Narrow paths out of poverty and educational demand: Evidence from Dominican baseball*

Brian Marein† Craig Palsson‡

August 14, 2023

Abstract

Do paths out of poverty with low probabilities of success (e.g., sports and entertainment) reduce the demand for schooling in low-income or marginalized communities? We study the effect of recruitment for professional baseball on educational attainment in the Dominican Republic, where all Major League Baseball (MLB) teams operate training academies for teenage boys. We exploit plausibly exogenous variation in exposure to MLB's sudden entry into the Dominican Republic based on preexisting local baseball cultures, which were largely determined by historical sugar production, and leverage the fact that girls are not recruited for professional baseball. Using a difference-in-differences design, we find that baseball has no measurable effect on school attendance, in contrast to highly publicized accounts in the popular press and legal journals. Although youths may underestimate the returns to education and overestimate their chances of success in sports and entertainment, their educational decisions are largely shaped by other factors.

Keywords: human capital, labor markets and school enrollment, economic development

JEL Classification Numbers: J24, I25, O15

*We thank seminar participants at the University at Buffalo and the University of Toronto for valuable comments and discussions.

†Wake Forest University, Department of Economics (mareinb@wfu.edu)

‡Utah State University, Huntsman School of Business (craig.palsson@usu.edu)

1 Introduction

Educational investments are shaped by the returns to schooling (Adukia et al., 2020; Heath & Mobarak, 2015; Oster & Steinberg, 2013). The demand for education falls as the wages of workers with low education rise relative to wages of workers with high education (Atkin, 2016; Black et al., 2005; Cascio & Narayan, 2022; Shah & Steinberg, 2017, 2021). The demand for education may also be low if students or their families underestimate the returns to education, as occurs in developing countries (Jensen, 2010). Some careers, especially in sports and entertainment, offer extremely high upside (i.e., fame and fortune) with little chance of success. For example, more than 250 million people worldwide play soccer, but only around 130 thousand do so professionally (Fédération Internationale de Football Association, 2019). In the United States, 1 in 4 members of Gen Z plan to become social media influencers (Langdon, 2022). Do such opportunities, which exert an outsize cultural influence and are thus highly visible, affect educational decisions in low-income and marginalized communities, where youths feel desperate for an escape from poverty? That is, does the slim possibility of riches erode the perceived returns to education and reduce the demand for schooling?

In this paper, we explore the effect of the recruitment of teenage boys in the Dominican Republic by professional baseball teams on educational attainment. Although baseball had been popular in the Dominican Republic since the early 20th century, Major League Baseball (MLB) did not begin extensively recruiting there until the late 1970s, after new MLB rules—the draft and minimum ages—reduced the benefits of signing and developing players from the United States (Bailey & Shepherd, 2011). The Dominican Republic offered a pool of cheap, talented labor. Nowadays, all 30 MLB franchises and one Japanese team operate training facilities in the Dominican Republic. In the 2022 season, 11.5% of MLB players were born in the Dominican Republic, a country of just 11 million inhabitants (Baseball Almanac, 2022). Estimates of those training full time for professional baseball vary widely, from more than 21,000 (Dominican Republic Ministry of Education, 2018) to 100,000 (Finkel et al., 2012), or about 3 to 15% of teenage boys.

We estimate the effect of MLB recruitment on the educational attainment of teenage boys in a difference-in-differences framework, exploiting the entry of MLB into the Dominican Republic following changes in its recruitment rules for domestic players and variation in preexisting local baseball cultures. MLB teams turned their attention towards foreign talent in the late 1970s because new MLB regulations limited the recruitment of American ballplayers. The timing of MLB's entry into the Dominican Republic is, therefore, exogenous to Dominican boys' training and educational choices. The number of Dominicans in the MLB and minor leagues began rapidly increasing in the 1980s, shortly after teams started extensively recruiting there. But exposure to the shock varied greatly over space, as there is significant variation in the number of MLB recruits across Dominican provinces. These differences are largely due to variation in local baseball cultures generated by historical sugar production, since sugar mills sponsored baseball for cane cutters during the dead season (Klein, 1991). Therefore, the effect of MLB's entry on educational attainment should be more pronounced in provinces with more developed preexisting baseball cultures.

Using Dominican census data and information on the birthplaces of professional ballplayers, we test whether boys of recruitment age have relatively worse educational attainment after MLB's entry into the Dominican Republic in areas that produced more players per capita prior to the establishment of MLB training academies. We find no evidence of such an effect. We also compare how boys' educational outcomes change relative to girls, who are not recruited, and find no evidence of an effect. Following Black et al. (2022) and Denes et al. (2021), we run simulated power analyses and show that our models are sufficiently powered to detect an effect for even the low-end estimates of the number of boys pursuing careers in baseball, meaning that the null results reflect a true lack of an effect rather than a lack of statistical power.

The supposed negative effect on boys' educational attainment is a focal point of articles in the popular press and legal journals calling for regulation of MLB's labor recruitment in the Dominican Republic and is the subject of an active policy discussion involving the US Agency

for International Development (USAID), the Dominican Ministry of Education, MLB, and the MLB Players Association. Wasch (2009, p. 107) shows that boys and girls enter the Dominican educational system at the same rate but that boys drop out disproportionately around the age of baseball recruitment, arguing that this pattern is circumstantial evidence that families choose baseball over school. Other articles in academic, mostly legal, journals likewise claim that MLB's presence deters boys from attending school (Gentile, 2022; Hanlon, 2013; Kalthoff, 2013; Nieves Murphy, 2023; Ottenson, 2014; Spagnuolo, 2003; White, 2017; Williamson, 2013), as do articles published by think tanks (Council on Hemispheric Affairs, 2010; Lisman, 2019). Similar sentiments are echoed in popular outlets; notably, VICE declares an "education crisis" (VICE Sports, 2015), and *The Nation* describes MLB recruiting as "strip-mining the Dominican Republic for talent... with no responsibility for who gets left behind" (Zirin, 2005). The 2012 documentary *Ballplayer: Pelotero* introduces MLB academies to a broad audience, and one of its directors reports meeting boys whose parents encouraged them to drop out: "[Y]ou can either go to school... or you can play baseball and maybe win the lottery" (Page-Kirby, 2012).

The only other effort to establish a causal link between MLB recruitment and educational outcomes is Chon (2020), who likewise finds no effect. The author exploits the expansion of athlete visas by the US government as an exogenous source of variation in the returns to education, comparing the years of schooling of boys of recruitment age to those too old to be recruited before and after the visa expansion, in municipalities near MLB facilities (treatment group) to those farther away (control group). The author finds similar results by classifying treatment municipalities based on the number of players born in a municipality who appeared on minor league rosters between 2006 and 2010. The author attributes the null result to a countervailing positive effect on the returns to education caused by a spillover effect of MLB academies on local labor markets, creating jobs in local businesses such as hotels, restaurants, and private academies. That analysis, in contrast to this paper, may produce a null result because the policy change did not meaningfully impact recruiting: there

is no change in the trend of Dominican players in the minor leagues after the visa expansion. The effect of MLB recruitment on education, therefore, remains an open question.

This paper contributes to the literature on the relationship between the returns to schooling and educational attainment by demonstrating that youths do not systematically pursue low-probability paths out of poverty where they would otherwise pursue education. Past work confirms theoretical predictions that the demand for education falls as the returns to education fall, but the outside employment opportunities considered in those papers are not high risk in the sense that they require years of up-front investment with small chances of success, unlike baseball (Adukia et al., 2020; Atkin, 2016; Black et al., 2005; Cascio & Narayan, 2022; Heath & Mobarak, 2015; Oster & Steinberg, 2013; Shah & Steinberg, 2017, 2021). In the United States, scholars have expressed concern that Black youths may see sports, rather than education, as a primary means of economic advancement (Beamon & Bell, 2006; Edwards, 2000; Gates, 1991). Black and Hispanic parents prioritize the pursuit of professional playing opportunities as an outcome for youth sports at much higher rates than do white parents (Solomon, 2020). Yet, to our knowledge, there has been no attempt to show that such "lotteries" are detrimental to education. This study suggests that unsatisfactory educational outcomes are caused by other factors. Other studies find some evidence of a positive effect of athletics on education, but the mechanisms are skills developed rather than dropping out of school, which is less concerning in developed countries where compulsory education is enforced (Pfeifer & Cornelißen, 2010; Rees & Sabia, 2010).[1] In line with our findings, Ransom & Ransom (2018) finds no effect of high school sports on educational outcomes in the United States.

This paper also contributes to the literature on the effects of foreign direct investment in developing countries. Studies generally find that FDI has important positive effects on the labor markets of host countries, including higher wages, higher productivity, and increased

[1]Eide & Ronan (2001) finds evidence that sports participation has a negative effect on the educational attainment of white males but a positive effect for black males. Harris (2014) finds no effect of sports participation on the educational attainment of black males.

employment (Hale & Xu, 2016). MLB's entry into the Dominican Republic likely had large positive effects on local development, although no study has yet tried to measure the size of the impact (Meyer & Kuhn, 2008). Most concerns, however, have been about labor standards in the training academies and the effect on educational attainment. The results of this paper do not undermine the importance of MLB's educational initiatives but do suggest that those calling for reform might focus their efforts on other issues with the academies.

Finally, this paper builds on the literature on lotteries and risk preferences. Previous research shows that younger people tend to be more willing to take risks (Dohmen et al., 2011). Although those with less education or income tend to be more risk averse (Donkers et al., 2001), lottery play is much more common among the poor and less educated (Beckert & Lutter, 2012; Clotfelter & Cook, 1990). Lottery play is also positively associated with being an ethnic minority (Beckert & Lutter, 2012). Taken together, these findings suggest that low probability, or narrow, paths out of poverty, which are often described as lotteries, may be more enticing to the young, poor, less educated, and minorities. This paper suggests that young boys from a developing country do not bet on baseball at the expense of education, although this may be due to a perception of low returns to education rather than a lack of interest in the "gamble" (Jensen, 2010). Prospects overestimate their likelihood of success in baseball and perceive their career path through education as complex and uncertain, which may explain why Dominicans' demand for education is low rather than why the pursuit of professional baseball is popular, consistent with Jensen (ENTRENA et al., 2022).

2 Baseball in the Dominican Republic

2.1 Pre-MLB local baseball cultures

Baseball was introduced to the Dominican Republic from neighboring Cuba in the late 19th century and took root in the capital, Santo Domingo, with encouragement from wealthy

students exposed to the sport while attending school in the United States.[2] The cultural preeminence of baseball, however, can be explained by historical sugar production, as sugar refineries, mostly US-owned, sponsored baseball as a diversion for cane cutters during the months they were idle from the fields. The Dominican sugar industry enjoyed explosive growth in the early 20th century, and planters filled labor needs by importing thousands of workers, mostly from Haiti and the British West Indies. Large concentrations of idle working-age men allowed for teams to play organized baseball games and tournaments. Fierce rivalries developed between refineries, as tight-knit communities surrounding refineries identified with and supported their local teams.

As Klein (1991, p. 15) explains in his book *Sugarball: The American Game, The Dominican Dream*, "[B]aseball is inextricably bound up with the production of sugar." *Sugar*, a 2008 film produced by HBO, offers a fictional account of a ballplayer from San Pedro with the nickname "Sugar." In Part One, titled "Sugar," of his book about San Pedro de Macorís—the epicenter of both Dominican sugar and baseball—Kurlansky (2010, p. 54) declares, "To baseball fans who ask, 'Why San Pedro de Macorís?' the answer is not the water but the sugar." Indeed, a former player tells Kurlansky, "[Baseball players] all come from here because we played ball for the mills every Sunday" (99).

Figure 1 is a map of sugar production in the Dominican Republic in 1930. The sugar industry existed almost exclusively on the southern coast, with the highest concentration of mills in the southeast near San Pedro de Macorís. The promotion of baseball by sugar mills, and the clustering of sugar mills in only some areas, generated variation in local baseball cultures over space that predates exposure to MLB investment and recruiting. Figure 2 shows the amount of land planted in sugarcane in the early 20th century in historical provinces relative to the per capita number of professional players from that province in 1977, and the relationship is visibly positive; of the few exceptions, three (Santiago, Espaillat, and La Vega) surround the city of Santiago, consistent with baseball culture first emerging in the

[2]This subsection is based on Klein (1991, 2014) and Ruck (1998) where not otherwise specified.

main cities, and Azua's involvement in the sugar industry is understated since the immense Central Barahona operated just outside its border. Hence, the only true exception to the pattern described above is Monte Cristi on the northern border with Haiti, discussed below.

2.2 MLB's entry into the Dominican Republic

Before 1965, MLB teams devoted substantial resources to identifying talented American ballplayers in their mid-teens and training them for several years in hopes of signing them once they turned eighteen.[3] By the late 1950s and early 1960s, however, teams felt that this system of labor recruitment cut into profits: competition over prospects led to the payment of large bonuses to rookies, and ball clubs in big cities had the resources to sign the best players, leading to competitive imbalance and, therefore, lower attendance at games.

In 1965, the league introduced a draft and stricter age minimums to promote competitive balance and eliminate excessive bonuses. Rather than directly signing with a team, prospects entered a draft in which teams would take turns picking players in reverse order of their records from the previous season. The draft involved many rounds, with each team having the opportunity to select a player in each round. The team that drafted a player had exclusive rights to negotiate with and sign him to a contract. Players were not eligible for the draft until graduating high school, continuing a rule prohibiting teams from signing players before age eighteen; players who went to college were not eligible for the draft until completing their sophomore year and reaching age twenty-one.

The new rules were written with American ballplayers in mind since Americans filled most MLB roster spots. Those from outside the United States were exempted because their eligibility would be difficult to verify, and many of them were already under contract to clubs in their home countries. These changes inadvertently created powerful incentives to focus on the development and recruitment of foreign players. The draft reduced the probability that a team would sign a domestic player that it scouted and developed, and the stricter

[3]This subsection is based on Bailey & Shepherd (2011).

age minimums reduced the incentive to invest in developing young talent since other teams would likely see players' performance by the time they became eligible to be signed. In sum, the rules reduced the expected return on investment in domestic ballplayers.

Relocating scouting activities abroad occurred slowly, as teams were unaccustomed to recruiting outside the United States. In the 1970s, teams increasingly evaded the draft by moving their scouts to Latin America—or, more precisely, the Spanish circum-Caribbean—where baseball was popular. Cuba had been by far MLB's most important source of foreign players but was left out of this new wave of recruitment in Latin America due to the US embargo. Puerto Rico, a US territory, was heavily targeted by scouts until Puerto Ricans were subjected to the draft in 1989. The two other loci of recruitment were Venezuela and the Dominican Republic, where MLB teams opened academies to develop local players. In 1977, the Toronto Blue Jays opened the first academy in the Dominican Republic; by 1990, thirteen teams had academies in the Dominican Republic, and by 2003, all 30 MLB franchises maintained academies there. In 1985, MiLB founded the Dominican Summer League, the first affiliated league outside of the United States and Canada.

2.3 Dominicans in American professional baseball

The number of Dominicans playing American professional baseball closely tracks MLB's entry into the Dominican Republic (see Figure 3).[4] The first Dominican in the minor leagues debuted in 1925, and the first Dominican in the majors debuted in 1956, although he was a US citizen who attended high school in New York.[5] Most Dominicans were effectively barred from American baseball until the first Black player was signed by a major league team in 1947 (Kurlansky, 2010). Few Dominicans played professionally in North America before the 1970s. From the late 1970s, the number of Dominicans entering American professional

[4]We refer to MLB and affiliated leagues as American professional baseball for simplicity despite some teams in Canada because the leagues are based in, and predominately operate in, the United States. The major leagues existed for nearly a century before expanding into Canada.

[5]Major League Baseball consists of the National League and American League, often called the major leagues or majors. Minor League Baseball serves as a developmental system for MLB and is often referred to as the minor leagues or minors.

baseball grew steadily. By the 2000s, around one in ten MLB players and one in four MiLB players hailed from the Dominican Republic (Cary, 2007).

From the beginning, the epicenter of Dominican baseball has been San Pedro de Macorís, which produces by far the most MLB players per capita of any city in the world (Florida, 2019). In 1977, the number of players in American professional baseball per capita from San Pedro was three times higher than any other province and nine times the national average; San Pedro represented just three percent of the population but 26 percent of the professional ballplayers. Between 1977 and 2010, 15 percent of new Dominican professional ballplayers came from San Pedro. According to Ruck (1998, p. xi), "[I]f the Dominican Republic has become the epicenter of Caribbean baseball, San Pedro de Macoris is its Mecca."

The other hotbeds of talent are primarily on the southern coast, in the areas of historical sugar production and in the capital (see Figure 4). La Romana, which borders San Pedro de Macorís and is home to the country's largest sugar mill, had the second highest rate of player production in 1977 and is third for the period 1977 to 2010. Two other neighboring provinces, Hato Mayor (sixth from 1977-2010) and El Seibo (eighth) are also among the top producers of talent per capita. Santo Domingo—including the Distrito Nacional, which split off in 2001—produced the largest share of players (30 percent) but ranks ninth in per capita terms. The only province that clearly departs from the pattern of baseball in sugar-producing areas and the capital is, once again, Monte Cristi (third in 1977, fourth since) on the northern coast bordering Haiti.[6] Monte Cristi's success in producing professional ballplayers is not problematic for our identification strategy, however, as treatment is based on a measure of local baseball culture prior to MLB's entry, not sugar production; we discuss sugar only to explain the general spatial pattern of baseball culture.

[6]Santiago, the second largest city, is in the north and is tied for fourth for total number of professional players but ranks 18th per capita.

2.4 Baseball training and MLB recruiting

Dominican boys learn and play baseball informally from an early age.[7] Around age thirteen or fourteen, though sometimes younger, the most talented players are identified by and contract with *buscones*, or independent trainers, who provide daily instruction in baseball skills.[8] Players can first legally sign a professional contract with a ball club at sixteen and a half years old, but *buscones* tend to continue developing players until they are signed, sometimes at ages seventeen or eighteen. Players then reside and train daily at their respective MLB team's Dominican academy for up to three years.[9] Successful recruits move on to minor leagues in the United States.

Most training is unregulated, so it is difficult to know precisely the size of the market. Estimates of those training full time for professional baseball vary widely, from more than 21,000 (Dominican Republic Ministry of Education, 2018) to 100,000 (Finkel et al., 2012), or about 3 to 15 percent of boys ages 12 to 18. The Dominican Ministry of Education, which provides the low-end estimate of full-time trainees, estimates that there are 1,400 independent training academies in operation. According to ENTRENA et al. (2022), 97 percent of prospects never sign a contract with an MLB team.

3 Census and baseball data

We use data from Dominican national censuses for 1981 (8.5% sample), 2002 (10%), and 2010 (10%) made available by IPUMS International (Minnesota Population Center, 2020). The data include demographic information (i.e., birth year, sex, province of birth, and province of residence) as well as educational outcomes (i.e., attendance and years of schooling). The 1981 census was conducted just after MLB's entry, when MLB's presence

[7] This subsection is based on Klein (2014).

[8] B*Buscones* also provide food and housing, secure tryouts, and assist in negotiations with professional clubs. In return, buscones receive a percentage of their pupils' signing bonuses.

[9] Players also receive language and cultural instruction and play in the Dominican Summer League, a branch of affiliated Minor League Baseball.

was still limited and only a couple teams had training facilities in the Dominican Republic; the 2002 and 2010 censuses were conducted when MLB's activities were extensive. The 2010 census includes both individuals who were teenagers before and individuals who were teenagers after MLB's entry.

Data on the birthplaces of Dominicans who played in the MLB or MiLB by 2010 come from The Baseball Cube, an online aggregator of baseball-related data. The website includes information on all major leaguers since 1871 and all minor leaguers in affiliated leagues since 1977. Few Dominicans played professionally in the United States prior to 1977, so the data include the vast majority of Dominican professional ballplayers.

The level of analysis is the province, of which there are 31 plus the national district. A lower level of analysis is not possible given significant changes over time in municipal borders and imprecise reporting of births in the baseball data. We combine the *Distrito Nacional* with the province of Santo Domingo, which split in 2001, since both jurisdictions may be referred to as Santo Domingo in players' reported births, giving us 31 units of analysis. Four provinces have been founded since 1982; where possible, including in our main analysis using only the 2010 census, we use modern administrative divisions.

4 MLB's entry and educational outcomes

4.1 Educational outcomes across birth cohorts in the 2010 census

The first test of whether teenage boys' educational outcomes respond to MLB's entry into the Dominican Republic uses only the 2010 census and is based on the following regression:

$$Education_{pt} = \sum_{t \neq 1959-62} \gamma_t Pre\text{-}MLB_p \cdot \delta_t + \theta_p + \delta_t + \varepsilon_{pt} \quad (1)$$

where $Education_{pt}$ is an educational outcome (i.e., years of schooling or completion (0/1)) for boys born in province p in year t. θ_p are province fixed effects to control for any time-invariant

factors at the province level that are correlated with education, and δ_t are birth year fixed effects to control for any factors that are common across all provinces but change over time and are correlated with education. To ensure sufficiently large cohort sizes, four years of births are grouped together. The reference cohort consists of males born between 1959 and 1962, since boys born immediately thereafter were the first to be of primary school (grades 1-8) age with MLB academies in operation. Men born before 1951 are excluded because there are too few observations per birth cohort, as are men born after 1990 to keep groups of four years and because many are too young to be expected to finish secondary school. Girls are excluded because they are not recruited for professional baseball.

The variable of interest is *Pre-MLBp*, which is the total number of active players in the MLB or MiLB in 1977 who were born in province p divided by the population of p in 1981.[10] The variable is intended to measure local baseball cultures as they existed just prior to MLB's entry. The year 1977 is chosen for this variable in part because it is the first year for which MiLB data are available from The Baseball Cube. But 1977 is also the year that the first MLB academy opened in the Dominican Republic, such that the distribution of ballplayers across provinces is unrelated to location-specific MLB investment. Our measure of exposure to the shock should not be affected by endogenous responses to MLB recruitment. The variable is interacted with birth year fixed effects since it does not change over time, revealing how educational outcomes change in more exposed communities over time.

In any case, the distribution of birthplaces of Dominicans in American professional baseball has remained stable since MLB's entry into the Dominican Republic, as seen in Figure 5. The provinces from which players tended to come before MLB's entry are the provinces from which players came after MLB's entry: the Pearson correlation coefficient for the per capita number of active players in 1977 and the per capita number of player debuting from 1977 to 2010 is 0.84. Even when San Pedro de Macorís is excluded, the coefficient is

[10] As previously noted, several provinces were formed between 1982 and 2001 by splitting off of other provinces, but we use modern provincial definitions. To estimate population in 1981 for provinces which did not yet exist, we reassign some of a "mother" province's 1981 population to the new province, with the share based on the relative populations of the "mother" and new provinces in 2002.

0.67. The only visible exception is Peravia, which in 1977 had produced the sixth highest number of professionals per capita but which has emerged has the second top producer since then. When Peravia is excluded, the correlation coefficient is 0.94.

The first difference in this difference-in-differences design is based on time or, more precisely, birth year: earlier cohorts did not encounter MLB investment and recruiting, whereas later cohorts were exposed. Although some Dominicans did play professionally in North America prior to MLB's entry, the numbers were small. There were 90 Dominicans active in American professional baseball in 1977, compared to 1,078 in 2009.[11] Initially, MLB teams skimmed only those payers who were impossible to ignore and did not engage in player development (Klein, 2014). It is safe to assume that young Dominicans were not thinking about baseball as a career path until American scouts regularly showed up.

The second difference is based on exposure to MLB's entry across space. The production of baseball talent is not uniform across Dominican provinces. We assume that the areas that are most affected by MLB's entry are those with a strong preexisting baseball culture. Although we do not observe MLB investment directly, we know that the hotbeds of talent in 1977 have continued to be so during the build up of MLB activities in the decades thereafter. We are agnostic about the mechanisms—e.g., better competition, better training, more role models, access to scouts, etc.—through which a local community influences baseball outcomes and, instead, simply assume that a boy born in a community with a strong baseball culture sees greater opportunities to reach American professional baseball than does one in a community with a comparatively weak baseball culture. A boy growing up in San Pedro de Macorís—"That town with all the shortstops" (Kurlansky, 2010, p. 97)—must see baseball more optimistically than a boy in Baoruco, Independencia, or Pedernales—provinces which have produced no major leaguers.[12]

By taking the difference in differences, we test whether educational outcomes change

[11] We use 2009, instead of 2010, here and in the appendix because we want to exclude players in the Dominican Summer League, who are included in The Baseball Cube data from 2010 forward.

[12] Shortstop is one of the most important of the nine defensive positions in baseball.

differentially in communities more exposed to MLB's entry than in communities less affected. More precisely, we want to know whether educational outcomes in provinces more exposed to the shock worsen relative to less exposed provinces after MLB enters the Dominican Republic, as would be expected if the negative accounts of professional baseball's effect on education are true. In other words, educational outcomes would become relatively worse in provinces which produce more ballplayers per capita. The exact timing of the decline is somewhat fuzzy because MLB's entry was not sharp, but, based on Figure 3, the effect should emerge around the time that MLB gains a foothold in the Dominican Republic with the establishment of the first academy in 1977 and increases in magnitude thereafter as investment ramps up. The identifying assumption is parallel trends, or that educational outcomes in more exposed communities would change by the same amount as in less exposed communities if MLB had not come to the country. Although the assumption cannot be tested, flexible estimation reveals whether educational outcomes were changing differentially with respect to local baseball cultures prior to MLB's entry, which can inform the assumption.

Figure 6 displays the results for Equation 1. Only one estimate for the pre-treatment periods is marginally statistically different from zero in one year: the period 1955 to 1958 for with primary school (grades 1-8) completion as the dependent variable at the 10% level . F-tests for joint significance of pre-1959 coefficients produce p-values of 0.19, 0.53, and 0.20, respectively, for the three outcomes, such that the null hypothesis of no significant pre-trends cannot be rejected at conventional levels. The absence of significant pre-trends gives reason to believe that the parallel trends assumption holds after 1965.

There is no clear jump or downward trend after the reference cohort, 1959-62, or at any point thereafter, for any of the three outcomes. To summarize the effect of MLB on boys' education, taking a linear combination of the coefficient estimates for post-treatment period suggests that a one standard deviation increase in pre-MLB baseball culture results in a decrease of 0.01 percentage points [95% CI: -1.0, 1.0] in the probability of completing high school and 0.04 fewer years of schooling [95% CI: -0.14, 0.13]. The estimated effect

on completing primary school is slightly positive (0.6 percentage points [95% CI: -0.6, 1.8]). All coefficient estimates are small and none are statistically distinguishable from zero. Coefficients are not even consistently negative. Primary school completion is the most appropriate outcome to measure since students begin training around age 12, and we can rule out effects larger than a decrease of 0.06 percentage points in the probability of completing primary school based on the 95% confidence interval. The results are robust to using the number of baseball players from 1977 to 2010 per capita as an alternative measure of exposure (see Appendix Figure A1). If professional baseball had a large negative effect on education, boys in communities more exposed to the shock would have relatively worse educational outcomes after MLB's entry; they do not, suggesting no such effect.

The coefficient estimates are difficult to interpret because the number of boys pursuing careers in baseball is imprecise and, at the provincial level, unknown. Nonetheless, a back-of-the-envelope calculation can improve understanding. The low-end estimate of athletes pursuing professional baseball is 21,000, which translates to 2.7 percent of all teenage boys. From 1978 to 2009, 15 percent of Dominicans in American baseball came from San Pedro de Macorís, while the province constituted 3.2 percent of the national population—that is, San Pedro produced nearly five times more ballplayers than would be expected given its population. A fair assumption is that San Pedro also produced 15 percent of boys training for professional baseball, which implies that about 13 percent of boys in San Pedro train for baseball. With an average effect of 0.12 fewer years of schooling for all boys in San Pedro relative to the least exposed communities, a boy in San Pedro pursuing professional baseball would end up with less than one fewer year of schooling on average. This estimate should be interpreted as an upper-bound, with the evidence suggesting no significant difference.

It is important to consider statistical power in the context of a null result, as the true effect may be too small to be reliably detected by the model. But power is difficult to estimate for complex econometric models, such as Equation 1 where treatment is continuous and occurs repeatedly over many years. To rule out that the null result reflects a lack of statistical

power, we follow Black et al. (2022) in running simulated power analyses. Specifically, we run simulations using the same number of provinces and years of data but only include females, who are assumed to be untreated. In each simulation, we randomly re-assign $Pre\text{-}MLB_p$ to provinces, ensuring that the variation in treatment does not differ from the actual data, which could lead to overestimation of power. We then impose treatment effects of varying sizes based on the randomly assigned treatment and calculate the percentage of simulations that detect a negative effect at the 5% and 10% levels. Based on these results, we report the minimum detectable effect (MDE), or the smallest effect size that is rejected in 80% and 50% of simulations, respectively.[13]

For our main outcome variable, primary school completion, we can detect effects of 2.0 and 2.2 percentage points per standard deviation increase in exposure to MLB at the 5 and 10% levels, respectively, with 80% power and effects of 1.4 and 1.2 percentage points with 50% power (see Figure A3). Put another way, going from the least to the most exposed communities—from a community with no active professional players in 1977 to San Pedro de Macorís—we can detect effects of 11.5 and 10.5 percentage points per standard deviation increase in exposure to MLB at the 5 and 10% levels, respectively, with 80% power and effects of 7.5 and 6.5 percentage points with 50% power (see Figure A4). The lower bound of the 95 percent confidence interval of the estimated effect using real data (-0.6%) is well below these thresholds. Moreover, under the most conservative estimate of the number of boys training for professional baseball—(more than) 21,000 between the ages of 12 and 19, or roughly 2.7% of that age range—about 13% of boys in San Pedro de Macorís train for baseball, compared to less than 1% in the least affected communities. The model is sufficiently powered to rule out such effects under the assumption that all those boys would otherwise be enrolled in school and reasonably well powered to rule out that only half of them would otherwise be in school—once again, under the most conservative assumptions. Following Denes et al. (2021), we also validate our model by confirming that the average estimated effect in the simulations

[13]For example, Shapiro et al. (2021) assess statistical power at the 50% threshold.

is approximately equal to the imposed effect (see Figure A5).

4.2 School attendance across censuses, 1981-2010

The second test of whether teenage boys' educational outcomes respond to MLB's entry uses the 1981, 2002, and 2010 censuses and is based on the following regression:

$$Attendance_{apt} = \sum_{t>1981} \gamma_t Pre\text{-}MLB_p \cdot \delta_t + \theta_p + \mu_a \cdot \delta_t + \varepsilon_{apt} \tag{2}$$

where $Attendance_{apt}$ is average school attendance for age a in province p in census year t. In this model, δ_t are census year fixed effects to control for any factors that are common across all provinces but change over time and are correlated with education. Age-specific census year fixed effects control for age-specific changes in attendance common across the country over time. The reference year is 1981. Although 1981 falls after the first MLB academy opened in 1977, only two teams had academies then, and the academies were small compared to their modern form. The first fully modern academy opened in 1986, and MLB saw its role in the Dominican Republic as haphazardly skimming talent until the 1990s (Klein, 2014). If MLB has an effect on attendance, the effect should grow after 1981.

The results of Equation 2 are shown in Table 1. Only boys ages 13 to 16 are included, since these are prime ages of recruitment and training for baseball prospects. Relative to 1981, a one standard deviation increase in the MLB exposure variable causes no decrease in school attendance in 2002; in 2010, a one standard deviation increase in the MLB exposure variable causes a decrease of 0.2 percentage points in the probability of attending school, but the difference is not statistically significant (see Column 1). Consistent with Section 4.1, the evidence does not suggest that MLB is negatively affecting Dominican boys' education: there is no change in school attendance in provinces where ballplayers tend to come from relative to other provinces after MLB ramped up investment in the Dominican Republic.

4.3 Comparing boys to girls

A third of test of whether teenage boys' educational outcomes respond to MLB's entry compares boys to girls in a triple differences model. Equation 1 is adjusted as follows:

$$Education_{pt} = \sum_{t \neq 1959-62} \gamma_t Pre - MLB_p \cdot Male_i \cdot \delta_t + \theta_p \cdot \delta_t + \theta_p \cdot Male_i + \delta_t \cdot Male_i + \varepsilon_{pt} \quad (3)$$

and Equation 2 can be adjusted as follows:

$$Attendance_{apt} = \sum_{t>1981} \gamma_t Pre - MLB_p \cdot Male_i \cdot \delta_t + \theta_p \cdot \mu_a \cdot \delta_t + \theta_p \cdot Male_i + \mu_a \cdot \delta_t \cdot Male_i + \varepsilon_{apt} \quad (4)$$

where $Male_i$ is an indicator variable that takes the value of 1 for boys and 0 for girls. Birth year-specific province fixed effects allow educational outcomes to evolve commonly across genders over time within a province.

Equations 3 and 4 are within-province models, testing whether boys' educational outcomes change—or, in this case, worsen—relative to girls over time in communities more exposed to MLB's entry. If MLB negatively affects boys' educational outcomes, we should expect to see that boys' outcomes worsen relative to girls after MLB's entry in provinces more exposed to the shock. This approach has the advantage that it allows outcomes across provinces to vary over time. The identifying assumption is that boys' educational outcomes would change at the same rates as girls' within provinces in the absence of the MLB's entry conditional on sex-specific birth year fixed effects. That is, the model controls for general changes in sex-specific outcomes over time under the assumption that the relative changes in sex-specific outcomes are common across provinces.

The results for Equation 3 are shown in Figure 7. Only one pre-1959 coefficient estimate is statistically significant across the three outcomes, for primary school completion, but in general the graphs indicate that there are no differential pretrends. The coefficient estimates after the reference period are generally positive and, in the case of primary school completion

as the dependent variable, significantly different from zero. However, the reference year is essentially arbitrary and takes an anomalously low value—that is, both the pre- and post-treatment coefficients are positive. The pattern is clear across all three graphs that there is no major change over time and, certainly, no significant decline at any time that would suggest that professional baseball has a negative effect on education. The results are robust to using the number of baseball players from 1978 to 2009 per capita as an alternative measure of exposure (see Appendix Figure A2).

The results for Equation 4 are shown in Table 1, Column 2. Relative to 1981, the effect of MLB exposure for males in 2002 and 2010 is statistically indistinguishable from zero. That is, there is no evidence that the school attendance of males in baseball communities worsened relative to their female counterparts as MLB ramped up investment in the Dominican Republic. The magnitudes of the coefficients are tiny; the larger point estimate, for 2010, indicates that a one standard deviation increase in pre-MLB baseball culture decreases the probability of school attendance by 0.5 percentage points for boys ages 13 to 16. Once again, the evidence does not suggest that MLB is negatively affecting Dominican boys' education, and certainly not on the scale suggested by popular media.

4.4 Robustness check: 2006 expansion of US visas

Chon (2020) also finds no effect of MLB recruitment on Dominican boys' educational outcomes but exploits an expansion of visas to the US in 2006 to identify the change in school attendance between the 2002 and 2010 censuses. A null result from that identification strategy may not be informative because there is not a clear change after 2006 in the trend of the number of Dominicans playing American professional baseball, as seen in Figure 1.3 of that study (reproduced here as Figure A6). It is not obvious that the increase in the number of visas would change boys' perceived returns to education.

However, according to Klein (2014), the supply of H2B visas was limited before 2006 such that baseball teams had to be selective in sending minor leaguers to the United States,

resulting in a backlog of players left in the Dominican academies. The Compete Act of 2006 expanded the supply of H2B visas for minor league baseball players, among other workers, and relieved the backlog. It is possible that this change affected boy' perceived returns to education, knowing that the chances of playing ball in the United States had improved.

As a robustness check, we follow Chon (2020) in testing whether educational outcomes changed between 2002 and 2010 in response to the 2006 US visa expansion. The difference between our work and the previous study is that Chon defines treatment as binary and only includes municipalities close to MLB academies in the treatment group. This classification is problematic because there are some areas, such as Peravia and Monte Cristi, that produce professional ballplayers at a high rate but fall in the control group. In this analysis, since the policy change occurs in 2006, we tweak the exposure variable to include all ballplayers who debut in American professional baseball between 1978 and 2006 and divide it by the population of the province in 2002.

Table 2 displays results for regressions reevaluating the effect of the 2006 US visa expansion on boys' education. Columns 1 and 2, respectively, are based on Equations 2 and 4 of this study but use only the 2002 and 2010 censuses. There is no statistically significant or otherwise meaningful difference in 2010 for areas more exposed to the shock or for boys relative to girls in those areas. Columns 3 and 4 repeat that analysis but with years of schooling as the dependent variable, as in Chon (2020), and there is no effect.

Columns 5 through 6 most closely approximate the analysis in Chon (2020): instead of comparing boys to girls, as we do elsewhere in this study, here we compare boys age 14 to 17 (treated) to boys age 18 to 21 (control). When the US visa expansion took effect in 2007, boys aged 11 to 14 were young enough to respond to the policy change and prepare for MLB academy tryouts, whereas boys slightly older already would have needed to have prepared for years. Boys aged 11 to 14 would be 14 to 17 years old in 2010. Therefore, if the visa expansion worsened educational outcomes, boys age 14 to 17 in the census should fare relatively worse than boys 18 to 21 in municipalities with stronger preexisting baseball cultures after the

policy change. In reality, there is no evidence from the triple differences model to suggest that their outcomes worsened, as the differences are all small and statistically insignificant.

5 Discussion and Conclusion

This paper studies changes in educational outcomes across provinces before and after MLB's entry into the Dominican Republic and finds no evidence that professional baseball worsens outcomes. The result is surprising in light of abundant statements made in the popular press and legal journals attributing poor educational outcomes to recruitment for professional baseball. It is also not difficult to imagine that young boys in a developing country would take their chances at making millions of dollars, especially when seeing so many of their countrymen playing professionally on television. Yet, the educational outcomes of boys in communities more exposed to MLB's entry do not worsen relative to boys in less affected communities in response to MLB recruiting, and boys' outcomes likewise do not worsen compared to girls in those communities. Poor educational outcomes for boys in the Dominican Republic are not the result of MLB recruiting.

As critics allege, young boys overestimate their chances of success in baseball—in a recent survey, 34% of prospects guessed that more than 20% of their peers will sign a professional contract, whereas industry experts put the actual number at 3 to 5% (ENTRENA et al., 2022)—but these misguided beliefs alone are not driving students to drop out of school. One reason may be that dropping out of school may not be as common among baseball prospects as previously thought: 96% of those surveyed still attended school, although mostly in non-traditional settings, and just 7% did not expect to attend school the following year. However, high attendance may be the result of recent efforts by MLB and partners to emphasize education, such that earlier cohorts possibly dropped out at higher rates. Still, only one quarter of respondents practiced baseball more than 20 hours per week, leaving ample time for education, and nearly three quarters expected to resume studies full-time if

not signed to a professional baseball contract.

A simple explanation for the null result is that poor educational outcomes are a reflection of an underperforming educational system rather than of baseball. Educational outcomes in the Dominican Republic over the period studied are generally poor, not only for baseball players. As Klein (2014) notes, low education levels among ballplayers does not mean that they are less educated than the population at large. Of the 30 boys that Klein (1991) followed in 1987-89, six (or 20%) had a high school diploma, which is not far, particularly for a small sample, from the national average of about 27% according to IPUMS census data. More recently, Klein (2014) also claims that the MLB Commissioner's Dominican Office informed him that ballplayers slightly exceeded the national average for high school completion.[14] In general, Dominicans undervalue education, as the perceived returns to secondary education are extremely low despite measured returns (Jensen, 2010), and baseball prospects perceive a career path through education as complex and uncertain for them (ENTRENA et al., 2022).

Studying baseball and education in the Dominican Republic contributes to our understanding of the relationship between education and outside employment opportunities. Baseball, unlike careers studied in previous works, is defined by high risk and high reward, much like other careers in sports and entertainment. The Dominican Republic is an ideal location for studying the effect of such careers on education because of baseball's prevalence and the relative lack of other very lucrative career options. The absence of evidence that boys' educational outcomes respond to MLB recruiting suggests that careers defined by high risk and high reward are unlikely to shape educational decisions, even in poor and marginalized communities.

[14]Notably, although many prospects come from low-income backgrounds, 84.3% of the survey ed prospects have access to water within their home, which suggests that the prospects do not belong to the lowest income levels of the country compared to the rest of the population. Klein (1991, p. 69) reports that a "fair number" of rookies are the middle-class sons of journalists, clerks, and teachers.

References

Adukia, A., Asher, S., & Novosad, P. (2020). Educational investment responses to economic opportunity: Evidence from Indian road construction. *American Economic Journal: Applied Economics*, *12*(1), 348-376.

Atkin, D. (2016). Endogenous skill acquisition and export manufacturing in Mexico. *American Economic Review*, *106*(8), 2046-2085.

Ayala, C. J. (1999). *American sugar kingdom: The plantation economy of the Spanish Caribbean, 1898-1934*. University of North Carolina Press.

Bailey, J. S., & Shepherd, G. B. (2011). Baseball's accidental racism: The draft, African-American players, and the law. *Connecticut Law Review*, *44*(1), 197-258.

Baseball Almanac. (2022). *MLB players by birthplace during the 2022 season.* Retrieved from https://www.baseball-almanac.com/players/birthplace.php?y=2022

Beamon, K., & Bell, P. A. (2006). Academics versus athletics: An examination of the effects of background and socialization on African American male student athletes. *Social Science Journal*, *43*(3), 393-403.

Beckert, J., & Lutter, M. (2012). Why the poor play the lottery: Sociological approaches to explaining class-based lottery play. *Sociology*, *47*, 1152-1170.

Black, B., Hollingsworth, A., Nunes, L., & Simon, K. (2022). Simulated power analyses for observational studies: An application to the Affordable Care Act Medicaid expansion. *Journal of Public Economics*, *213*.

Black, D. A., McKinnish, T. G., & Sanders, S. G. (2005). Tight labor markets and the demand for education: Evidence from the coal boom and bust. *Industrial and Labor Relations Review*, *59*(1), 3-16.

Cary, P. (2007). Where ballplayers are born and made. *US News and World Report*, *142*(11), 44-45.

Cascio, E. U., & Narayan, A. (2022). Who needs a fracking education? The educational response to low-skill-biased technological change. *Industrial and Labor Relations Review*, *75*(1), 56-89.

Chon, E. R. (2020). *Essays on labor and development economics.* [Doctoral thesis, University of Washington]. Retrieved from https://digital.lib.washington.edu/researchworks/handle/1773/46777

Clotfelter, C. T., & Cook, P. J. (1990). On the economics of state lotteries. *Journal of Economic Perspectives*, *4*, 105-119.

Council on Hemispheric Affairs. (2010, April 20). *Realities behind America's favorite pastime: The Dominican Republic's cheap labor bazaar for the major leagues.* Retrieved from https://www.coha.org/realities-behind-america%e2%80%99s-favorite-pastime-the-dominican-republic%e2%80%99s-cheap-labor-bazaar-for-the-major-leagues/

Denes, M. R., Howell, S. T., Mezzanotti, F., Wang, X., & Xu, T. (2021). *Investor Tax Credits and Entrepreneurship: Evidence from US States.* (NBER Working Paper 27751). National Bureau of Economic Research. Cambridge, MA: National Bureau of Economic Research. Retrieved from http://www.nber.org/papers/w27751

Dohmen, T., Falk, A., Golsteyn, B. H. H., Huffman, D., & Sunde, U. (2011). Risk attitudes across the life course. *Economic Journal*, *127*(605), F95-F116.

Dominican Republic Ministry of Education. (2018). *Propuesta para la solución de la deserción escolar de los prospectos de béisbol en la República Dominicana.*

Donkers, B., Melenberg, B., & Van Soest, A. (2001). Estimating risk attitudes using lotteries: A large sample approach. *Journal of Risk and Uncertainty*, *22*, 165-195.

Edwards, H. (2000). Crisis of black athletes on the eve of the 21st century. *Society*, *37*(3), 9-13.

Eide, E. R., & Ronan, N. (2001). Is participation in high school athletics an investment or a consumption good? Evidence from high school and beyond. *Economics of Education Review*, *20*(5), 431-442.

ENTRENA, Grupo Línea Base, & DevTech Systems, Inc. (2022). *Educational opportunities for baseball prospects in the Dominican Republic.* United States Agency for International Development.

Finkel, R., Martin, T., & Paley, J. (Directors). (2012). *Ballplayer: Pelotero.* Strand Releasing.

Florida, R. (2019, October 22). The World Series isn't global, but baseball players are. *Bloomberg*. Retrieved from https://www.bloomberg.com/news/articles/2019-10-22/the-cities-that-produce-the-most-mlb-players

Fédération Internationale de Football Association. (2019). *FIFA Professional Football Report 2019.* Zurich: Fédération Internationale de Football Association. Retrieved from https://digitalhub.fifa.com/m/a59132e138824c1c/original/jlr5corccbsef4n4brde.pdf

Gates, H. L., Jr. (1991, August 19). Delusions of grandeur. *New York Times*. Retrieved from https://vault.si.com/vault/1991/08/19/delusions-of-grandeur-young-blacks-must-be-taught-that-sports

Gentile, P. C. (2022). MLB's neocolonial practices in the Dominican Republic academy system. *Journal of Sport and Social Issues*, *46*(3), 269-292.

Hale, G., & Xu, M. (2016). *FDI effects on the labor market of host countries.* (Working Paper 2016-25). Federal Reserve Bank of San Francisco. Retrieved from https://www.frbsf.org/wp-content/uploads/sites/4/wp2016-25.pdf

Hanlon, R. S. (2013). School's out forever: The applicability of international human rights law to Major League Baseball academies in the Dominican Republic. *Global Business and Development Law Journal*, *26*(1), 235-258.

Harris, P. C. (2014). The sports participation effect on educational attainment of black males. *Education and Urban Society*, *45*(5), 507-521.

Heath, R., & Mobarak, A. M. (2015). Manufacturing growth and the lives of Bangladeshi women. *Journal of Development Economics*, *115*, 1-15.

Jensen, R. (2010). The (perceived) returns to education and the demand for schooling. *Quarterly Journal of Economics*, *125*(2), 515-548.

Kalthoff, M. (2013). Out of sight, out of mind: Confronting the legal, economic and social issues raised by Major League Baseball's peculiar treatment of foreign talent. *Connecticut Journal of International Law*, *29*(2), 353-386.

Klein, A. (1991). *Sugarball: The American game, the Dominican dream.* Yale University Press.

Klein, A. (2014). *Dominican baseball: New pride, old prejudice.* Temple University Press.

Knight, M. (1928). *The Americans in Santo Domingo.* New York: Vanguard Press.

Kurlansky, M. (2010). *The eastern stars: How baseball changed the Dominican town of San Pedro de Macorís.* New York: Riverhead Books.

Langdon, S. (2022, August 19). *Gen Z and the rise of the influencer culture.* Higher Visibility. Retrieved from https://www.highervisibility.com/ppc/learn/gen-z-and-the-rise-of-influencer-culture/

Lisman, M. C. (2019, March 25). *Walk-off or trade-off? Baseball and education in the Dominican Republic.* The Inter-American Dialogue. Retrieved from https://www.thedialogue.org/blogs/2019/03/baseball-education-dominican-republic/

Meyer, C. A., & Kuhn, S. (2008). *Effects of Major League Baseball on Economic Development in the Dominican Republic. (Department of Economics Working Paper No. 18-03). Fairfax, VA: George Mason University*. Retrieved from https://dx.doi.org/10.2139/ssrn.3148304

Minnesota Population Center. (2020). *Integrated Public Use Microdata Series, International* (Version 7.3) [dataset]. Minneapolis, MN: IPUMS. Retrieved from https://doi.org/10.18128/D020.V7.3

Nieves Murphy, C. (2023). Striking out: How the MLB's baseball academies interfere with children's human rights in the Dominican Republic. *Human Rights Brief*, *26*(2), 77-80.

Oster, E., & Steinberg, B. M. (2013). Do it service centers promote school enrollment? Evidence from India. *Journal of Development Economics*, *104*, 123-135.

Ottenson, E. B. (2014). The social cost of baseball: Addressing the effects of Major League Baseball recruitment in Latin America and the Caribbean. *Washington University Global Studies Law Review*, *13*(4), 767-800.

Page-Kirby, K. (2012, July 12). Major league conflict: 'Ballplayer: Pelotero' slams MLB over its scouting tactics in the Dominican Republic. *Washington Post*. Retrieved from https://www.washingtonpost.com/express/wp/2012/07/12/major-league-conflict/

Pfeifer, C., & Cornelißen, T. (2010). The impact of participation in sports on educational attainment—new evidence from Germany. *Economics of Education Review*, *29*(1), 94-103.

Ransom, M. R., & Ransom, T. (2018). Do high school sports build or reveal character? bounding causal estimates of sports participation. *Economics of Education Review*, *64*, 75-89.

Rees, D. I., & Sabia, J. J. (2010). Sports participation and academic performance: Evidence from the National Longitudinal Study of Adolescent Health. *Economics of Education Review*, *29*(5), 751-759.

Ruck, R. (1998). *The tropic of baseball: Baseball in the Dominican Republic*. University of Nebraska Press.

Shah, M., & Steinberg, B. M. (2017). Drought of opportunities: Contemporaneous and long-term impacts of rainfall shocks on human capital. *Journal of Political Economy*, *125*(2), 527-561.

Shah, M., & Steinberg, B. M. (2021). Workfare and human capital investment evidence from India. *Journal of Human Resources*, *56*(2), 380-405.

Shapiro, B. T., Hitsch, G. T., & Tuchman, A. E. (2021). Tv advertising effectiveness and profitability: Generalizable results from 288 brands. *Econometrica*, *89*(4).

Solomon, J. (2020, February 25). Survey: African-American youth more often play sports to chase college, pro dreams. *Aspen Institute Project Play*. Retrieved from https://www.aspenprojectplay.org/news/african-american-youth-more-often-play-sports-to-chase-college-pro-dreams

Spagnuolo, D. L. (2003). Swinging for the fence: A call for institutional reform as Dominican boys risk their futures for a chance in Major League Baseball. *University of Pennsylvania Journal of International Economic Law*, *24*(1), 263-288.

VICE Sports. (2015). *Outside the lines: Reforming baseball in the dominican republic.* Retrieved from https://video.vice.com/fr_ca/video/the-education-crisis-crippling-dominican-baseball-players/55cb70681ce00c683baee7cc

Wasch, A. (2009). Children left behind: The effect of Major League Baseball on education in the Dominican Republic. *Texas Review of Entertainment and Sports Law*, *11*(1), 99-124.

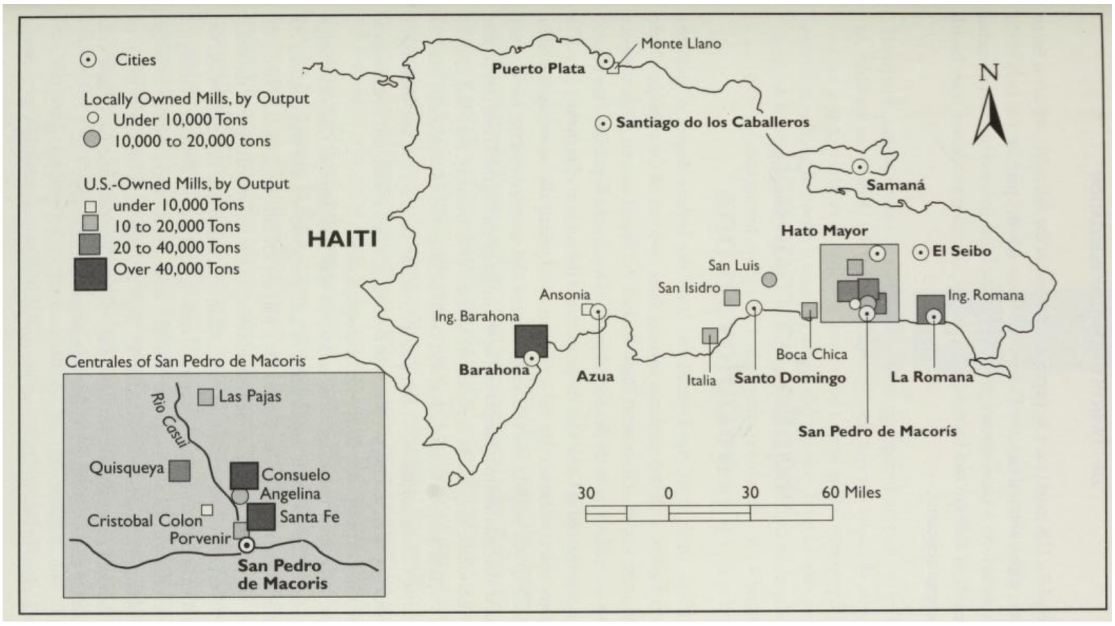
White, A. (2017). Curtailing MLB's recruiting abuses of Latin American talent. *Michigan State International Law Review*, *25*(3), 699-734.

Williamson, D. (2013). Part of the team: Building closer relationships between MLB teams and independent agents in the Dominican Republic through an MLB code of conduct. *New York University Journal of Intellectual Property and Entertainment Law*, *2*(2), 369-414.

Zirin, D. (2005, November 14). Say it ain't so, big leagues. *The Nation*. Retrieved from https://www.thenation.com/article/archive/say-it-aint-so-big-leagues/

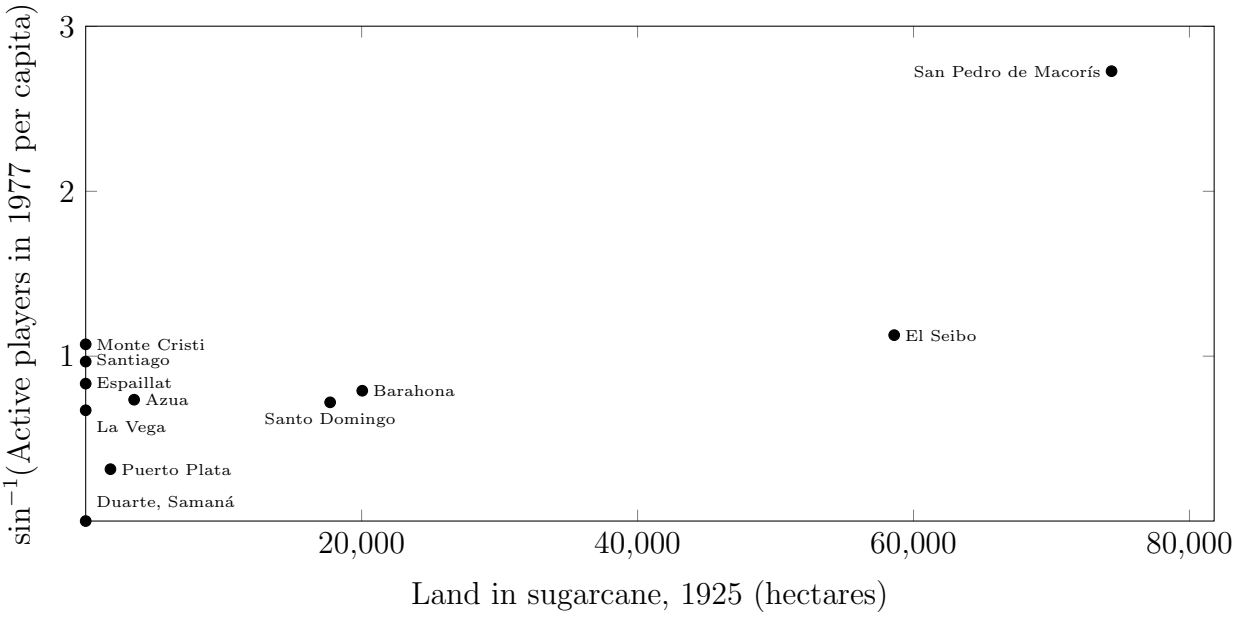
A Figures

Figure 1: Sugar mills in 1930



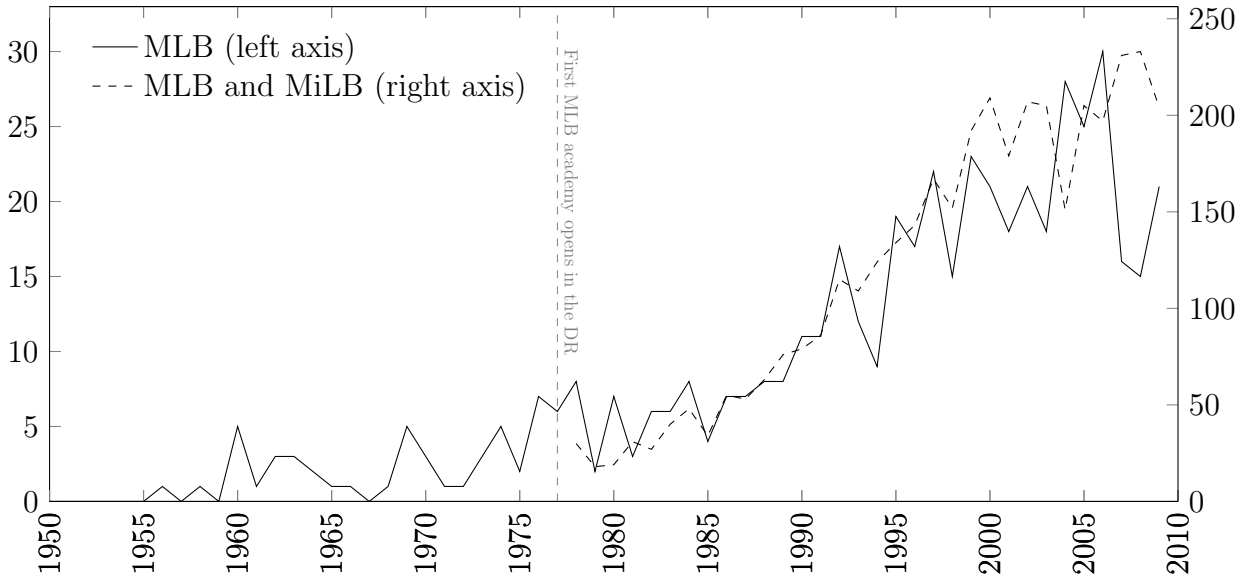
Source: Ayala (1999)

Figure 2: Historical sugar production and professional ballplayers per capita



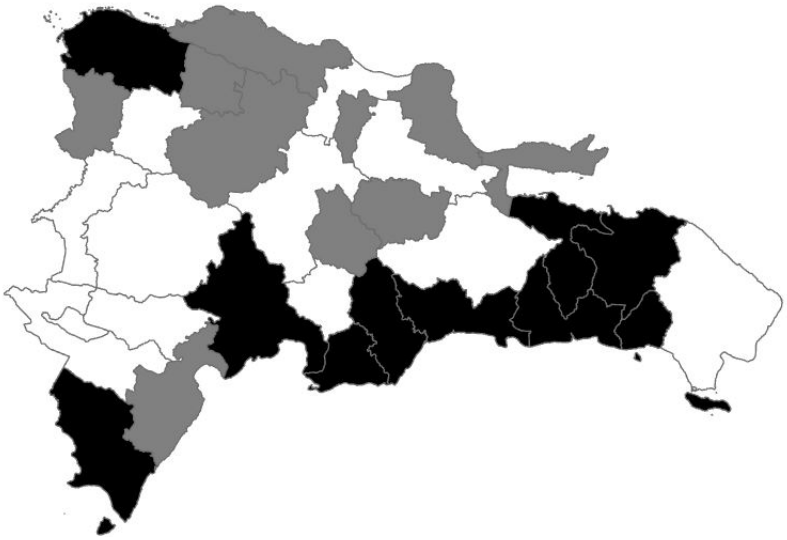
Sources: The Baseball Cube and Knight (1928)

Figure 3: Dominican players debuting in MLB and affiliated leagues, 1950-2009



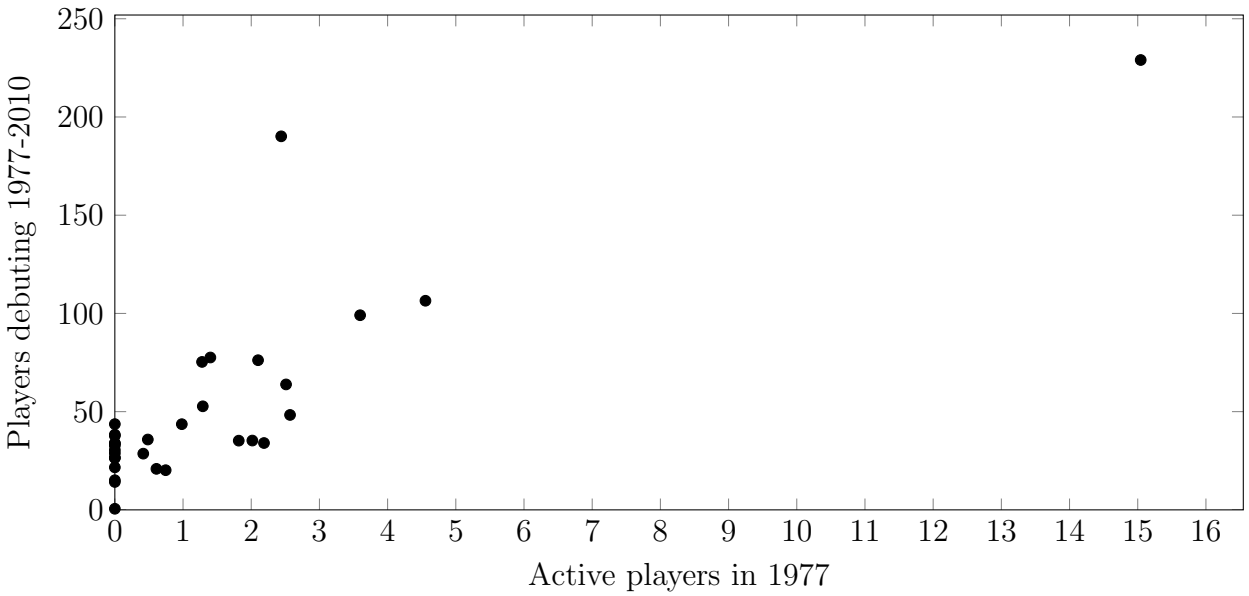
Notes: Data for the minor leagues are unavailable prior to 1978. No Dominicans played in the major leagues from 1876 to 1955. Each player is counted only once. Independent leagues are included. The Dominican Summer League is not included.
Sources: Baseball-Reference.com and The Baseball Cube

Figure 4: Per capita MLB and MiLB players, 1977-2010, by province



Note: Shading corresponds to terciles, with black representing the highest number of MLB and MiLB players born in a province per capita.
Source: Authors' calculations based on Baseball-Reference.com and The Baseball Cube

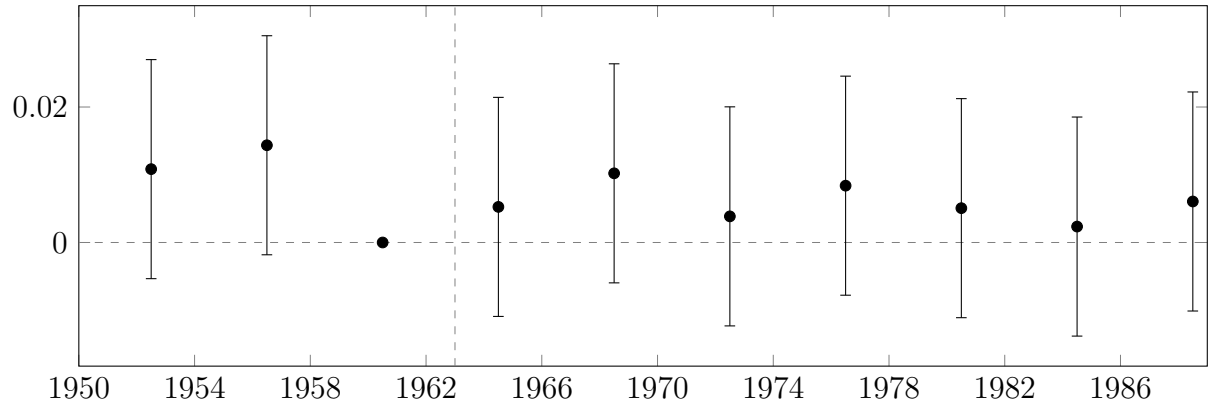
Figure 5: Dominican MLB and MiLB players per 100,000 population, by province of birth



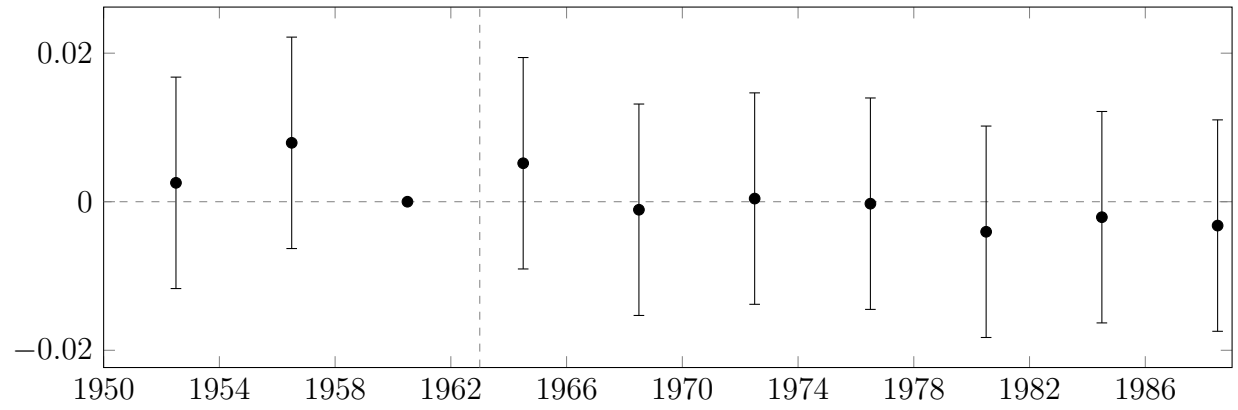
Sources: Baseball-Reference.com and The Baseball Cube

Figure 6: The effect of MLB on boys' education

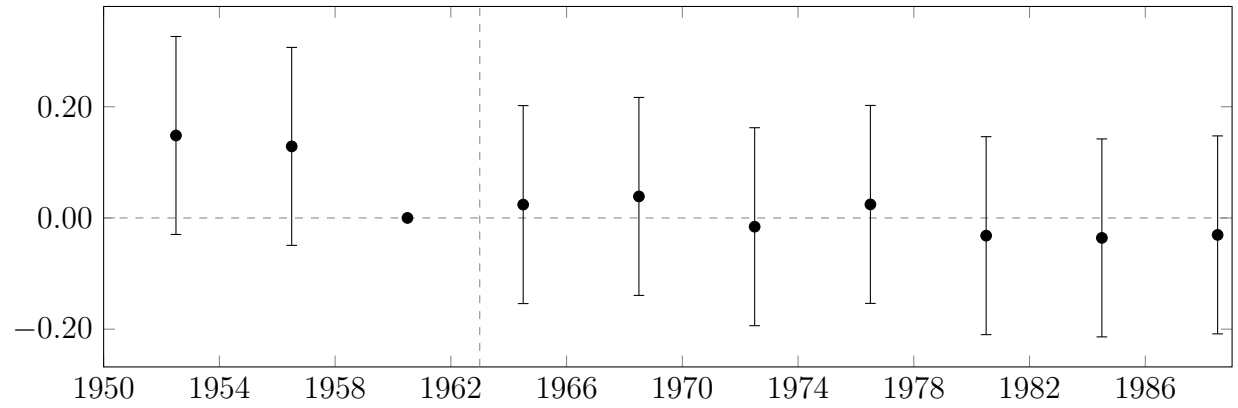
(a) Primary school completion (0/1)



(b) Secondary school completion (0/1)



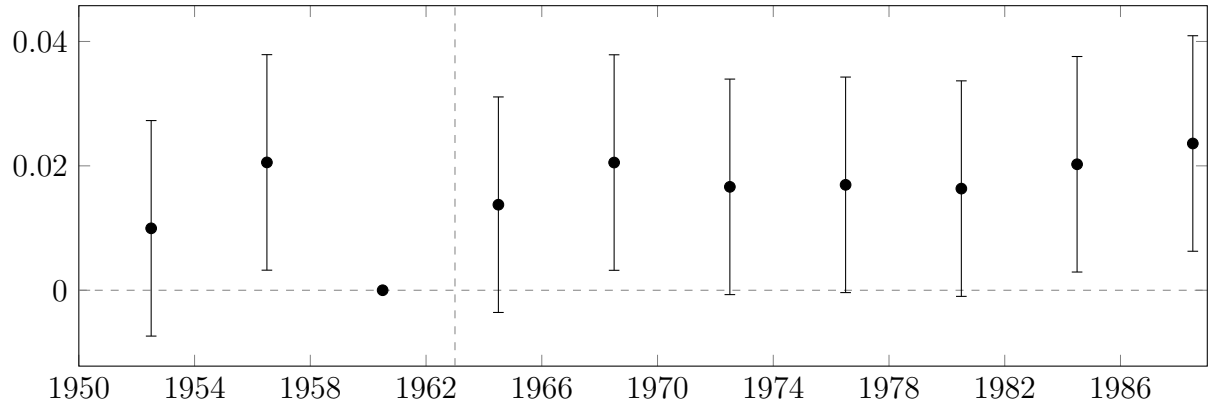
(c) Years of schooling



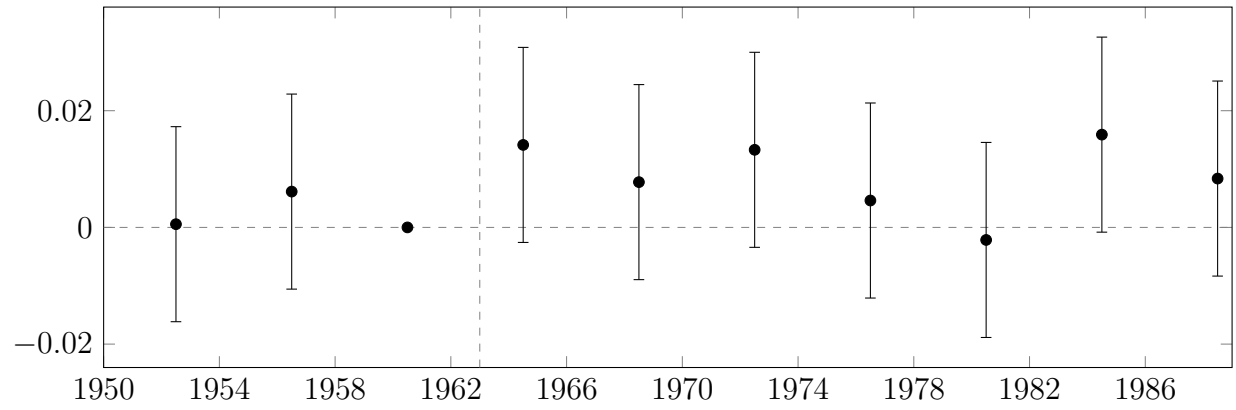
Notes: This figure is based on Equation 1. The dependent variable is shown above each panel. The x-axis depicts birth year. Coefficients correspond to the pre-MLB exposure variable interacted with birth year fixed effects. Men born from 1959 to 1962 are the reference group. Error bars are 95 percent confidence intervals.

Figure 7: Comparing boys to girls: The effect of MLB on boys' education

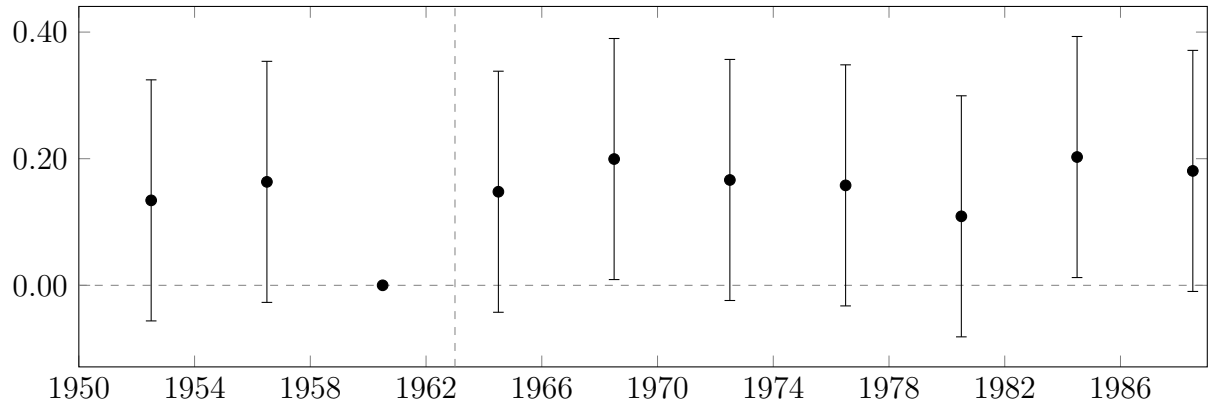
(a) Primary school completion (0/1)



(b) Secondary school completion (0/1)



(c) Years of schooling



Notes: This figure is based on Equation 3. The dependent variable is shown above each panel. The x-axis depicts birth year. Coefficients correspond to the pre-MLB exposure variable interacted with birth year fixed effects and a male indicator variable. Men born from 1959 to 1962 are the reference group. Error bars are 95 percent confidence intervals.

B Tables

Table 1: The effect of MLB on boys' school attendance, 1981-2010

Dependent variable: school attendance	(1)	(2)	(3)	(4)
$Pre\text{-}MLB_p \times \delta_{2002}$	0.002	-0.004		
$\times$_____	(0.005)	(0.009)		
$Pre\text{-}MLB_p \times \delta_{2010}$	-0.002	-0.005		
$\times$_____	(0.005)	(0.009)		
$MLB\ 1978\text{-}2009_p \times \delta_{2002}$			0.001	0.000
$\times$_____			(0.005)	(0.009)
$MLB\ 1978\text{-}2009_p \times \delta_{2010}$			-0.002	-0.001
$\times$_____			(0.005)	(0.009)
3rd interaction	None	$Male_i$	None	$Male_i$
Sexes	M	M/F	M	M/F
Observations	372	744	372	744

Notes: This table is based on Equations 2 and 4. Coefficients in the top two rows correspond to the pre-MLB exposure variable interacted with birth year fixed effects. Coefficients in the bottom two rows correspond to to players debuting 1977- 2010 divided by the provincial population interacted with birth year fixed effects. Census year 1981 is the reference group. Sample only includes ages 13 to 16. Data come from the IPUMS samples of the Dominican census. Robust standard errors are shown in parentheses. Significance levels are denoted by * p <.10, ** p <.05, *** p <.01.

Table 2: Reconsidering the effect of the 2006 US visa expansion on boys' education

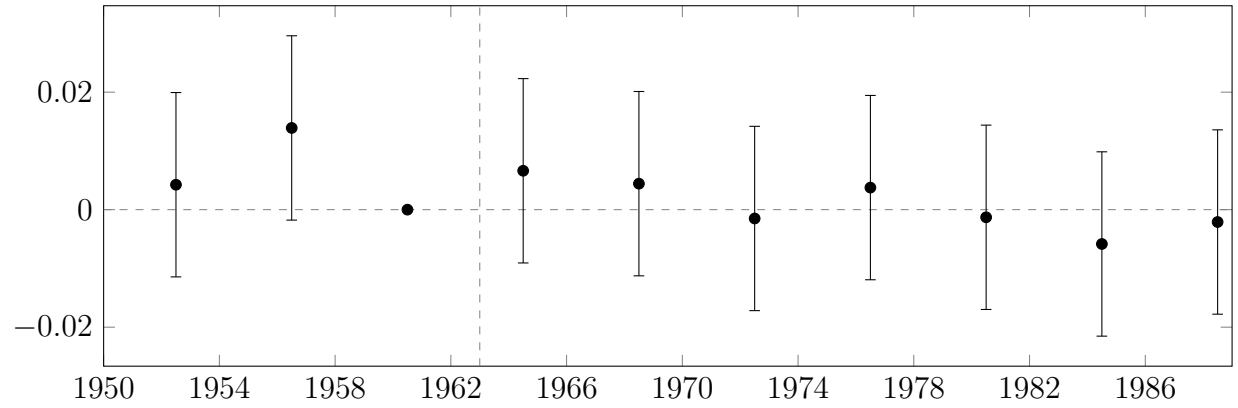
Dependent	Attendance		Years of school			Primary
variable:	(1)	(2)	(3)	(4)	(5)	(6)
$Pre\text{-}2007\ MLB_p$	-0.003	-0.001	-0.02	-0.01	-0.03	0.003
$\times\delta_{2010} \times$ _____	(0.004)	(0.009)	(0.03)	(0.16)	(0.05)	(0.007)
3rd interaction	None	$Male_i$	None	$Male_i$	$Age\ 14\text{-}17_i$	$Age\ 14\text{-}17_i$
Sex	M	M/F	M	M/F	M	M
Observations	248	496	248	496	124	124

Notes: This table is based on Equations 2 and 4. $Pre\text{-}2007\ MLB_p$ is the per capita number of players debuting in American professional baseball from province p from 1978 to 2007, standardized to have a mean of 0 and a standard deviation of 1. Census year 2002 is the reference year. In columns 5-6, boys ages 14-17 are the treatment group and boys ages 18-21 are the control group. Data come from the IPUMS samples of the Dominican census. Standard errors are shown in parentheses. Significance levels are denoted by * p <.10, ** p <.05, *** p <.01.

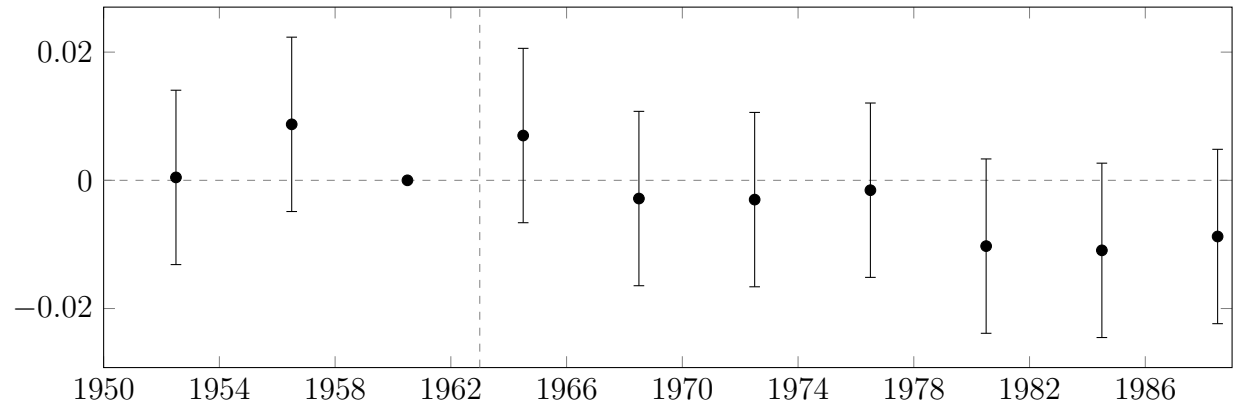
C Additional Figures

Figure A1: The effect of MLB on boys' education (MLB 1977-2010 exposure variable)

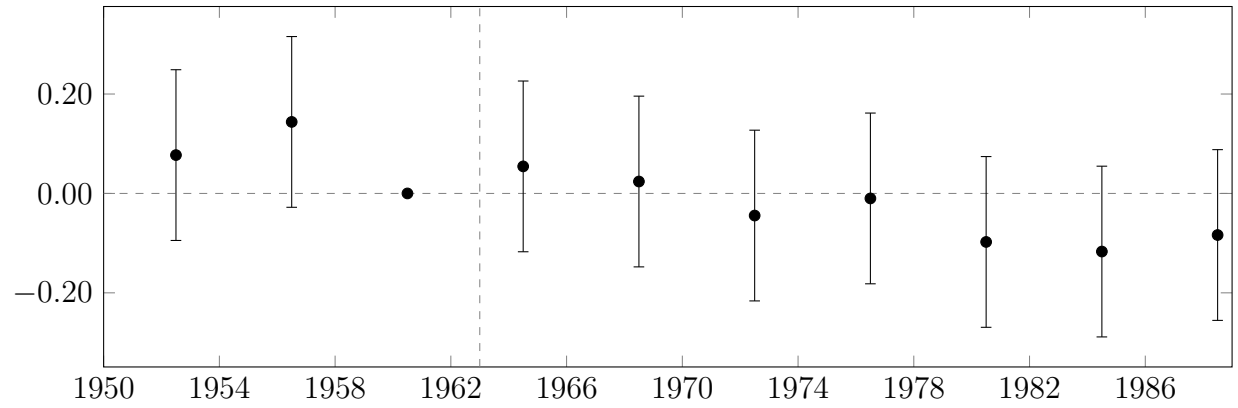
(a) Primary school completion (0/1)



(b) Secondary school completion (0/1)



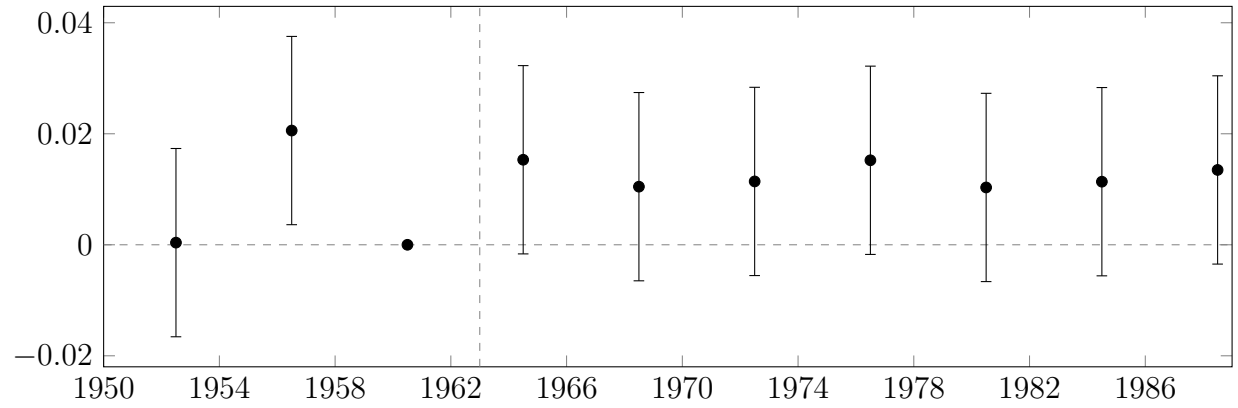
(c) Years of schooling



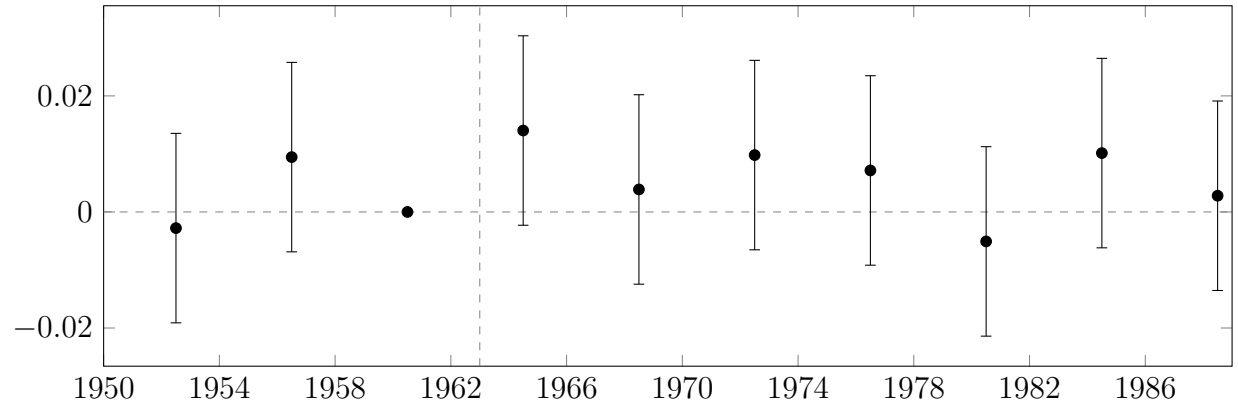
Notes: This figure is based on Equation 1. The dependent variable is shown above each panel. The x-axis depicts birth year. Coefficients correspond to players debuting 1977- 2010 divided by the provincial population interacted with birth year fixed effects. Men born from 1959 to 1962 are the reference group.

Figure A2: Comparing boys to girls: The effect of MLB on boys' education (MLB 1977-2010 exposure variable)

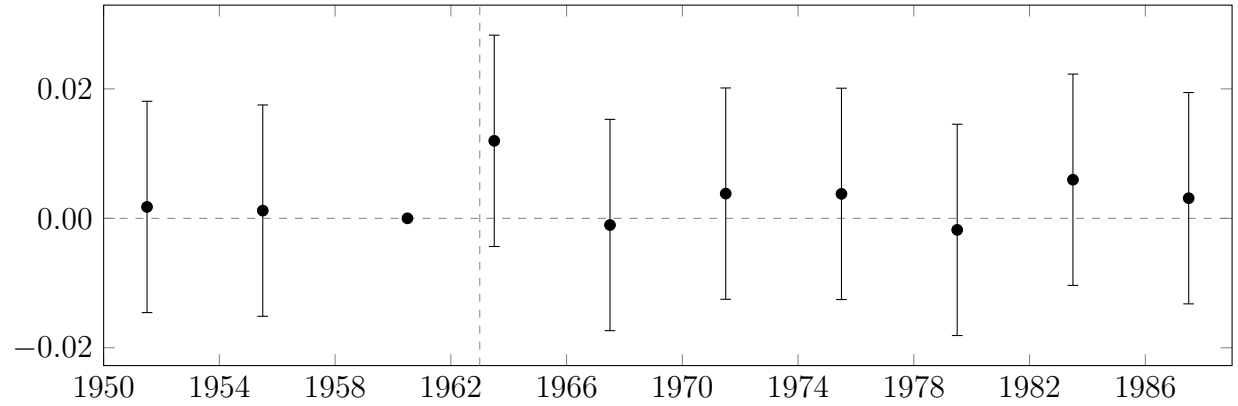
(a) Primary school completion (0/1)



(b) Secondary school completion (0/1)

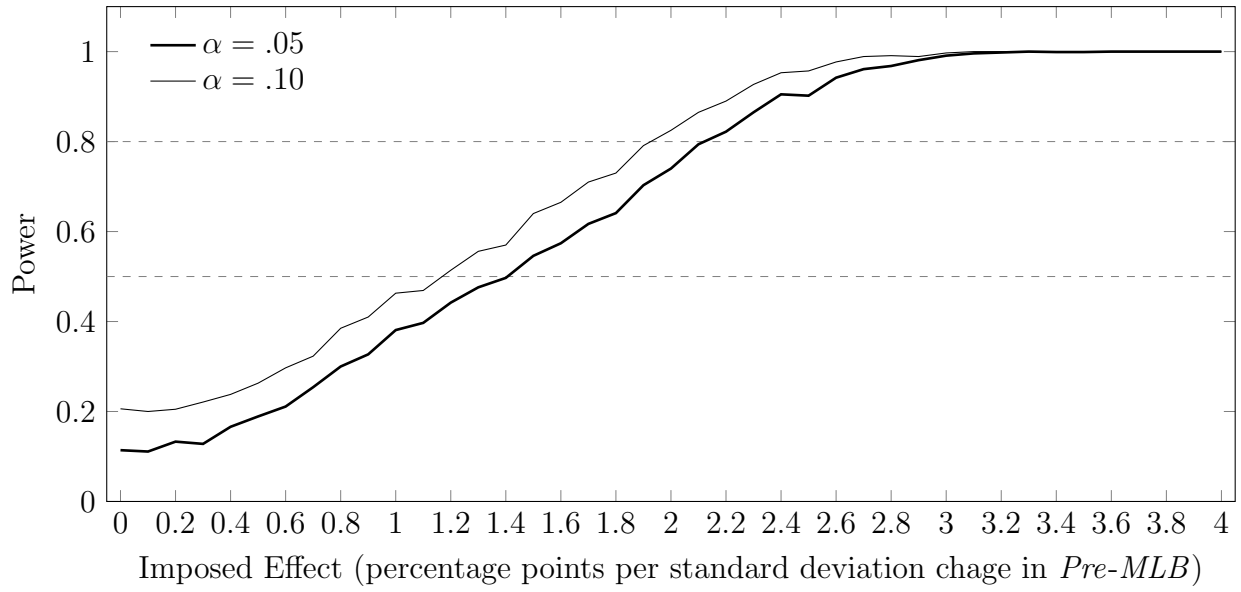


(c) Years of schooling



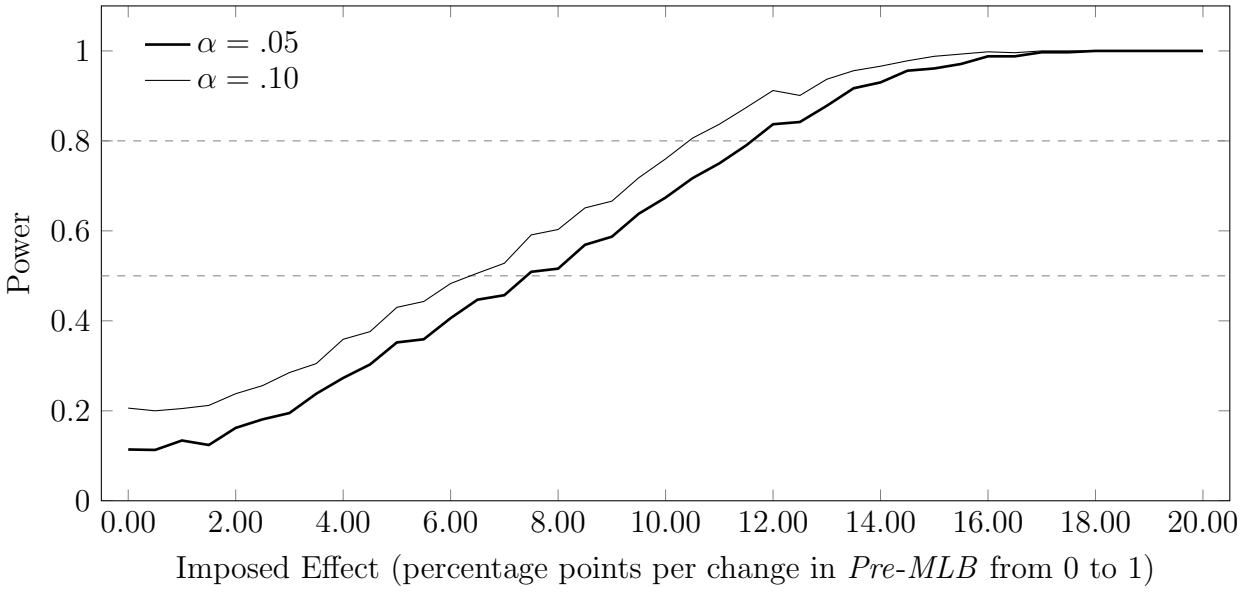
Notes: This figure is based on Equation 3. The dependent variable is shown above each panel. The x-axis depicts birth year. Coefficients correspond to players debuting 1977- 2010 divided by the provincial population interacted with birth year fixed effects and a male indicator variable. Men born between 1959 and 1962 are the reference group.

Figure A3: Power simulation results (Primary school completion (0/1))



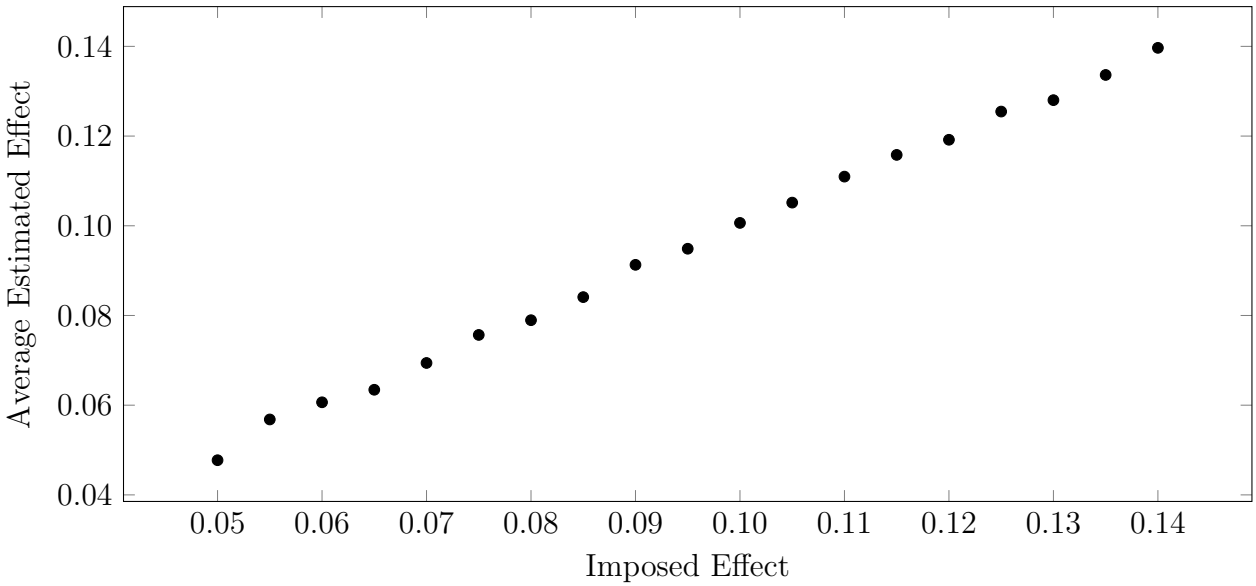
Notes: Each line represents results from 1000 simulations. Each simulation reruns Equation 1 with primary school completion as the dependent variable for girls only. Exposure to MLB recruiting is randomly reassigned to provinces and an effect is then imposed on provinces corresponding to the assigned exposure. Statistical significance is measured for an average of coefficients for the last 24 birth years.

Figure A4: Power simulation results (Primary school completion (0/1))



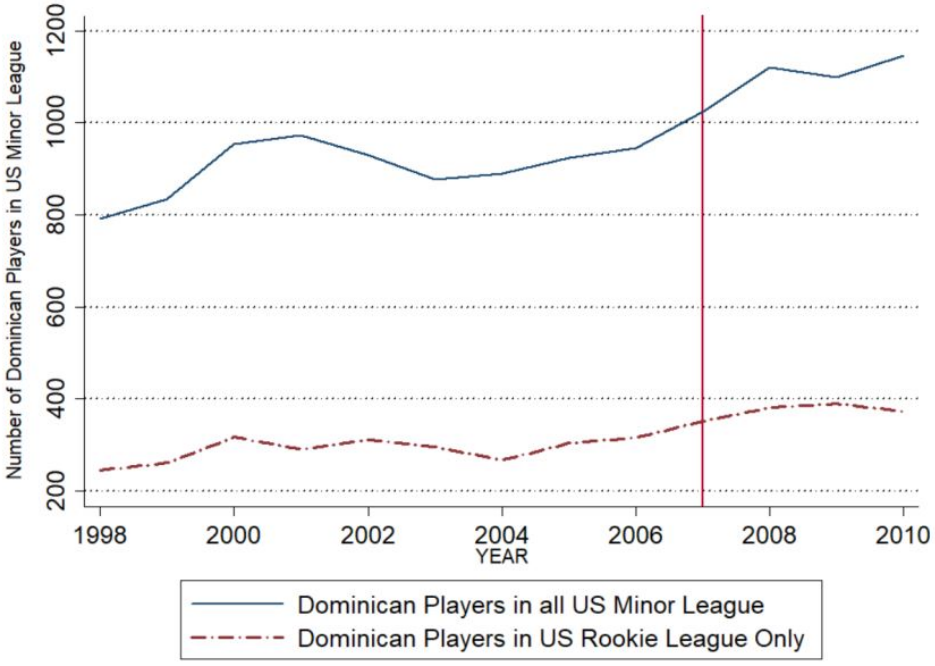
Notes: Each line represents results from 1000 simulations. Each simulation reruns Equation 1 with primary school completion as the dependent variable for girls only. Exposure to MLB recruiting is randomly reassigned to provinces and an effect is then imposed on provinces corresponding to the assigned exposure. Statistical significance is measured for an average of coefficients for the last 24 birth years.

Figure A5: Validity check for power analysis



Sources: Each dot represents results from 1000 simulations. Each simulation reruns Equation 1 with primary school completion as the dependent variable for girls only. Exposure to MLB recruiting is randomly reassigned to provinces and an effect is then imposed on provinces corresponding to the assigned exposure. The estimated effect is an average of coefficients for the last 24 birth years.

Figure A6: Dominicans in Minor League Baseball



Source: Chon (2020)