FRIDAY NIGHT LIGHTS: THE EFFECT OF HIGH SCHOOL ATHLETIC DIVISION ON STUDENT ACADEMIC AND ATHLETIC PERFORMANCE

by

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A THESIS

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While there exists consensus on the effect of high school sports participation on academic achievement and educational attainment, very little is known about the effect of high school athletic division on athletic and academic performance. This thesis uses a Regression Discontinuity Design approach by exploiting strict cutoffs in Texas that determine high school athletic division solely on student enrollment. Since enrollment cutoffs remain unknown to each school, randomization around the threshold will allow us to reliably measure the causal effect of athletic division on athletic and academic performance. However, this thesis highlights the difficulties in answering this question: namely, it suffers from small sample size, and finds no statistically significant effects. While large standard errors detract from the power of these results, this thesis does cast doubt on athletic division having large effects on student performance.

Acknowledgements

"Football cannot be defended in the high school unless it is subordinated, controlled, and made to contribute something definite in the cause of education" -Roy Henderson, 1927 Athletic Director of the University Interscholastic League

Thank you to my family for always supporting me, encouraging me, and listening to me ramble on about this thesis. You helped me more than you know, and words cannot express my gratitude.

Thank you to my thesis committee for all of your guidance, and for helping make my experience at the University of Oregon such an incredibly positive one.

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Introduction

During the 2013-2014 school year, the number of high school sports participants increased for the 25th consecutive year to nearly 8 million students according to the National Federation of State High School Associations (“High School Participation Increases for the 25th Consecutive Year”). The state of Texas claimed the most participants of any state with 805,299 out of approximately 5 million enrolled students (“High School Participation Increases for the 25th Consecutive Year”). While most would agree that sports participation can teach students intangibles such as cooperation, leadership, and work ethic, it is unclear how athletic participation affects academic performance. When approaching this issue theoretically, economists first employed Becker's simple allocation of time model (1965) and had students optimize their participation in two activities: school and leisure. However, this would imply substituting away from school to sports (leisure) may have negative effects on academic performance, and this generally contradicts economic literature which finds that athletic participation results in small, but positive academic effects. Specifically, economists have found that athletes receive better grades (Rees and Sabia 2010; Lipscomb 2007), have higher levels of educational attainment (Pfeifer and Corneliben 2010; Stevenson 2010; Barron et al 2000), and even spend more time doing homework (Marsh and Kleitman 2002).

To create a model that follows empirical evidence Pfeifer and Corneliben (2010) split the "leisure" category into two categories: good and bad. In this case, sports are considered a good leisure activity whereas partying or watching television, for example, are labeled bad leisure activities contingent on their potential to harm academic performance. With this model, the decision to participate in sports can reduce the amount of “bad” leisure activity and have indirect positive effects on educational outcomes. Moreover, athletic participation can also improve a student's health leading to possibly higher attendance rates and improved human capital. Finally, the soft skills students acquire on the field may also help them improve their grades in the classroom.

While there is some consensus on how athletic participation positively affects academic performance, it remains unclear how athletic performance factors into this equation. Namely, if students have a successful sports season full of wins will they reap more positive academic benefits, less, or will wins and losses have no effect on academic performance? One way we can analyze this question is by looking at athletic division. It is a typical belief that being placed in a lower, less competitive division may help improve a school's win loss percentage across all sports while the opposite can be said of moving up to a more competitive division. Athletic division may affect students through several mechanisms. First, a boost in win loss percentage could help boost school pride, student morale, and community support which could positively affect students’ grades. Another mechanism could be that schools in higher athletic divisions increase the amount of time they practice and this could either reduce the amount of good leisure time students have thereby lowering grades or it could lower bad leisure time and possibly indirectly help educational outcomes. While these examples are conjecture, the true effect of athletic performance on student academic performance is not very well known. Currently, there is only one paper, Lindo et al (2012) that studies this relationship and it looks at college students. It does find that when the University of Oregon football team had a relatively successful football season the dropout rate among certain student groups experienced a statistically significant decrease, but male grades also fell. However, due to several factors including differences between high school and college students, this paper does not find a statistically significant decrease in the drop rate or a decrease in grades.

This paper takes advantage of discrete enrollment thresholds that determine athletic division in the state of Texas to ascertain the average treatment effect using a Regression Discontinuity design. It assumes that high schools just above the threshold, in the more competitive division, have less successful athletic seasons — making the playoffs less often — compared to high schools below the threshold. However, upon analysis, this assumption is much weaker than originally thought. This thesis finds very little statistically significant evidence that high schools that exceed the enrollment threshold actually have poor athletic performance compared to their counterparts in the less competitive division. Overall, this paper examines one enrollment threshold that was determined at two different time periods: the threshold between the 4A and 5A divisions for the 2008-2010 and 2010-2012.[1] In February 2008, the threshold was announced that dictated athletic division for the 2008-2009 and 2009-2010 school year. This threshold and resulting data from 2008-2010 is hereby referred to as the "2008 realignment". Similarly, in February 2010 new enrollment cutoffs were announced that determined athletic division for the 2010-2011 and 2011-2012 school year, and this data is hereby referred to as the "2010 realignment".

[1] Originally, I wanted to also examine the threshold between the 3A and 4A division to see if the results would be different from the 4A and 5A threshold. However, the former threshold is much easier to predict and coupled with the enrollment distribution, there may be manipulation at the 3A and 4A threshold. This violates the primary assumption of a Regression Discontinuity design.

The results of this thesis show that the effects of athletic division are still unclear, largely due to sample size problems which will further be discussed in the results and conclusion section. However, it does cast some doubt on whether athletic division and athletic program performance has large effects on students. This implication thus calls into question schools spending more money by opening new schools, redrawing boundaries, denying transfers etc. to slow the growth of their enrollment and improve the performance of athletic programs since these may have no tangible effects on students' educational outcomes. After all, as the number of high school sports participants has increased so too has the cost of high school athletics, particularly in the state of Texas. On average, high school football coaches across the country make an average salary of $39,000, but in Texas, that number was $88,000 in 2011 (Ripley 2013). Due to the private nature of donations, high school spending on athletics can be hard to track, but in 2011-2012 one Texas high school of just 300 students cut all athletics programs and saved an estimated $150,000 (Ripley 2013). That year, 80% of students passed their classes compared to just 50% the prior year (Ripley 2013). Overall, these results raise the question: are schools spending their money on things that will truly help their students succeed? This thesis may show that there are better ways for a school to spend money that are more effective in improving a student's academic performance.

Background

In the early 1900s, many groups across the United States came together to help public school teachers administer fair and organized athletic competitions and activities for high school students. These groups would eventually become known as athletic associations, and each state possesses a high school athletic association to oversee its athletics and activities. This thesis examines Texas' athletic association: the University Interscholastic League (UIL) that has operated as a part of the University of Texas since 1910. It is the largest inter-school organization of its kind in the world (University Interscholastic League 2016).

Realignment

In order to ensure more fairness in interschool competition, the UIL places each Texas high school in one of five divisions: 1A, 2A, 3A, 4A, or 5A based entirely on the school's total enrollment.[2] Each school then only competes against schools in the *same* division in order to prevent the state's smallest schools from competing against the state's largest schools. This logic does follow the assumption that since larger schools have more resources and access to a larger talent pool, their athletic programs will be superior to smaller schools. Moreover, the UIL also places each school in a geographically contiguous district (typically with five, seven, or nine other schools) and district games then make up the majority of each school's regular season schedule. In most sports, the top four teams in each district advance to playoffs at the end of each season.

[2] In 2014, the UIL created a sixth division (6A) which held any school with 2,100 students or more. It may be that a six division system affects students differently than a five division system so this thesis restricts its focus to analyzing the five division system.

Every two years the UIL adjusts the student enrollment cutoffs, which determine a school's athletic division, and redraws athletic districts. To prevent schools from manipulating their enrollment numbers to get in a favorable, less competitive division, the UIL takes several measures. First, all schools report their enrollment numbers to the UIL in October of the school year before realignment begins. If a high school would like to move up to the more competitive division, they may also request to be elevated and the UIL will generally honor this request. It is worth noting that the future enrollment cutoffs are still unknown to *all* parties. In section III, this thesis will offer a compelling argument that these enrollment cutoffs are indeed extremely difficult to precisely predict. After receiving all relevant data, the UIL then verifies all enrollment figures and determines enrollment cutoffs with certain stipulations. They may only place between 220 and 245 high schools in the most competitive division (5A) and in the lower divisions they keep the enrollment ratio between the largest school in the division and smallest school at 2.0 or less while placing at least 200 schools in each division. This ensures that a school will never compete against another that is more than double its size. In February, the UIL announces these enrollment cutoffs and for the next two school years, high schools will compete in their designated division and district.

Measures to Encourage Academics

In 1984, Texas became the first state to implement a "No Pass, No Play" law that mandated that any high school student athlete must be passing all of his or her classes with a grade of 70% or better in order to remain eligible for athletics. However, in 1995 the law was amended to reduce the suspension time from six weeks to three for academic ineligibility and also allowed districts to exempt Advanced Placement (AP) courses from the "No Pass, No Play" law entirely. Moreover, the state of Texas also pioneered an Advanced Placement Incentive Program which first began in 1996. The program, targeted at low income students in minority-majority schools, subsidizes AP test fees and pays students for passing AP test scores. In addition, it provides bonuses for AP teachers whose students perform well and subsidizes teacher training. While just over 60 low income schools benefit from the program, Jackson (2010) found in a difference-in-difference study[3] that the program has resulted in an increase in students taking AP/IB courses, increases in the number of students with high SAT/ACT scores, and higher college matriculation rates.

[3] A difference-in-difference study compares the treatment group before and after treatment to a control group before and after treatment to control for any time trends that are unrelated to treatment.

Data and Methods

This thesis focuses on the state of Texas for several reasons: its large size, passionate culture surrounding athletics, and most importantly, a wealth of available data on all public high schools. In the 1980s, the state voted to create the Public Education Information Management System (PEIMS) and this decision facilitated the creation of the Texas Education Agency's database, one of the largest education databases in the world (Texas Education Agency 2016). I take advantage of publicly released "School Report Cards" for all high schools in Texas via the Texas Education Agency database. The report cards date back to the 2003-2004 school year, and run through 2014-2015. Each school report card contains the following information: attendance rate and dropout rate for each school, average SAT and ACT score, the percentage of students passing all state tests, expenditure per student, and racial composition of the student body.

Moreover, I have also obtained data containing the enrollment numbers that each high school submitted to the UIL for the 2008, 2010, and 2012 realignments.[4] This data also includes the resulting enrollment thresholds and which high schools requested, and were approved, to be elevated an athletic division. Furthermore, UIL archives also contain playoff brackets and district rankings for volleyball, baseball, boy's and girl's basketball, and football from the 2002-2003 school year to the present. This results in a period of analysis which ranges from the 2008-2009 school year to the 2013-2014 school year.

[4] In 2014, the UIL decided to add a sixth division (6A) for any high school with 2,100 students or more. Since a five division system may affect students differently than a six division system, I only analyze a five division system.

The specific enrollment cutoffs that determine athletic division allow for the use of a regression discontinuity design (Thistlethwaite and Campbell, 1960) and the high schools that can be elevated by request are omitted from analysis. Overall, the number of schools who are elevated by request is extremely small so this omission does not affect the resulting analysis. This regression discontinuity design then can test the effect of athletic division on student academic performance indicators and athletic program success.

In order for a regression discontinuity design to be valid, it needs to satisfy one major assumption. Of utmost importance, there must be randomization around the threshold. This means that groups cannot precisely manipulate whether or not they receive the "treatment". Thus "treated" groups should have no observable or unobservable differences from the control group beside a difference in their treatment status.

In order to offer a compelling argument that schools cannot precisely manipulate their enrollment numbers, this thesis must explore several avenues through which schools can alter their enrollment. First, schools can legitimately change enrollment by denying transfers, redrawing boundary lines, and pressuring their district to open up a new high school, but these options are costly and may only be effective in the long run, not the short run. Thus schools cannot change enrollment to precisely manipulate which side of the threshold they are on and must accept the realignment in the short run. A school may also change their enrollment through illegitimate means and falsify records. To account for this, the UIL checks for increases in students who do not count towards enrollment totals, larger student growth than average, and regularly conducts investigations to determine whether a school has falsified records thereby creating a deterrent effect.

Although schools can use the above mechanisms to change their enrollment, they still lack the ability to precisely manipulate what side of the threshold they are on due to unpredictable enrollment cutoffs. There are several pieces of evidence that support this. First, the enrollment cutoff for the 5A division rarely follows a pattern as evidenced by historical data, and thus is extremely difficult to predict. Figure 1 shows the 5A cutoff from 1988 through 2012 to highlight this variability. In particular, the 2008 cutoff of 2,085 students was significantly higher than the 2006 cutoff: the last time the cutoff increased by more than 100 students was ten years ago in the 1998 realignment. Then in 2010, the cutoff surprisingly fell for the first time in 20 years. Besides surprising cutoffs, I have also graphed the enrollment distribution in Figure 2 and Figure 3 to further provide evidence for randomization around the threshold for the 2008 and 2010 realignment as suggested by McCrary (2008). If there were manipulation, one would expect a high density of the distribution to be just to the left of the threshold, but both of these figures show the contrary, and the distribution is instead continuous through the threshold. This provides powerful evidence that schools were not able to control what side of the threshold they were on.

Below Table 4, Figure 6 also presents scatterplots for race variables which are expected to remain stable across the threshold. Many economists contend that regressing demographic variables on the treatment variable should yield statistically insignificant results. Otherwise, there may be manipulation at the threshold. Table 4 summarizes the results of regressions on the percentage of white and Hispanic students in each respective school. The table shows that none of these estimates are statistically significant at the 10% level. However, it should be noted that this could also result from the small sample size of this study and therefore, this does not provide definitive evidence for randomization around the threshold. Coupled with all of the above arguments, there is strong evidence that there does exist randomization at the threshold.

The main results are based on local linear regression discontinuity design with rectangular kernel.[5] In a local linear model, more weight is placed on data closer to the threshold in order to more accurately determine the average treatment effect. I use robust standard errors and confidence intervals to account for any heteroskedasticity in my data which may occur if the variability of academic statistics partially depends on enrollment. An indicator called "Above_Threshold" indicates whether the school falls below the threshold and into the 4A division or surpasses the threshold and lands in 5A. The "Above_Threshold*Enrollment" term allows the slope of the line above the threshold to differ from the slope of the line below the threshold.

$$SAT_i = \beta_0 + \beta_1 * Enrollment_i + \beta_2 * Above\_Threshold_i + \beta_3 * (Enrollment_i * Above\_Threshold_i)$$

[5] I have also included results with a triangular kernel in the appendix (Table 5) to show that my estimates are not sensitive to kernel choice.

Results

Athletic Performance

Initially, I estimate the effect of athletic division classification on a school's athletic performance. I do expect that any changes in student academic performance ultimately stem from a change in a school's athletic performance. Due to randomization at the threshold, the one observable difference between treated and untreated schools is athletic division. This thesis contends that the only mechanism through which athletic division affects academic performance is through changing a school’s academic performance.[6] Overall, I utilize past playoff brackets for volleyball, baseball, football, girl's basketball, and boy's basketball to analyze performance in both the school's first year and second year (the final year) in their corresponding athletic division. For this analysis, I create a dummy variable for each sport and each year tracking whether a school placed in the **top two** of its district. For example, the variable "Volleyball1" equals one if the school was in the top two of its division in the first year of realignment and equals zero if they did not finish in the top two. As discussed in the previous section, I look at the 5A division during the 2008 and 2010 realignment.

To obtain these estimates, I use a local linear regression discontinuity design with rectangular kernel. The results are summarized in Table 1 with a bandwidth 50 and a bandwidth of 100. Using the “rdrobust” package in Stata (Calanico et al 2014), the optimal bandwidth for most sports and academic indicators lies at approximately 50 students. However, I also present a bandwidth of 100 to show the sensitivity of estimates to bandwidth choice. The table shows that only one of the estimates is

[6] I do test whether a school’s expenditure changes at the threshold and find that while expenditure is related to enrollment, there are no statistically significant changes at the threshold.

statistically significant at the 10% level at both bandwidths. This significant estimate shows that schools in 5A were less likely to place in the top two of their division in volleyball in the 2011-2012 school year.7 These results may occur for two, non-exclusive reasons: first, my sample size is quite low which increases the standard errors of my estimates and thus increases the minimal detectable effect. In each time period, there are only about 50 schools within 100 students of the threshold resulting in only approximately 50 observations for a bandwidth of 100. With this small sample size, the regression is unable to uncover the true effect of athletic division classification. Second, it may be that athletic division classification has a very small or negligible effect on athletic performance. For schools within 200 students of the threshold, a blunt average for each sport shows that landing in the higher division only decreases a school's chance of finishing in the top two by about 10%.

Academic Performance

Since this analysis attributes observed performance indicators only to the previous realignment and classification, it captures the short run effect of realignment. In estimating the effect of division classification on student academic performance, I also use a local linear regression discontinuity design with rectangular kernel.8 The results of this analysis are shown in Table 2 with a bandwidth of 50 and Table 3 with a bandwidth of 100. These tables illustrate that none of the academic indicators are statistically significant at both bandwidths. While there are several academic indicators

[7] With a bandwidth of 50, the estimate predicts that the higher classification (5A) makes a school 41.1% less likely to be in the top two of our division. With a bandwidth of 100, the estimate predicts that the higher classification makes a school 16.9% less likely to be in the top two.

[8] These estimates are also not sensitive to kernel choice. Table 6 and 7 in the Appendix shows the resulting estimates using a triangular kernel.

that are statistically significant at one bandwidth, they are extremely sensitive to bandwidth choice. While a bandwidth of 50 may provide more biased estimates and higher standard errors, its close distance to the threshold may also increase precision.

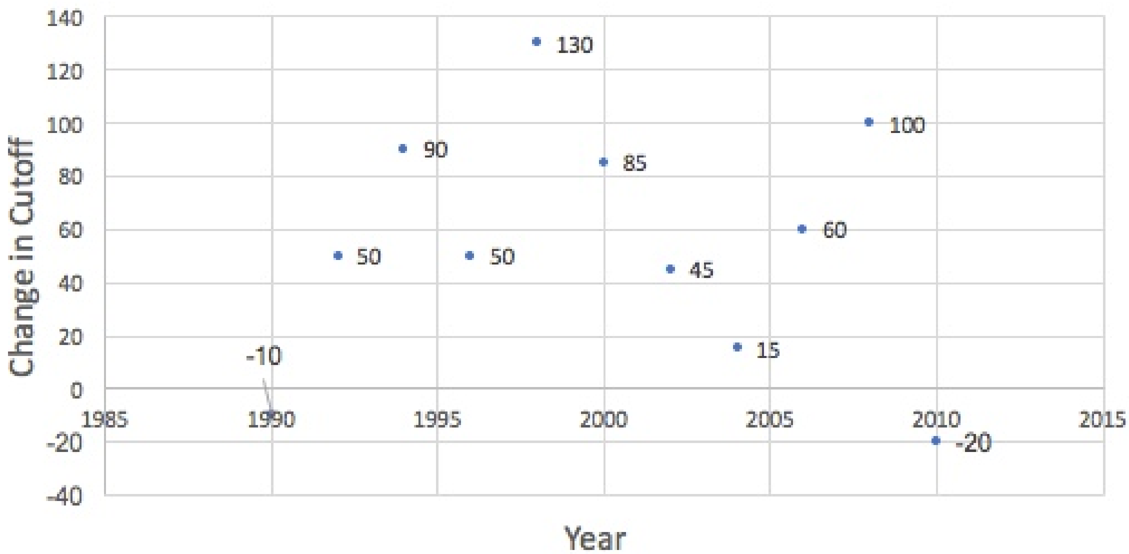
Figure 4 and 5 show scatter plots for all academic outcomes in the school years 2008-2009 and 2010-2011 respectively. They show that academic indicators are not strongly correlated with the school’s enrollment, and also highlight the variability between schools. This makes sense given that many factors determine an average student’s academic success at a particular school.

Conclusion

This thesis exposes some of the difficulties in ascertaining the true effects of athletic division classification on a school's athletic and academic performance. It also casts some doubt on whether classification has a large effect on athletic and academic performance indicators. Despite this uncertainty, many schools go to great lengths to try to be placed in a lower athletic division. The Frisco school district redraws boundary lines every school year, forcing students to switch high schools, in an attempt to keep all nine of their high schools below the 6A threshold (Bash 2016). While changing schools each year may have disastrous effects on impacted students, the Frisco school district still bets that positive effects from the lower athletic division (5A) and slightly smaller class sizes will outweigh these potentially negative effects. Moreover, other districts, such as Katy, build new multi-million dollar schools in order to avoid surpassing the 6A enrollment threshold in the future. In this case, it is also difficult to determine whether the benefits of slightly smaller schools and lower athletic division surpasses the very real cost of building a new school. This thesis illustrates that many schools make these costly decisions knowing little about the true effect of athletic division on their students. In order to gain some certainty on this research question, it would be helpful to increase the sample size either by analyzing high schools throughout the country or by analyzing data at the individual student level and not the school level. Unless athletic division classification has significant positive effects on academics, schools may be wasting time and money to imprecisely avoid enrollment thresholds while they could instead directly subsidize academic success.

Appendix

Figure 1: Historical Changes in the 5A Enrollment Cutoff[9]



[9] This is in comparison to the previous realignment cutoff.

Figure 2: Enrollment Distribution (2008)

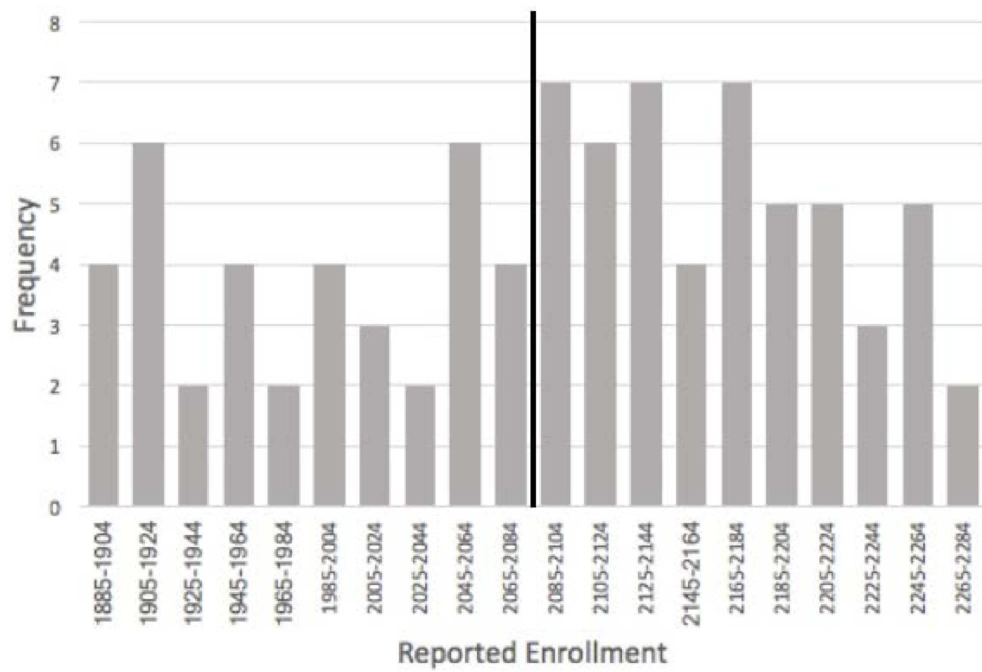


Figure 3: Enrollment Distribution (2010)

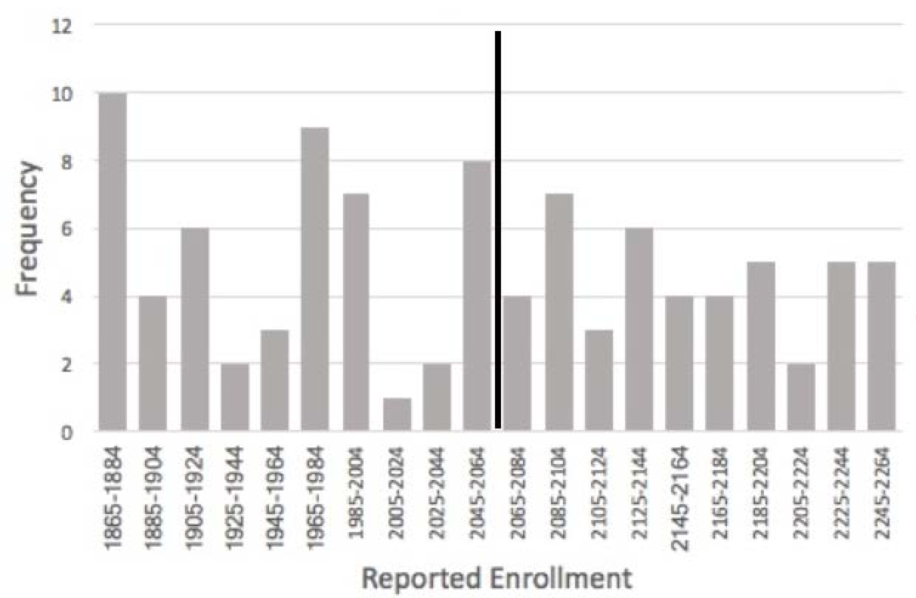
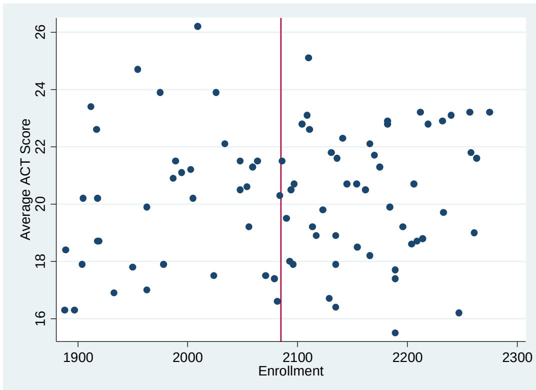
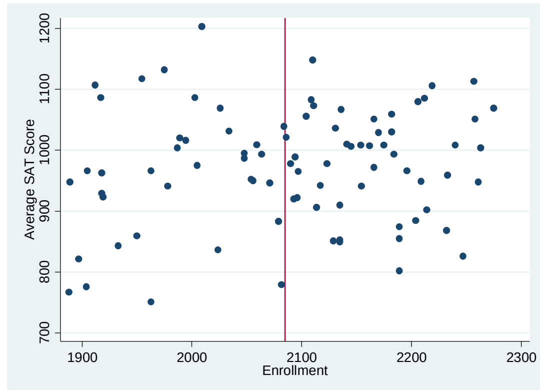


Figure 4: Academic Outcomes for 2008 Realignment, 2008-2009 School Year

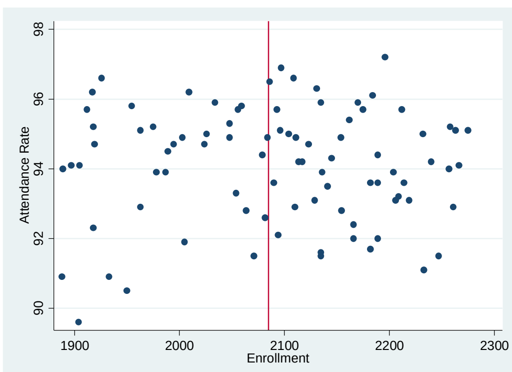
ACT Score



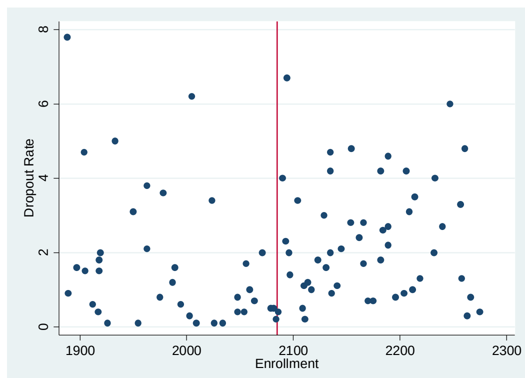
SAT Score



Attendance Rate



Dropout Rate



Percentage of Students Passing State Tests

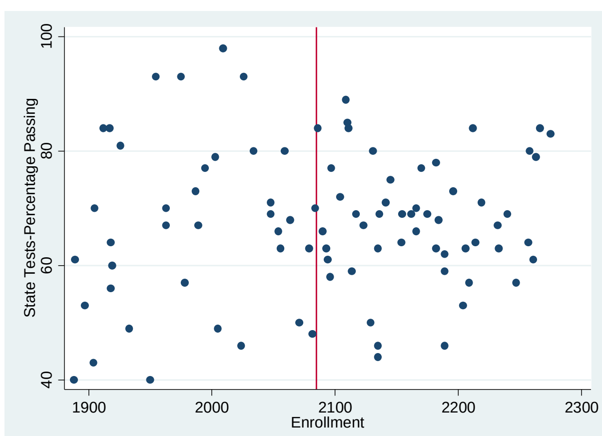
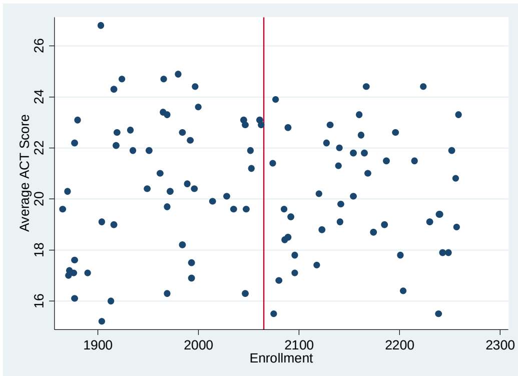
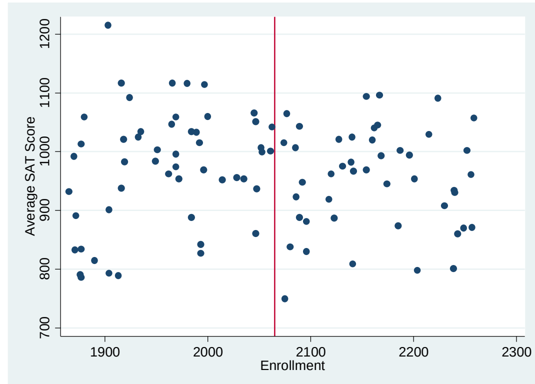


Figure 5: Academic Outcomes for 2010 Realignment, 2010-2011 School Year

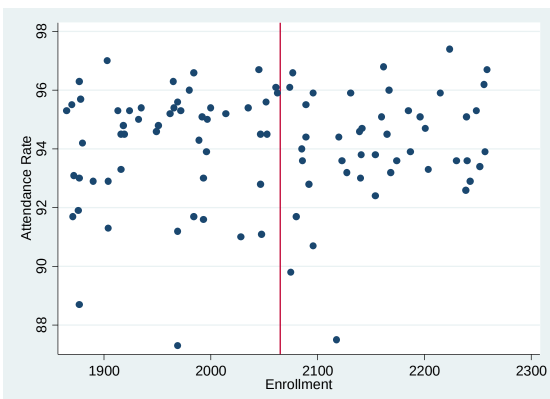
ACT Score



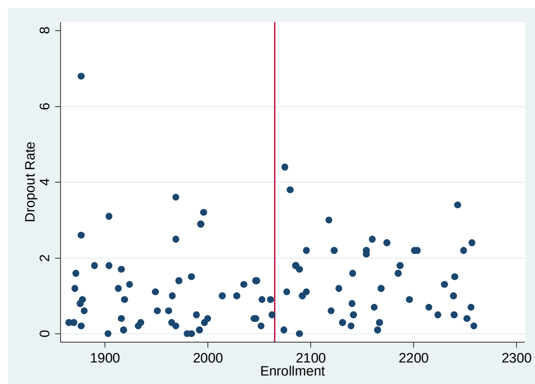
SAT Score



Attendance Rate



Dropout Rate



Percentage of Students Passing State Tests

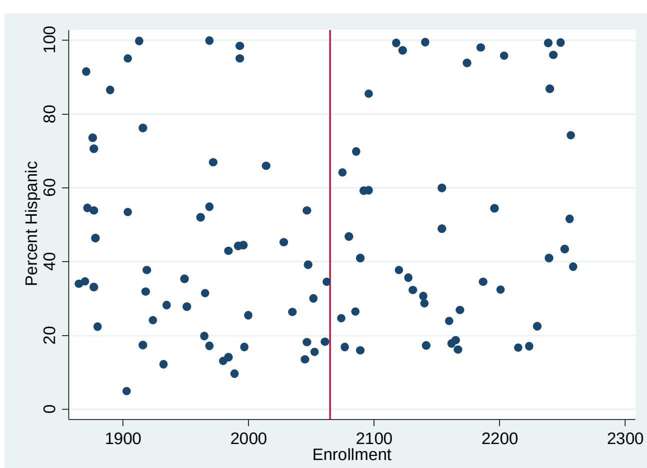


Table 1: The Effect of Classification on Athletic Performance

	2008		2010	
Enrollment in (Cutoff - 50, Cutoff +50)	2008-2009	2009-2010	2010-2011	2011-2012
Volleyball	0.246	0.444	0.081	-0.411*
	(0.136)	(0.178)	(0.264)	(0.380)
Baseball	-0.019	-0.013	-0.121	0.338
	(0.116)	(0.244)	(0.503)	(0.392)
Girl's Basketball	0.106	-0.100	-0.384	0.202
	(0.366)	(0.331)	(0.336)	(0.154)
Boy's Basketball	-0.495**	-0.191	-0.107	-0.341
	(0.348)	(0.388)	(0.269)	(0.374)
Football	0.367	-0.168	-0.006	0.600
	(0.359)	(0.374)	(0.592)	(0.564)
Enrollment in (Cutoff - 100, Cutoff +100)	2008-2009	2009-2010	2010-2011	2011-2012
Volleyball	0.069	0.083	-0.143	-0.169**
	(0.182)	(0.169)	(0.213)	(0.238)
Baseball	0.042	-0.331	0.158	0.162
	(0.165)	(0.219)	(0.257)	(0.226)
Girl's Basketball	0.062	-0.137	-0.078	-0.222
	(0.250)	(0.228)	(0.233)	(0.183)
Boy's Basketball	-0.309	-0.081	-0.185	-0.290
	(0.207)	(0.328)	(0.236)	(0.236)
Football	0.176	-0.114	-0.204	0.040
	(0.289)	(0.244)	(0.301)	(0.294)

*, **, and *** indicate significance at the 10%, 5%, and 1% level respectively.

Table 2 and 3: The Effect of Classification on Academic Performance

Enrollment in (Cutoff - 50, Cutoff +50)

	2008		2010	
	Year 1	Year 2	Year 1	Year 2
Attendance Rate	2.093	1.940	-2.180	-2.294
	(1.2295)	(1.449)	(3.044)	(2.544)
Dropout Rate	1.459*	-0.109	2.041	1.814
	(1.134)	(0.923)	(1.190)	(1.568)
STAAR	18.324	14.016	-8.526	-6.820
	(8.156)	(7.724)	(14.604)	(9.212)
SAT	117.6	119.39	-66.436	-99.247
	(73.333)	(72.308)	(123.07)	(193.97)
ACT	3.396	3.553	-2.233	-2.143
	(1.287)	(1.9315)	(3.131)	(3.146)

Enrollment in (Cutoff - 100, Cutoff + 100)

	2008		2010	
	Year 1	Year 2	Year 1	Year 2
Attendance Rate	0.825*	1.040	-1.48	-1.056
	(0.846)	(0.94068)	(1.28)	(1.056)
Dropout Rate	1.605	0.335	1.20	1.18
	(0.765)	(0.576)	(0.625)	(0.635)
STAAR	7.4451*	5.226	-7.9	-10.281
	(5.298)	(4.948)	(6.836)	(4.67)
SAT	49.959	48.253	-79.417	-120.03
	(41.405)	(42.993)	(49.635)	(79.221)
ACT	1.180**	1.341	-2.613	-2.477
	(1.287)	(1.176)	(1.408)	(1.421)

*, **, and *** indicate significance at the 10%, 5%, and 1% level respectively.

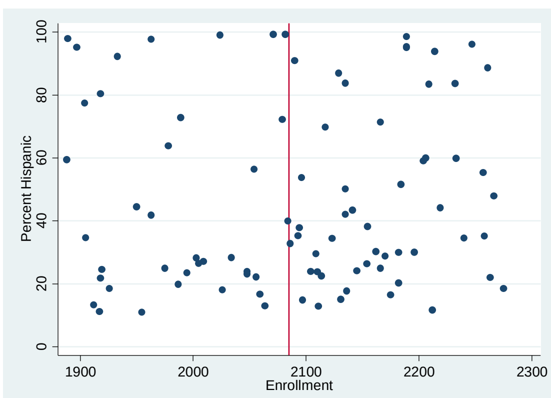
Table 4: Regression of the Demographic Variables

Enrollment in (Cutoff - 50, Cutoff +50)		
	2008-2009	2010-2011
Percentage of White Students	34.088	-33.54
	(14.594)	(27.687)
Percentage of Hispanic Students	-42.644	-3.169
	(21.562)	(21.389)
Enrollment in (Cutoff - 100, Cutoff + 100)		
	2008-2009	2010-2011
Percentage of White Students	6.041	-27.713
	(12.45)	(14.032)
Percentage of Hispanic Students	-13.51	23.565
	(13.825)	(11.111)

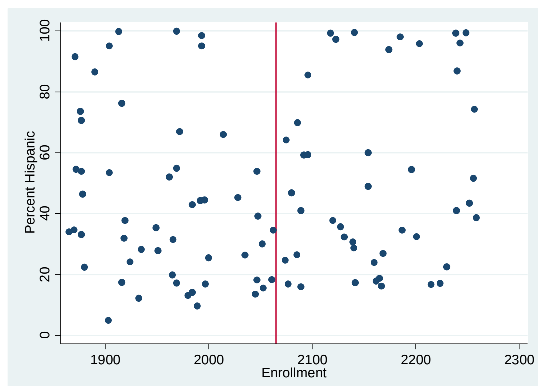
Nothing is statistically significant at the 10% level.

Figure 6: Scatter Plots of Demographic Variables

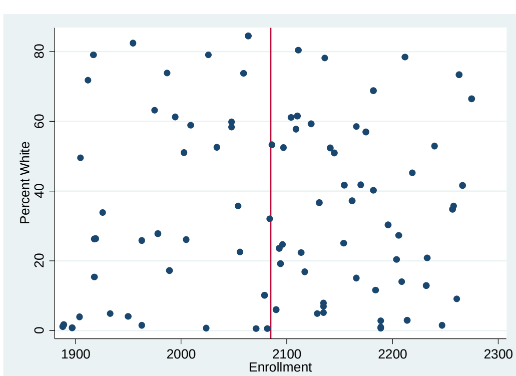
2008 Percentage of Hispanic Students



2010 Percentage of Hispanic Students



2008 Percentage of White Students



2010 Percentage of White Students

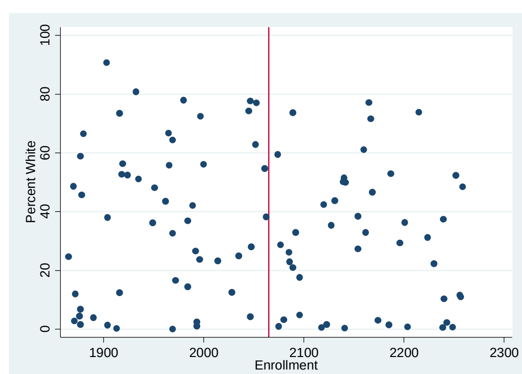


Table 5: The Effect of Classification on Athletic Performance, Triangular Kernel

	2008		2010	
Enrollment in (Cutoff - 50, Cutoff +50)	2008-2009	2009-2010	2010-2011	2011-2012
Volleyball	0.531	0.210*	0.009	-0.582
	(0.065)	(0.138)	(0.242)	(0.394)
Baseball	-0.041	-0.025	-0.277	0.341
	(0.051)	(0.211)	(0.541)	(0.389)
Girl's Basketball	0.112	-0.008	-0.273	0.151
	(0.395)	(0.373)	(0.292)	(0.112)
Boy's Basketball	-0.581**	-0.128	-0.084	-0.429
	(0.345)	(0.437)	(0.198)	(0.432)
Football	0.388	-0.420**	-0.021	0.630
	(0.367)	(0.369)	(0.637)	(0.607)
Enrollment in (Cutoff - 100, Cutoff +100)				
Volleyball	0.025	0.178	-0.246	-0.395*
	(0.131)	(0.156)	(0.214)	(0.256)
Baseball	-0.053	-0.265	0.125	0.218
	(0.134)	(0.207)	(0.293)	(0.240)
Girl's Basketball	0.078	-0.105	-0.079	-0.223
	(0.297)	(0.267)	(0.228)	(0.176)
Boy's Basketball	-0.390	-0.261	-0.034	-0.226
	(0.248)	(0.299)	(0.214)	(0.244)
Football	0.265	-0.181	-0.218	-0.048
	(0.299)	(0.280)	(0.332)	(0.325)

Table 6 and 7: The Effect of Athletic Classification on Academic Performance, Triangular Kernel

Enrollment in (Cutoff - 50, Cutoff +50)

	2008		2010	
	Year 1	Year 2	Year 1	Year 2
Attendance Rate	1.683	1.449	-2.240	-2.371
	(1.383)	(1.583)	(3.059)	(2.659)
Dropout Rate	2.390	0.849	2.036	1.864
	(1.451)	(1.100)	(1.875)	(1.642)
STAAR	12.113	9.644	-8.962	-7.174
	(9.460)	(8.992)	(15.114)	(9.415)
SAT	73.096	86.001	-85.107	-122.25
	(80.783)	(82.805)	(129.85)	(202.55)
ACT	2.123	2.351	-2.774	-2.545
	(1.439)	(2.203)	(3.248)	(3.197)

Enrollment in (Cutoff - 100, Cutoff + 100)

	2008		2010	
	Year 1	Year 2	Year 1	Year 2
Attendance Rate	1.447	1.487	-1.162	-1.132
	(0.980)	(1.115)	(1.384)	(1.212)
Dropout Rate	1.766	0.322	1.372	1.398
	(0.973)	(0.701)	(0.765)	(0.750)
STAAR	11.888*	8.671	-8.685	-9.145
	(6.452)	(6.020)	(7.662)	(5.097)
SAT	75.981	75.295	-79.496	-101.21
	(53.656)	(54.364)	(60.019)	(94.91)
ACT	2.135*	2.202	-2.679	-2.406
	(1.002)	(1.467)	(1.621)	(1.617)

Bibliography

[1] Barron, J., B. Ewing, and G. Waddell. 2000. "The Effects of High School Athletic Participation on Education and Labor Market Outcomes." *The Review of Economics and Statistics*. Vol. 82, No. 3, pp. 409-421.

[2] Bash, Homa. 2016. "Frisco ISD Rezones Schools, High Schools Will Remain 5A." NBC. 5 November 2016. Accessed 23 March 2017. Web.

[3] Becker, G. 1965. "A Theory of the Allocation of Time." *The Economic Journal*. Vol. 75, No. 299, pp. 493-517.

[4] Calonico, S., M. Cattaneo, and R. Titiunik. 2014. "Robust Data-Driven Inference in the Regression Discontinuity Design." *The Stata Journal*. Vol. 14, No. 4, pp. 909-946.

[5] Eide, E. and N. Ronan. 2001. "Is participation in high school athletics an investment or consumption good? Evidence from high school and beyond." *Economics of Education Review.* Vol. 20, pp. 431-442.

[6] "High School Participation Increases for the 25th Consecutive Year." *National Federation of State High School Associations*, Oct. 2014. Accessed 23 March 2017. Web.

[7] Jackson, C. 2010. "A Little Now for a Lot Later: A Look at the Texas Advanced Placement Initiative Program." Journal of Human Resources. Vol. 45, No. 3, pp. 591-639.

[8] Lindo, J., I. Swensen, and G. Waddell. 2012. "Are Big-Time Sports a Threat to Student Achievement?" *American Economic Journal: Applied Economics*. Vol. 4, No. 4, pp. 254-274.

[9] Lipscomb, S. 2007. "Secondary school extracurricular involvement and academic achievement: a fixed effects approach." *Economics of Education Review*. Vol. 26, pp. 463- 472.

[10] Marsh H. and S. Kleitman. 2002. "Extracurricular School Activities: The Good, the Bad, and the Nonlinear." Harvard Education Review. Vol. 72, No. 4, pp. 464-515.

[11] McCrary, J. 2008. "Manipulation of the Running Variable in Regression Discontinuity Design: A Density Test." *Journal of Econometrics*. Vol. 142, No. 2, pp. 698-714.

[12] Pfeifer, C. and T. Corneliben. 2010. “The Impact of Participation in Sports on Educational Attainment- New Evidence from Germany.” *Economics of Education Review*. Vol. 29, No. 1, pp. 94-103.

[13] Rees, D. and J. Sabia. 2010. “Sports participation and academic performance: Evidence from the National Longitudinal Study of Adolescent Health.” *Economics of Education Review*. Vol. 29, no. 5, pp. 751-759.

[14] Ripley, Amanda. 2013. “The Case Against High School Sports.” *The Atlantic*, October 2013. Accessed 23 March 2017. Web.

[15] Stevenson, B. Year. 2010. “Beyond the Classroom: Using Title IX to Measure the Return of High School Sports.” (NBER Working Paper No. 15728). Cambridge, MA: National Bureau of Economic Research.

[16] Thistlethwaite, D. and Campbell, D. 1960. "Regression-Discontinuity Analysis: An Alternative to the Ex-Post Facto Experiment." *Journal of Educational Psychology*. Vol. 51, pp. 309-317.