	2009	No	No	
Mississippi	1994	No	No	
North Carolina	1998	Yes	No	
Ohio	2004	No	Yes	
Oklahoma	1996	Yes	No	
Oregon	2000	No	Yes	
South Carolina	1998	No	No	
Tennessee	1990	No	No	
Texas	1995	No	No	
West Virginia	1988	No	No	
Wisconsin	1988	No	No	Only some counties enacted policy
State Name	Policy Start Year	Truants Only?	Discipline Only?	Other
<i>Behavior-Based</i>				
California	1992	Yes	No	
Delaware	2000	Yes	No	
Louisiana	2004 ⁶	No	Yes	
Kansas	1999	No	Yes	
Nevada	2003	Yes	No	
New Mexico	2005	Yes	No	
Oregon	1995 ⁶	No	Yes	
Rhode Island	2005	No	Yes	
Virginia	1996	No	No	Parental permission required for dropouts

Implementing many of these policies requires coordinated efforts between local education agen-

⁴In the original version of this policy, Iowa had an exemption for working students. This exemption was removed in 2005.

⁵Kentucky instituted this policy in 1990 in some counties; however, the law was struck down by the Kentucky Supreme Court in 2003 (*D.F. v Codell*). A new law, identical to the original for the purposes of this research, was implemented in 2007.

⁶Louisiana and Oregon initially had Behavior-Based policies focusing on discipline, but then changed to

cies and the drivers' license issuing offices. For example, some states, such as Kentucky, have an electronic communication system in place between schools and the Kentucky Division of Motor Vehicle Licensing, so that a student failing to meet the requirements to keep his or her license at school will be automatically "flagged" in the system. Then the Kentucky DMV will examine the student's record and determine whether there is justification to suspend his or her license. In contrast, states like Texas have no such electronic communication system in place. Instead, students in Texas must take a form confirming their enrollment and attendance for past 180 days in to the Texas Department of Public Safety in order to receive a learner's permit at age 15, to receive a graduated drivers' license at age 16, and to renew the license at age 17. Thus, heterogeneity across states in reporting student activity is present. However, due to the subjectiveness of attempting to categorize these systems, as well as uncertainty on how such electronic systems have been implemented over time, I am unable to examine the effects of differing reporting systems on student outcomes.

3 Data and Methods

3.1 Data

I collected information on the details of these policies from each state's code of laws and legislative histories. I then merged this policy information with data on student outcomes and school spending taken from the National Center for Education Statistics. The NCES's Common Core of Data (CCD) has public-use state-level data on dropout rates, graduation rates, diploma counts, and enrollments. Data on grade enrollments from grade 8 to grade 12, as well as total diploma recipients, were taken from the State Nonfiscal Public Elementary/Secondary Education Survey datasets available on the NCES website. I merged the individual data files from 1986-87 to 2012-13, assembling a panel dataset. The data are missing the number of diplomas in 1986-87, as well as from 2010-11 to 2012-13. For school years from 2005-06 to 2009-10, data on the number of diploma recipients in each state were taken from the CCD's State Dropout and Completion Data Files.

Enrollment-Based policies focusing on dropouts at a later date.

Graduation rates are unavailable in a consistent and accurate form across all years of my dataset. With the passage of the No Child Left Behind Act (NCLB) in 2001, the US Department of Education (DoE) mandated that states begin implementing more accurate measures of four-year graduation rates. As a result, attempting to link the NCES’s graduation rates, which are self-reported by each state, and do not follow a consistent formula, before and after 2001 would create severe inconsistencies in my analysis. To circumvent this issue, I use the Averaged Freshman Graduation Rate (AFGR), proposed by Greene and Winters (2002), which is an easily calculable graduation rate statistic that only requires state-level grade enrollment data. The AFGR was the standard graduation rate used by the US DoE from 2005-2012 in determining school- and district-level adequate yearly progress under NCLB, and is generally considered to be a good estimate of on-time graduation rates, given limited available data.⁷ The AFGR is calculated for each state (s), in every year (t) using the formula below:

$$AFGR_{s,t} = \frac{Diplomas_{s,t} * 3}{Grade\ 8_{s,t-4} + Grade\ 9_{s,t-3} + Grade\ 10_{s,t-2}} * 100\%$$

Simply put, the AFGR uses the average enrollment for a single cohort from 8th to 10th grade as the “enrollment base” from which the four-year graduation rate is calculated. I use the AFGR, as opposed to educational attainment in the full population as in Barua and Vidal-Fernandez, to provide a policy analysis more aligned with the interests of policy makers and educational agencies. The US DoE’s Race to the Top program, implemented in 2011, challenges states to achieve four-year graduation rates of 90% by the year 2020, so a four-year graduation rate is a more appropriate statistic to study than overall educational attainment in a state-level policy analysis such as this.

Dropout rates were taken from the NCES’s annual *Dropout Rates in the United States* reports. The NCES uses an *event dropout rate* definition, which is calculated as the total number of students that drop out of school in a given year, divided by total enrollment in that year. This is

⁷See Heckman and LaFontaine (2012) for an overview of various graduation rate statistics used in the United States, and a comparison of the AFGR to graduation rate estimates from other sources.

in contrast to other agencies that report *status dropout rates*, which are the fraction of people of schooling age (typically ages 15-21) that are not currently enrolled in school and have not completed school. Since these No Pass, No Drive policies tend to have grandfathering clauses, where students that have already dropped out of school before the policy takes effect do not lose their licenses, the event dropout rate is a more appropriate statistic for examining the early years of the policy. Additionally, status dropout rates typically consider individuals up to age 21, while NPND policies only affect those under the age of 18. I also took data on total expenditures on public schooling per pupil from the NCEs's Elementary/Secondary Information System (ELSi), and state unemployment rates were taken from the Bureau of Labor Statistics.

3.2 Model Specification

I aim to identify the impact of No Pass, No Drive laws on state average dropout rates and graduation rates. This is done by exploiting variation in the time of passage of these laws among the twenty states with Enrollment-Based policies and the seven states with Behavior-Based policies. The primary regression model of interest is below:

$$Y_{st} = \beta_0 + \beta_1 \text{EnrollBased}_{st} + \beta_2 \text{BehaviorBased}_{st} + \varepsilon_{st}$$

Above, the variables Enroll-Based and Behavior-Based are binary – *EnrollBased_{st}* is set equal to 1 if state *s* has an Enrollment-Based policy in place at time *t* and equal to 0 otherwise, and likewise for Behavior-Based. The outcome variable, *Y_{st}*, is either the dropout rate or AFGR, depending on the regression.

In order to account for differences in educational quality and economic climate between the states with and without these policies, I include a pair of control variables mentioned previously – per-student public schooling expenditures and state unemployment rates. I also include state and year fixed effects to control for baseline differences between states and the overall downward trends

observed in both dropout rates and graduation rates over the past 25 years. Finally, I include state-specific linear time trends to correct for additional state-level trends in dropout rates and graduation rates differing from the overall trend. A cursory glance at the data suggests that states that initially have low dropout rates and/or graduation rates saw those numbers fall to a lesser extent than states with high rates. The primary regression model used for analysis is below:

$$Y_{st} = \beta_0 + \beta_1 \text{Group}A_{st} + \beta_2 \text{Group}B_{st} + \beta_3 \log(\text{Spending})_{st} + \beta_4 \text{Unemp}_{st} + \delta_t + \gamma_s + \gamma_s * t + \varepsilon_{st}$$

The coefficients β_1 and β_2 are the parameters of interest in this regression, and should be interpreted as the causal effect of these No Pass, No Drive policies on dropout rates and graduation rates.

4 Results

Table 2: Effects of No Pass, No Drive Policies on Dropouts

	<i>Dropout Rate</i>			
	(1)	(2)	(3)	(4)
Enrollment-Based	-0.929** (0.351)	0.125 (0.346)	0.272 (0.375)	0.174 (0.364)
Behavior-Based	-0.250 (0.513)	1.018*** (0.295)	1.050*** (0.276)	
Behavior-Based - Truants				1.229*** (0.263)
Behavior-Based - Other				0.393 (0.648)
Fixed Effects and Trends?		Yes	Yes	Yes
School and Macro Controls?			Yes	Yes
<i>N</i>	869	869	818	818

Standard errors in parentheses, clustered by state.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2 shows the primary regression results, using the previous model specification and the dropout rate as the dependent variable. Column (1) shows the naïve regression results on dropout

rates, demonstrating that the states with the No Pass, No Drive policies have below-average dropout rates. Columns (3) and (4) include the full set of controls, and are the main results of this regression. It is important to note here that, based on the event dropout rate definition, the coefficient on either policy would not be influenced by students *delaying* their dropout decision. So, for example, if a student subject to one of these policies at age 16 decides to drop out of school at age 18, when they no longer are affected by the policy, the policy coefficient would remain unchanged. Looking at column (3), Enrollment-Based policies have no significant effect on dropout rates, indicating that any students who do change their behavior based on this policy are delaying their dropout decision. Behavior-Based policies, alternatively, appear to cause a significant increase in the dropout rate – the mean dropout rate is 4.23%, so approximately 25% more students drop out of school than would have otherwise. Column (4) demonstrates an explanation as to why this is occurring; in the four states that revoke the drivers’ licenses of habitual truants, the policy increases the dropout rate by approximately 1.2 percentage points, while in the other three states, there is no significant effect. Recall the incentives at work in these policies – a habitual truant will lose his or her driving privileges, but a dropout will not in these four states. Table 8 shows, however, that the Behavior-Based policies have a severe type I error problem – placebo testing shows that a policy with the frequency of Behavior-Based policies in this dataset will show significance at the $p < 0.01$ level in over 8% of regressions. This means that the results for Behavior-Based policies could roughly be interpreted as significant at the $p < 0.1$ level, but may not be the true impact of these No Pass, No Drive policies at all. Next I consider the effect of these policies on the AFGR. Table 3 shows the primary regression results on Averaged Freshman Graduation Rates.

Again, column (1) shows the naïve regression results, demonstrating that the states with No Pass, No Drive policies have below average AFGRs. Interestingly, however, after including the full set of controls, column (3) shows the treatment effect of the policy is still negative, implying that these policies are reducing graduation rates in some meaningful way. Additionally, adding the spending and unemployment controls in moving from column (2) to column (3) increased the magnitude of the coefficient estimate and decreased the standard error, suggesting that omitted

Table 3: Effects of No Pass, No Drive Policies on AFGR

	<i>Averaged Freshman Graduation Rate</i>			
	(1)	(2)	(3)	(4)
Enrollment-Based	-3.667*	-1.133	-1.330*	-1.139
	(1.932)	(0.816)	(0.763)	(0.764)
Behavior-Based	-4.949**	-2.628*	-2.732*	
	(2.244)	(1.461)	(1.448)	
Behavior-Based - Truants				-4.999**
				(2.365)
Behavior-Based - Other				0.597
				(1.103)
Fixed Effects and Trends?		Yes	Yes	Yes
School and Macro Controls?			Yes	Yes
<i>N</i>	1018	1018	1018	1018

Standard errors in parentheses, clustered by state.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

variable bias is unlikely to be the force driving this surprising result. For Behavior-Based policies, this could potentially be explained by the increase in dropout rates observed in the previous set of regressions. Column (4) shows that the states that target truants have a negative effect on AFGR, while the other Behavior-Based states have a positive, but insignificant effect. However, this does not explain the negative coefficient on the Enrollment-Based policy. The following section investigates the potential causes of this AFGR reduction.

4.1 No Pass, No Drive Laws and the AFGR

Based on the way in which AFGR is calculated, there are two mechanisms by which these No Pass, No Drive policies could be reducing the AFGR in Table 3. The policy could be decreasing the numerator – that is, reducing the number of diplomas handed out each year by making it more difficult for students to graduate, or creating some kind of discouragement effect that causes students to not graduate. This is likely the cause of the large, negative Behavior-Based coefficient, but

is unlikely for Enrollment-Based policies; the incentives created by these Enrollment-Based NPND policies would in no way lead me to expect students to respond by failing to graduate. Alternatively, this policy could be increasing the denominator – that is, increasing enrollment in 8th, 9th, and/or 10th grades. In addressing these two possibilities, an important feature of the US education system needs to be mentioned – the so-called “ninth grade bottleneck”.

A number of papers have noted that ninth grade retention rates are extremely high in the United States, and have grown drastically over the past 50-60 years. McCallumore and Sparapani (2010) estimate that approximately 22% of students repeat at least some 9th grade classes. This has increased 9th grade enrollment to the point where it is an entirely inaccurate measure of a single grade cohort’s size. The AFGR was created, in part, to correct for this very issue; it reduces the impact of 9th grade enrollment on graduation rates by factoring in estimated cohort size, using 8th and 10th grade enrollments to smooth the estimated enrollment base. To identify the effect the No Pass, No Drive policies have on the AFGR, I first consider how these policies affect year-to-year enrollment changes for a particular cohort. Using the CCD enrollment data I construct a number of dependent variables showing year-to-year enrollment changes for a single cohort. For example, the 8th to 9th grade enrollment change is calculated as:

$$\% \text{ Change } 8\text{th} - 9\text{th}_{s,t} = \frac{9\text{th Grade Enrollment}_{s,t} - 8\text{th Grade Enrollment}_{s,t-1}}{8\text{th Grade Enrollment}_{s,t-1}} * 100\%$$

Alternatively, I could use $\log(\text{Enrollment})$ as the dependent variable in these regressions. I use the percentage changes in grade enrollment to better account for between-cohort variation, and also to more clearly show the lack of promotion out of the 9th grade. Table 4 shows summary statistics for year-to-year enrollment changes by grade for a single cohort.

Table 4 demonstrates the overall pooling effect of 9th grade – a great number of students repeat the 9th grade at least once. In addition, many students will repeat the 9th grade until they

Table 4: Year-to-Year Enrollment Changes by Cohort

	Overall Average 1987-2012	Average in 1990	Average in 2010
8th to 9th change	+11.286%	+11.271%	+9.952%
9th to 10th change	-7.932%	-7.524%	-6.686%
10th to 11th change	-8.364%	-8.802%	-6.913%
11th to 12th change	-6.389%	-9.084%	-1.778%
12 Grade Graduation Rate	90.261%	97.449%	91.151% ⁸

Source: Common Core of Data

drop out of school. 9th grade retention rates have fallen since 1990, likely due to improvements in school quality and the introduction of policies directed at reducing this effect. However, it still remains true that 9th grade enrollments are much larger than would be expected given 8th grade enrollments – indicating that 9th grade retention is still a problem. Raw dropout counts show that 9th grade dropouts and 11th grade dropouts are roughly equal in number; however, due to compulsory schooling until the age of 16, 9th graders should be unable to drop out of school unless they have repeated a grade.⁹ The table above shows that, on average, total 9th grade enrollment is approximately 11 percent greater than total 8th grade enrollment for a single cohort. After 9th grade, enrollment numbers fall every year as one would expect. Although the AFGR was created to reduce the bias caused by this effect, if these policies are causing a disparate impact in any one grade then the AFGR would be still be influenced, even if the “true” four-year graduation rate is unaffected. I begin by directly examining the effect of NPND policies on the 9th grade bottleneck, and then show that a reduction in graduates is not the cause of the AFGR decline. Table 5 looks at the 9th grade bottleneck, showing results from a regression specified identically to the previous regressions examining dropout and graduation rates, including the same set of controls, but using percentage enrollment changes as the dependent variable.

Table 5 shows important effects of the Enrollment-Based policies. First, note in column (1) that

⁸Diploma counts for 2010 were unavailable at the time of writing; this number is the 2009 12th Grade Graduation Rate.

⁹*Numbers and Rates of Public High School Dropouts: School Year 2004-05* shows 125,115 9th graders and 125,882 11th graders dropped out of school in 2004-05.

Table 5: Effects of No Pass, No Drive Policies on Grade Enrollments

	Percentage Change in Enrollment			
	8th-9th (1)	9th-10th (2)	10th-11th (3)	11th-12th (4)
Enrollment-Based	2.826** (1.316)	-1.611 (1.065)	-0.782 (0.728)	0.348 (0.555)
Behavior-Based	0.288 (1.065)	0.318 (1.036)	-2.058** (1.007)	0.426 (0.795)
log(Spending)	-14.50** (6.215)	3.896 (6.254)	-1.398 (6.023)	-5.349* (3.043)
Unemp. Rate	-0.580 (0.348)	-0.162 (0.243)	-0.158 (0.313)	0.00274 (0.195)
<i>All specifications include two-way fixed effects, school and macro controls, and state-specific time trends.</i>				
<i>N</i>	1071	1071	1071	1071

Standard errors in parentheses, clustered by state

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

the coefficient on per-student spending is large, negative, and significant. This indicates that the 9th grade pooling effect is alleviated by improving funding and school quality. Compare this to the Enrollment-Based policy effect; the policy increases the gap between 8th and 9th grade enrollment, and it may make the 9th to 10th grade attrition rate larger as well, although this coefficient is not significant. Clearly, this is evidence that the Enrollment-Based policy increases the rate of pooling in 9th grade, constricting the 9th grade bottleneck to an even greater degree than before the policy was implemented. To understand why this occurs, consider the type of student affected by this policy – before the policy, many students were dropping out of school at the age of 16, but with the policy, they wait until they turn 18. The results in Table 2 indicated that dropout rates were not significantly affected by this policy, so it must be that the policy is simply causing students to delay their dropout decision. Without the policy, many of these “marginal” students – those that would have changed their behavior under these No Pass, No Drive policies – are retained in 9th grade until they drop out at age 16. With the policy, the primary difference is that these marginal

students are retained in 9th grade until they drop out at age 18.

The alternative explanation for the AFGR falling as a result of these policies, as in the summary statistics previously, is a decrease in the numerator of the AFGR statistic – that these policies reduce the number of diplomas given out in some meaningful way. I test for this in two ways; first, by using the 12th grade graduation rate, calculated as before as the ratio of diplomas to 12th grade enrollment in a given academic year. Finally, I consider a simple five-year graduation rate – calculated as the ratio of diplomas to 8th grade enrollment five years prior. The five-year graduation rate should not be affected by 9th grade pooling, and so it is a less noisy measure of on-time high school graduation. If these policies are actually making students graduate at a lower rate, instead of artificially lowering the AFGR statistic via increasing 9th grade enrollments, the coefficient estimates for these two specifications, especially the five-year graduation rate, should be negative and significant. Table 6 shows the effects of NPND policies on these two graduation rate estimates.

Column (1) shows the effect on the percentage of 12th graders that graduate in a given year. Neither policy has a significant effect, but both are negative and around 1. However, this is a far less accurate measure of a possible effect of these policies on graduation than the five-year graduation rate. If some of the “marginal” students – those who would drop out at age 16 without the policy but instead wait until they turn 18 – move through school on-track, meaning they are in 12th grade when they turn 18, then it is reasonable to assume that not only might these students drop out of the 12th grade, but also the average ability of 12th graders would decrease as a result of the policy. A more accurate measure of how these policies affect on-time graduation rates is the five-year graduation rate. Column (2) shows that the Enrollment-Based policy effect is negative, relatively small, and insignificant. However, the Behavior-Based policy effect is negative, large, and significant. Separating Behavior-Based policies into the two categories shows that the policies targeted at truants cause extremely large decreases in the five-year graduation rate, but the other policies do not have an effect. All of this evidence suggests that, while the Behavior-Based policies targeting truants appear to reduce *actual* graduation rates and increase dropout rates (noting

Table 6: Effects of No Pass, No Drive Policies on Alternative Graduation Rates

	12th Grade	5-Year	
	Grad. Rate	Grad. Rate	Grad. Rate
	(1)	(2)	(3)
Enrollment-Based	-0.928 (1.122)	-0.738 (0.729)	-0.479 (0.724)
Behavior-Based	-1.218* (0.716)	-3.657* (1.827)	
Behavior-Based - Truants			-6.422** (2.981)
Behavior-Based - Other			0.0187 (0.862)
log(Spending)	11.43* (5.822)	2.352 (6.109)	1.718 (6.177)
Unemp. Rate	0.571 (0.356)	0.263 (0.279)	0.219 (0.284)
<i>All specifications include two-way fixed effects and state-specific time trends.</i>			
<i>N</i>	1018	1018	1018

Standard errors in parentheses, clustered by state

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

again the type I error problem in Table 8), the Enrollment-Based policies only *artificially* reduce the AFGR by increasing 9th grade enrollment. To demonstrate the effects NPND policies have on overall enrollment more clearly, Figure 1 shows, for every 1,000 8th graders, how many students are expected to be enrolled at each grade level.

In Figure 1, the “Without NPND” bars show the average year-to-year enrollment changes among all 23 states that never begin a NPND policy. The “With NPND” bars add the regression results from Table 5 to the “Without NPND” averages, meaning that the “With NPND” effects show the expected results of a state enacting NPND laws among the states that do not currently have NPND laws. The number atop each bar shows the estimated size of the gap between the states

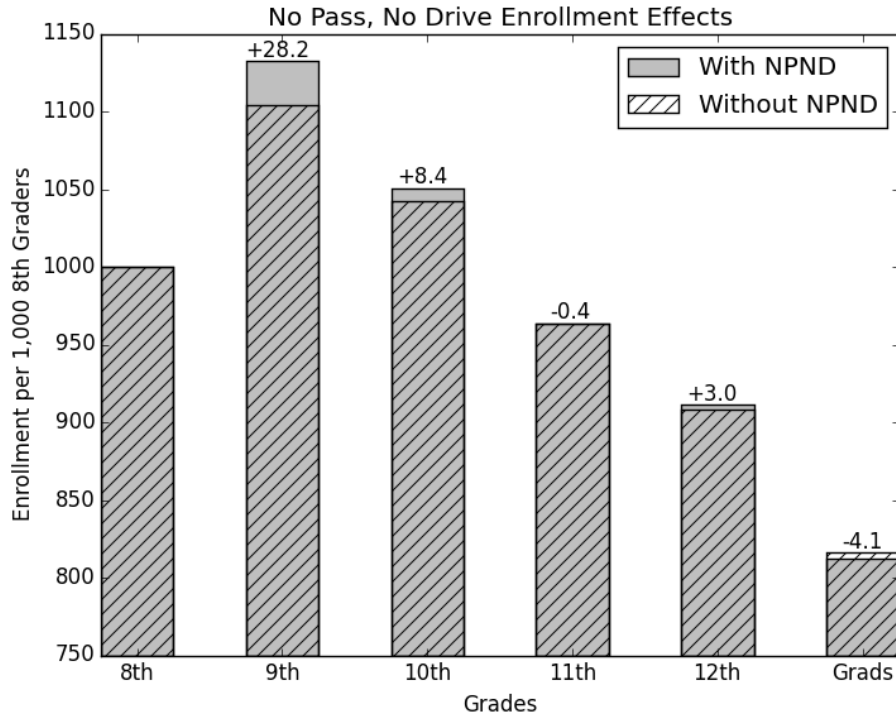


Figure 1: Effects of No Pass, No Drive Policies on Enrollment

with and without NPND policies. There are a few key features of the NPND policies that clearly reveal themselves in this graph. First, NPND laws have the largest effect in 9th grade. For every 1000 8th graders, 9th grade enrollment increases by more than 28 students as a result of these policies. Second, the negative coefficient on the 9th to 10th grade enrollment change does not cancel out the large, positive coefficient on the 8th to 9th grade enrollment change – 10th grade enrollment is also larger than expected, given 8th grade enrollment. Finally, the remaining coefficients essentially cancel out the remaining effect. That is, 11th and 12th grade enrollments and diploma counts are essentially identical, comparing NPND states to their counterparts without NPND laws. Additionally, recall that none of the coefficients after the 8th to 9th grade change were significantly different from zero. As a result, Figure 1 may be underestimating the size of 10th, 11th, and 12th grades, as well as the number of diplomas. Overall, the massive increase in

9th grade enrollment and the smaller increase in 10th grade enrollment are much more likely to be the causes of the AFGR reduction than a decline in high school graduates.

4.2 Additional Robustness Checks

A potential concern with these results is the classic “Ashenfelter’s Dip” problem – the enactment of these policies may have been preceded by, and possibly even caused by, a short-term shock to state educational outcomes. If this is true, then my regression results could be caused by simple mean reversion instead of any true causal effect of the policy. To consider this, I test the three years before the policy begins for deviations from the state-specific trends. Table 7 shows the results of these regressions.

Table 7: Pre-Policy Variation in AFGR, Dropout Rates, and Enrollment Changes

	Dropout Rate			AFGR			% Change 8th-9th		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Years Before Policy</i>									
Enrollment-Based: 1	0.00738 (0.0829)			-0.0492 (0.172)			0.331 (0.327)		
Enrollment-Based: 2		-0.0385 (0.0773)			-0.368** (0.148)			0.671** (0.251)	
Enrollment-Based: 3			0.0353 (0.0843)			-0.113 (0.173)			0.384 (0.321)
Behavior-Based: 1	0.270* (0.137)			-0.393 (0.302)			-0.256 (0.698)		
Behavior-Based: 2		0.0375 (0.107)			0.0894 (0.292)			-0.563 (0.612)	
Behavior-Based: 3			-0.0671 (0.189)			0.308 (0.465)			-0.340 (1.557)
<i>N</i>	818	818	818	1018	1018	1018	1071	1071	1071

Standard errors in parentheses, clustered by state

Spending and unemployment controls, two-way fixed effects, and state-specific time trends included in all models

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

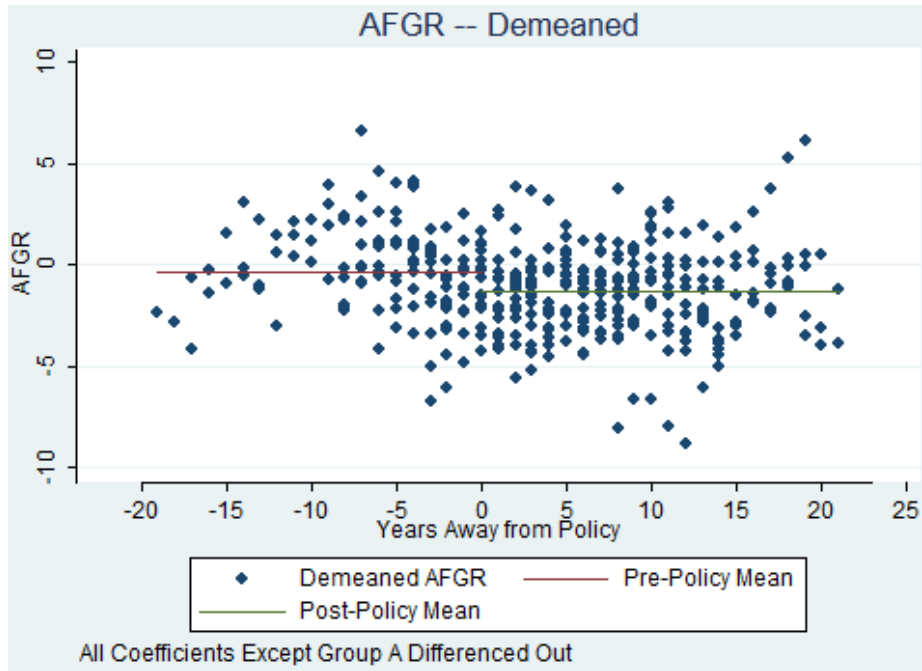
Columns (5) and (8) of Table 7 are the only ones that show any significance for Enrollment-

Based policies. However, instead of being a mean reversion concern, these coefficient estimates are in the same direction as the main results in Tables 3 and 5. This could mean that the coefficient estimates in Tables 3 and 5 are caused by some omitted variable bias, but these pre-policy coefficient estimates are much smaller in magnitude than the main result, implying that the start of these NPND policies is the major driving force behind the main set of results. To further demonstrate this, in Figure 2 I also graph the AFGR and 8th-9th grade percentage change data, removing the effects of all other covariates, to demonstrate the lack of evidence for an Ashenfelter's dip situation.

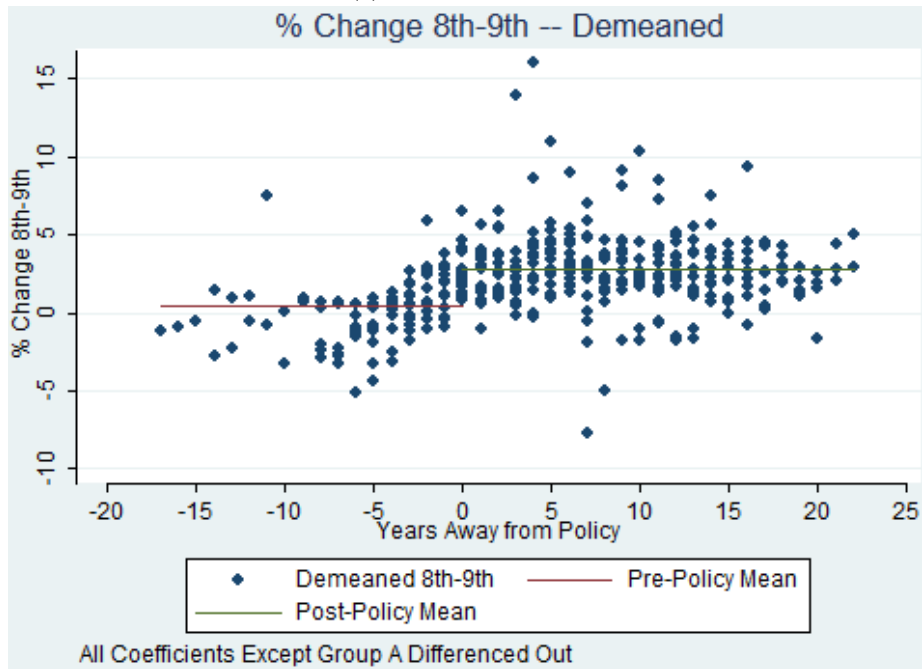
In Figure 2, Graphs (a) and (b) show the trend of the AFGR and 8th-9th grade percentage change, relative to the enactment of the NPND policy in Enrollment-Based states. Note that in both of these figures, Oregon and Louisiana were excluded. Both of these states enacted Behavior-Based policies targeting student discipline five years before enacting Enrollment-Based policies, and so including these states in the plots would conflate any pre-policy effects of the Enrollment-Based policies with the post-policy effects of Behavior-Based policies.¹⁰ Graph (a) shows a small decline in the AFGR after the policy is enacted, but this does not have any noticeable timing effects. There is a possible small pre-policy dip in the AFGR, especially in the lowest-performing states, but the post-policy effect is an overall lower AFGR than in the pre-policy years. In Graph (b), the effect of the policy is much more noticeable. The 8th-9th grade enrollment change was relatively constant before the policy was enacted, and rose to a new, higher, but still relatively flat level after the policy was enacted. Both of these results suggest that NPND policies are truly lowering the AFGR by increasing 9th grade retention.

A second possible concern with my results is that the data may be structured in a way that causes a high rate of type I error. For example, data with an extremely high level of variation in the dependent variables could cause overrejection of the null hypothesis, and thus any regression results would be largely uninterpretable. Bertrand et al. (2004) demonstrate that difference-in-difference

¹⁰I have also run the AFGR and 8th-9th grade enrollment change regressions excluding all observations from Louisiana and Oregon. The results are qualitatively identical (although the AFGR result is no longer significant), and are included in Table A in the appendix.



(a) Demeaned AFGR



(b) Demeaned % Change 8th-9th

Figure 2: Trends in AFGR and the 8th-9th Grade Enrollment Gap

estimation often suffers from overrejection of the null hypothesis, caused by serial correlation in the dependent variable. Since my dependent variable certainly has serial correlation, this could be causing my standard errors to be too small, creating type I error. To examine this problem, I mimic the methodology of Bertrand et al., by creating a group of “placebo policies”, where the policies are randomly assigned to various states, but in a similar way to how they are actually distributed across the United States. For Enrollment-Based policies, each state is given a 40% chance to begin the placebo policy so that in expectation, the number of states with the policy will be 20, the same as the number of Enrollment-Based states. In testing Behavior-Based policies, states are given a 14% chance to begin the placebo policy. After these states are selected, a “policy enactment year” is randomly selected from the discrete uniform distribution, with the earliest possible start year being 1987. Then, regression models identical to my main specifications are run and the placebo policy treatment coefficient is tested at the same significance level of my actual result to see if my results are at risk of type 1 error. In addition, I test for symmetry by performing both 1- and 2-tailed significance tests. If the data is structured in a way that causes overrejection of the null hypothesis in only one direction, this could also be cause for concern. For regression models where I did not find significance, I test for type II error by running these models and testing the placebo policy treatment coefficient at the $p < 0.1$ level. I simulate these placebo policy assignments for 10,000 replications, and calculate the simulated rejection rate I observe. The results of these placebo tests are summarized in Table 8.

The Enrollment-Based placebo testing yielded no unexpected results – in all regression models, the rejection probability was extremely close to its expected level. However, the Behavior-Based placebo testing demonstrated severe type I error – testing dropout rates at the 1% significance level, the null hypothesis was rejected nearly 20% of the time. All other measures also showed high rates of rejection for Behavior-Based policies. This is an indication that strong conclusions should not be drawn from the Behavior-Based results, as having relatively few states with a policy is not well-suited for statistical inference in this data set. The Enrollment-Based policy results, however, do not seem to face this problem, and are therefore unlikely to be driven by pure chance.

Table 8: Placebo Policy Testing Results

	Significance Level (Tails)	Rejection Percentage
<i>Enrollment-Based – 40% Chance to Begin Placebo Policy</i>		
Dropout Rate	0.1 (2)	11.19%
AFGR	0.05 (1)	5.68%
AFGR	0.1 (2)	11.27%
12th Grade Grad. Rate	0.1 (2)	10.90%
5-Year Grad. Rate	0.1 (2)	10.85%
<i>Percentage Changes</i>		
8th-9th	0.025 (1)	2.63%
8th-9th	0.05 (2)	4.94%
9th-10th	0.1 (2)	10.35%
10th-11th	0.1 (2)	10.38%
11th-12th	0.1 (2)	10.78%
<i>Behavior-Based – 14% Chance to Begin Placebo Policy</i>		
Dropout Rate	0.005 (1)	3.86%
Dropout Rate	0.01 (2)	8.96%
AFGR	0.1 (2)	19.76%
12th Grade Grad. Rate	0.1 (2)	19.66%
12th Grade Grad. Rate	0.05 (1)	9.27%
5-Year Grad. Rate	0.1 (2)	19.24%
5-Year Grad. Rate	0.05 (1)	9.69%
<i>Percentage Changes</i>		
8th-9th	0.1 (2)	17.91%
9th-10th	0.1 (2)	19.34%
10th-11th	0.05 (2)	10.04%
10th-11th	0.025 (1)	5.01%
11th-12th	0.1 (2)	18.81%

5 Discussion

5.1 No Child Left Behind and the AFGR

Upon passage of the No Child Left Behind Act in 2001, states were pushed to improve test scores, attendance rates, and graduation rates nationwide. Each state was given the option to design its own standards for educational accountability, subject to a few guidelines. Each school district was required to report to the state educational agency various annual measures of Adequate Yearly Progress (AYP), that would determine the district's and schools' levels and status of

federal education funding. The National High School Center reported that, for all schools, AYP was required to be measured along five dimensions – reading and mathematics proficiency, testing participation rates in reading and mathematics, and “at least one other academic indicator”. High schools were given the additional requirement that the other academic indicator must be a measure of on-time graduation, while middle and elementary schools typically would use daily attendance rates. Schools failing to meet the AYP standards created by their state’s educational agency for two consecutive years were designated as needing improvement. The school would then be required to allow all its students the option to transfer to another school satisfying AYP, likely losing some funding as a result. Each subsequent year of failing to meet the AYP standards would result in more harsh penalties, until, after five consecutive years of failing to meet AYP, the school would be required to undergo “restructuring”. Restructuring often would take the form of either reorganizing a public school into a charter or specialized school, or a massive replacement of the faculty and administration at the school.

Given the effects of NPND policies on enrollments and graduation rates that I have demonstrated, it is straightforward to understand the impact these policies had on Adequate Yearly Progress. Since these policies cause a strengthening of the ninth-grade bottleneck, causing a reduction in the AFGR, high schools in states with NPND laws will have a more difficult time reaching the required graduation rate under AYP. As I mentioned previously, from 2005 to 2012 the US DoE used the AFGR as its standard graduation rate statistic¹¹, meaning that states with these NPND policies were inadvertently harming their Adequate Yearly Progress.

These negative AFGR effects will likely have differential effects on states’ AYP, depending on the actions of each state’s educational agencies. One potential outcome of this is that states with NPND laws would have high rates of failure to meet AYP, resulting in high rates of “designation for improvement” and high restructuring rates. This is the most expected outcome, as NPND laws

¹¹From 2005 to 2012, the US DoE funded improved data collection and student tracking measures, resulting in the current standard graduation rate, implemented nationwide in 2013 – the Adjusted Cohort Graduation Rate (ACGR). The ACGR tracks all students individually through high school, so it would not be negatively impacted by NPND policies.

would make it more difficult for schools to reach the AYP levels. However, there are a few other possibilities – for example, instead of causing a large percentage of schools to fail to meet AYP, states could instead simply create lower standards for AYP in response to declining graduation rates. By doing this, schools would not be at lower risk of failing to meet the AYP standards, causing fewer schools to undergo restructuring, but the stated goals of No Child Left Behind – improving academic achievement and educational attainment among US youth – would essentially be ignored. Additionally, as reported by a number of news agencies, various cheating and data falsification scandals have occurred in order to keep schools and districts above the minimum AYP standards.¹² No Pass, No Drive policies, and the lower AFGR that accompanies them, would create greater incentives to falsify and misreport graduation rate data.

5.2 No Pass, No Drive and the Ninth Grade Bottleneck

Over the past 30-40 years, high school enrollment trends have changed drastically. As I mentioned previously, enrollment numbers in ninth grade now exceed both eighth and tenth grade, and there is some evidence that ninth grade enrollment is the highest of *all* grades. Haney et al. (2004) show that in academic year 1999-2000, ninth grade enrollment was the highest of all grades, K-12, nationwide, while in academic year 1968-69, ninth grade enrollment was only the highest out of grades 8-12. Many researchers in education have written on the causes of this ninth grade bottleneck – Haney and Madaus (1978) were the first to notice this growing issue, and suggested that the introduction of minimum competency testing in the early 1970s may be the cause. Regardless of the cause, however, my results show that No Pass, No Drive policies exacerbate the situation – ninth grade enrollment increases relative to both eighth and tenth grade enrollments as a result of this policy.

Given the impact of NPND policies on grade retention, then, it is important to consider how grade retention affects long-term outcomes both for students being retained and for students not

¹²See “ON EDUCATION; The ‘Zero Dropout’ Miracle: Alas! Alack! A Texas Tall Tale.” *The New York Times*, August 13, 2003 for an example of dropout and graduation rate falsification in Houston, TX.

being retained, but possibly experiencing externalities resulting from their retained peers. Jacob and Lefgren (2009) study a test score-based grade promotion method in Chicago using a regression discontinuity framework, and find that eighth graders retained due to insufficient test scores face an increased likelihood of dropping out of 8-15 percent, relative to their peers that met the minimum test score requirement for promotion. In addition, retained eighth graders were approximately 22 percent less likely to graduate from high school than their promoted peers. For eighth graders, and conceivably for ninth graders, grade retention does not appear to improve educational outcomes for the retained students. The NPND policies would conceivably have slightly different effects than high-stakes testing – students repeating the ninth grade multiple times under NPND are likely those that would have dropped out had the policy not been in place – but any positive effects of the NPND on those retained students would be minute at best.

The externalities created by higher ninth grade enrollment, however, may be more noticeable. No Pass, No Drive policies will have a definite impact on school quality through the No Child Left Behind mechanisms mentioned in the previous section, but the direction and magnitude of this impact is uncertain. Schools that are designated as “needing improvement” receive additional attention and funding, but are subject to a more rigorous set of educational standards, the impact of which is not readily identifiable. Schools could receive this additional funding and improve the quality of their schools, or they could panic after receiving this additional scrutiny, discouraging students from achieving higher academic standards. A stark example of this occurred in Birmingham, AL in 2000, when 522 students were dismissed from Birmingham Public Schools due to fears that those students would lower their schools scores on state standardized testing (Orel 2003). Additionally, negative externalities related to both increased class sizes and the type of student being retained in ninth grade could impact student achievement. Angrist and Lavy (1999) show that Israeli fourth and fifth graders have significantly higher test scores in smaller classes. Since NPND laws would likely increase average class sizes in the ninth grade, this may negatively affect student test scores. Carrell and Hoekstra (2010) consider the externalities created by children exposed to domestic violence. They show that children exposed to domestic violence significantly lower the

math and reading test scores of their peers. NPND policies are likely keeping troubled teens in the classroom, where they distract their peers and disrupt the learning environment, causing negative impacts on the achievement of their peers. Consequently, these negative externalities may even be amplifying the effects of NPND policies; not only are some “marginal” dropouts being retained in the ninth grade for up to two more years, they also may be causing some of their peers, who in the absence of NPND policies would have been promoted to tenth grade, to be retained alongside them.

6 Conclusion

Overall, No Pass, No Drive policies do not appear to be as unambiguously beneficial to educational outcomes as previous studies have found. While my analysis supports previous results that educational attainment increases due to the enactment of NPND policies, this increase seems to, at most, marginally improve the number of high school graduates in the population, and does not improve the number of *on-time* high school graduates. This slight increase in educational attainment also carries with it some significant, but previously unnoticed, costs. Enrollment in 9th grade, relative to 8th grade, increases by nearly 3 percent, and enrollment in 10th grade increases by approximately 1 percent. This puts pressure on state and local education budgets, as higher student enrollment numbers would require the hiring of additional teachers and staff, as well as increased overall spending on student services and needs ranging from cafeteria lunches to textbook purchases. Additionally, as discussed previously, the students being retained in school as a result of these NPND policies are the “marginal dropouts” who are nearly indifferent between dropping out of school and remaining in school in the absence of the NPND policies. These students are likely have an increased prevalence of behavioral and learning issues, which may be imposing negative externalities on their peers, raising the cost of NPND policies by reducing educational quality for the non-dropout students in these states. Add to this the fact that, for nearly a decade, NPND policies increased the likelihood for schools to fail to meet their Adequate Yearly Progress standards under the No Child Left Behind Act, and it is clear that NPND policies have a number of substantial,

but previously unnoticed, problems.

Moving forward, policy makers need to reevaluate the goals of No Pass, No Drive policies and examine how the results of these policies align with their goals. If the goal is simply to keep teenagers in school, potentially causing reductions in outcomes such as juvenile crime and teen pregnancy, then NPND laws appear to successfully achieve this goal – my results show that 9th and 10th grade enrollment increases, without bringing associated decreases in 11th or 12th grade enrollments. However, if the goal of NPND policies is to improve students' educational outcomes, then a major revision of these policies is needed. NPND policies increase educational attainment for marginal dropouts, but impose substantial costs on their schools and the overall student population. While the AFGR was replaced in 2012 by the ACGR in calculations of Adequate Yearly Progress, it is still one of the most widely cited graduation rate statistics by both news reporting agencies and lawmakers; thus, the fact that NPND laws lower the AFGR should be of great concern to policy makers. Add to this that the increased 9th and 10th grade enrollments create negative externalities on the students whose decisions were not directly influenced by NPND laws, and it appears that these laws likely have a negative overall effect on both the true quality of education (through these negative externalities and through shifts in resource allocation by educational agencies) and the perceived quality of education, as measured by the AFGR.

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Appendix: Additional Tables and Figures

Table A: Effects on AFGR and Enrollment,
Excluding Louisiana and Oregon

	(1)	(2)
	AFGR	8th-9th Enrollment Change
Enrollment-Based	-1.125 (0.802)	2.449* (1.246)
Behavior-Based	-2.207 (2.107)	-1.257 (0.888)
log(Spending)	5.249 (5.950)	-15.63** (6.437)
Unemp. Rate	0.304 (0.311)	-0.513 (0.359)
<i>N</i>	978	1029

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$