# Opportunity Cost of Time and Academic Performance: The impact of major soccer events on human capital accumulation

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July 16, 2024

**Abstract**

In this paper, I evaluate the impact of an increase in the value of leisure on academic performance, using the timing of World Cup and Copa América matches over 12 years as exogenous shocks to the opportunity cost of studying. Leveraging Uruguayans' soccer fanaticism and the coincidence of major sports events with final exam periods, I find a slight decline in university students' performance during these events. The negative impact is concentrated on the day before the exam, with no effect if the match is played the day after. Female students are more affected, possibly due to initial expectations conflicting with actual viewing behavior. Survey results suggest that women, ex-ante, believe they won't watch a match that interferes with study time, but end up doing so on match day. The findings do not appear to be driven by changes in teacher behavior.

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# 1 Introduction

When deciding how much effort to dedicate to preparing for college exams, students weight the benefits against the costs. In this paper, I study the effect of changes in the opportunity cost of studying on college performance. Since the effort allocated to exam preparation is an endogenous variable, I will use the timing of Uruguayan National Soccer Team matches in FIFA World Cups and Copas América as exogenous shocks to the opportunity cost of studying[1].

A common example used to explain trade-offs to undergraduate students is precisely the decision to divide time between studying and enjoying leisure. The level of effort invested in studying depends on this relative cost. Major soccer tournaments, for instance, increase the value of leisure, thereby raising the cost of dedicating an additional hour to studying. Similar shocks to the opportunity cost of studying, such as election days, can lead to less study time and increased distractions. Notably, the USA's 2016 presidential election coincided with the day before the 'Principles of Economics' midterm exam at Harvard, prompting Professor Mankiw to make the exam optional since "he did not want his students to have their grades affected". He stated, "It was a thoroughly, surprisingly close election, and I certainly didn't expect to stay up as late as I did"[2].

Leveraging the fervor of Uruguayans for soccer, particularly during major sporting events that coincide with university exam periods in the southern hemisphere (as opposed to holidays in the northern hemisphere), this study employs an administrative database comprising 172,050 academic performance observations for a panel of 4,053 undergraduate students at Universidad de Montevideo from 2003 to 2014. With World Cup and Copa América tournaments occurring every four years, this research captures the intersection of these major events with exam periods in six out of the twelve years with available academic outcome data[3].

[1] Major sporting events have been widely employed in various fields of economics as natural experiments, generating exogenous shocks to instrument endogenous variables of interest. For instance, Eisensee and Strömberg (2007) leverage the Olympic Games as a shock to TV coverage of natural disasters to examine the influence of mass media on the U.S. government's response to such disasters abroad. Webbink et al. (2017) utilize Champions League games as an instrument for the number of viewers of a crime TV program, exploring the impact of broadcasting crime suspects on TV on the probability of apprehension.

[2] Source: http://www.thecrimson.com/article/2016/11/10/professors-classes-post-election/

Sports not only pose challenges to the scheduling of university courses. In Uruguay, the primary presidential elections were legislatively set to take place on the last Sunday of June every five years. During the 2014 electoral campaign, politicians recognized that the primary elections coincided with the dates of the World Cup in Brazil (June 12 – July 13). Anticipating significant interference with voting behavior due to the sporting event, political parties opted to advance the electoral day to June 1, 2014, before the commencement of the World Cup. This legislative change was approved by Parliament in November 2012, well in advance of the World Cup's kickoff.

[3] To comprehend the fervor of Uruguayans for soccer, it's noteworthy that Uruguay holds a prominent place in the history of the sport. Presently, Uruguayan players feature in top leagues

In this study, I employ three primary empirical strategies. Firstly, I compare academic outcomes (exam attendance and grades) between periods with and without major sporting events, revealing a modest decline in performance during these tournaments. Secondly, I delve deeper into the data, examining daily exam results and matches. The analysis shows that the decline in performance (higher absenteeism and lower grades) is not uniform throughout the tournament period but is particularly concentrated the day before an exam. Specifically, if the National Soccer Team match occurs precisely one day *before* a student's exam, performance declines compared to when the match is played one day *after* an exam, thus avoiding interference with study time[4]. The third strategy involves using student fixed-effects models, applied to both the tournament period and the exact day of the match treatments. This approach controls for individual fixed unobservable heterogeneity, such as innate ability.

Given variations in soccer fanaticism between genders, exploring gender heterogeneity is a natural extension. The analysis reveals that the adverse impact is predominantly observed among female students. To investigate the underlying mechanisms, a survey was administered to 722 students. The survey suggests that female students may be more significantly affected as a National Team match serves as a more substantial disruption than anticipated. Ex-ante, female students are less informed about tournament schedules and express a lower willingness to watch a match if it is played the day before an exam. However, on the actual match day, they watch the game at a higher rate than expected, possibly close to 80%. These

globally. The national team boasts two World Cup victories and 15 Copa América triumphs—the major sporting events utilized in this paper as shocks to the opportunity cost of study time. Wikipedia explains that "The Uruguayan team is commonly referred to as La Celeste (The Sky Blue). (...) They have won the Copa América 15 times, being the team that has won the tournament on most occasions. The team has won the FIFA World Cup twice, including the first World Cup in 1930 as hosts, defeating Argentina 4–2 in the final. They won their second title in 1950, upsetting host Brazil 2–1 in the final match, which received an attendance higher than any soccer match ever. They have won the Gold Medals in soccer at the Summer Olympics twice, in 1924 and 1928 recognized by FIFA as World Championship, before the creation of the World Cup. Uruguay also won the 1980 Mundialito, a tournament among former World Cup champions. In total, Uruguay have won 20 official titles, a world record for the most international titles held by any country. (...) Their success is amplified by the fact that the nation has a very small population of around 3.4 million inhabitants (2011 est.). Uruguay is by far the smallest country in the world to have won a World Cup in terms of population, 1.75 million inhabitants in 1930. The second-smallest country, by population, to have won the World Cup is Argentina with a population of nearly 28 million people in 1978."

[4]This granular daily data affords an opportunity to examine interesting dynamics. The matching of soccer matches to exams shares similarities with the detailed analysis conducted by Card and Dahl (2011). In their work, they link Sunday football matches and domestic violence, revealing that upset losses by the home team (defeats when the home team was predicted to win by four or more points) lead to an increase in police reports of at-home male-on-female intimate partner violence. Interestingly, victories do not result in a similar breakdown of control for men. The escalation in violence following an upset loss is concentrated within a narrow time window near the end of the game, demonstrating a more pronounced effect for more significant games.

planning errors (the planning fallacy proposed by Kahneman and Tversky (1977)) leave them with little time to recover the lost study hours. While the mechanism section is suggestive and does not provide causal estimates, it indicates substantial differences between male and female students in their responses to soccer, potentially contributing to the observed gender disparity in the main analysis.

There are three key papers relevant to my research. Lindo, Swensen, and Waddell (2012) study the relationship between academic performance at the University of Oregon and the prominence of university football on campus, as measured by the team's winning percentage in a given year. Analyzing data from 1999-2007 for non-athlete undergraduate students, they discovered a negative impact on both men and women's GPAs due to the success of the university football team, with men experiencing a more pronounced effect. To understand underlying mechanisms, the authors conducted a survey involving 263 students. Their findings suggest that the differential impact of athletic success by gender may be linked to variations in time devoted to study for classes and engagement in distracting or risky behaviors, such as partying and alcohol consumption.

Hernández-Julián and Rotthoff (2014) replicate the analysis conducted by Lindo, Swensen, and Waddell (2012) for Clemson University. Utilizing two decades of data, they arrive at a similar conclusion that successful football seasons are correlated with lower grades. However, in their setting, they find that female students are more adversely affected than males.

Finally, Metcalfe, Burgess, and Proud (2019) capitalize on the coincidence of the World Cup and the European Championship with the period of annual, compulsory, high-stakes exams for secondary students in England. They employ a within-student analysis between early and late exams in years with and without soccer matches. Their findings indicate a negative impact of tournaments on student academic outcomes, attributed to a reduction in effort. Notably, boys exhibit a more pronounced impact compared to girls.

This paper contributes to the literature by examining these questions in a different setting, outside the developed world. Previous studies by Lindo, Swensen, and Waddell (2012) and Hernández-Julián and Rotthoff (2014) utilized aggregated data at the yearly level, varying the success percentage of university football teams across seasons. In contrast, my study offers more precisely defined treatment and control periods, with the instrument switched on and off with precision. Additionally, employing a strategy focusing on the exact match day allows for a granular analysis, revealing patterns that may be obscured in yearly assessments. The gender-specific results observed in the Uruguayan setting, with female university students experiencing greater impacts, diverge from the findings of Lindo, Swensen, and Waddell (2012) but align with those of Hernández-Julián and Rotthoff (2014).

I build upon the latter study by implementing a survey to investigate underlying mechanisms. Furthermore, relative to Metcalfe, Burgess, and Proud (2019), whose study included compulsory exams, my research setting allows students to postpone exams in response to disruptions in study time. This flexibility potentially mitigates adverse effects on aggregate exam grades, highlighting the nuanced dynamics at play.

The rest of the paper is organized as follows. Section 2 presents the data and the empirical strategy. Section 3 outlines the main results. In Section 4, I will interpret the main findings, exploring potential mechanisms that account for the gender difference in academic performance. Finally, section 5 concludes.

## 2 Data and empirical strategy

I use two primary data sources, matched to Tournament calendars: the internal registries at Universidad de Montevideo, and a special survey administered to students and teachers, tailored to understand the mechanisms.

***Administrative data***

The academic performance database covers a panel of 4,053 undergraduate students at the Universidad de Montevideo during the academic years 2003 to 2014, with 172,050 observations. This small private university, situated in the capital city of Uruguay, requires students to pass both courses and exams to progress in their careers. The final grade for a subject is a combination of 50% from the course and 50% from the exam. To pass a subject, students must achieve a grade of at least 4 out of 12 in the course and at least 6 out of 12 in the final exam.

Students have three consecutive periods to pass the exam. They can choose not to attend any of these instances if they believe they are not prepared, or for any other reason (no justification is required). If a student fails or does not attend the first instance, they can take the exam in the second or third period. Once the exam is passed, there is no option to retake it to improve the grade. Therefore, passing the exam in any of the three opportunities is mandatory; otherwise, they will have to repeat the year.

For first-semester courses, exam periods occur in June and July, coinciding with the World Cup or the Copa América, with the third period in December. Second-semester courses have exam periods in December, February, and March. Unlike academic calendars in the Northern Hemisphere, where major soccer tournaments overlap with holiday periods, these events coincide with a period of intense study for final examinations in the Southern Hemisphere[5]. Major sporting events are deliber-

[5]Upon reviewing the academic calendars of several universities, including Chicago, Harvard,

ately scheduled during holidays in the Northern Hemisphere to boost tourism and television viewership. Consequently, the FIFA World Cup is not a suitable instrument for gauging university students' academic efforts in those countries. Instead, other instruments, such as college football matches involving university teams, have been employed for this purpose.

An interesting feature of the academic calendar, beneficial for my empirical analysis, is the extended duration of final exams, spanning more than one month rather than just a single week. This feature allows for a significant overlap between soccer tournaments and exams. Given the absence of lectures during the exam period, any observed outcomes arise from variations in students' study habits, rather than learning during the course or reductions in professors' efforts in preparation or teaching.

Exams are centrally scheduled by the Beadle's Office and communicated to the academic community well in advance. Unlike mid-term examinations, where individual professors may have more flexibility, as Prof. Mankiw's episode after national elections day, the dates for final exams remain fixed. This ensures that the treatment does not affect the organization of the exam itself but only student (or professors) behavior. The centralized scheduling, established over a year in advance, provides a stable framework independent of soccer match schedules.

Table 1 provides summary statistics at both the student and exam levels. There dataset comprises a total of 172,050 observations, involving 4,053 different students. Slightly over half of the students are female. On average, students hold a GPA of 7.11, on a scale up to 12, with a passing mark of 6. The average student takes 32.89 exams, with 3.16 occurring during major sporting events. The two main outcome variables are displayed in rows 9 and 11. Given that taking an exam is not compulsory for a given period, in 24% of cases, students who had the opportunity to sit for an exam choose to defer to a subsequent period. Grades have been standardized with a mean of zero and standard deviation of one for the interpretation of regression results. The pass rate for an exam in the database is approximately 80%. A total of 12,824 exams took place during a major tournament, accounting for 7.45% of the sample.

Princeton, Yale, LSE, among others, it becomes evident that Spring Term concludes before the end of May or, at most, during the first week of June.

Table 1: Summary statistics of the exams database

| | | mean | s.d. | min | max | obs |
|---|---|---|---|---|---|---|
| | **Students** | | | | | |
| 1 | *Female* | 0.52 | 0.50 | 0 | 1 | 4,053 |
| 2 | *Cohort* | 2007.78 | 4.16 | 1995 | 2014 | 4,053 |
| 3 | *Credits Earned* | 223.97 | 146.88 | 0 | 769 | 4,053 |
| 4 | *Grade in courses* | 7.11 | 1.50 | 2 | 12 | 4,017 |
| 5 | *Number of exams taken* | 32.89 | 20.12 | 0 | 115 | 4,053 |
| 6 | *Exams during tournament* | 3.16 | 2.45 | 0 | 12 | 4,053 |
| 7 | *Didn't sit for the exam* | 0.23 | 0.21 | 0 | 1 | 4,053 |
| 8 | *Grade in exams* | 7.57 | 1.55 | 1 | 12 | 4,000 |
| | **Exams** | | | | | |
| 9 | *Didn't sit for the exam* | 0.24 | 0.42 | 0 | 1 | 172,050 |
| 10 | *Grade in exams* | 7.59 | 2.36 | 1 | 12 | 131,615 |
| 11 | *Grade in exams (std)* | 0.00 | 1.00 | -3 | 2 | 131,615 |
| 12 | *Credits attempted* | 6.37 | 2.24 | 0 | 29 | 172,050 |
| 13 | *Credits gained* | 5.22 | 3.16 | 0 | 29 | 172,050 |
| 14 | *Passed the exam* | 0.81 | 0.39 | 0.00 | 1.00 | 131,615 |
| 15 | *Year* | 2008.81 | 3.29 | 2003 | 2014 | 172,050 |
| 16 | *Semester* | 1.46 | 0.50 | 1 | 2 | 172,050 |
| 17 | *Period* | 1.46 | 0.74 | 1 | 4 | 172,050 |
| 18 | *During tournament* | 0.07 | 0.26 | 0 | 1 | 172,050 |
| 19 | *Students in a day* | 53.96 | 75.98 | 1 | 474 | 2,439 |

Notes: This table reports descriptive statistics for the panel of 4.053 students. Over the period from 2003 to 2014, a total of 172,050 individual exams were scheduled for these students, with 131,615 grades assigned. The last row consists of the raw exam-level data collapsed by the day of the exam.

***Surveys***

During the 2015 Copa América, I conducted two surveys—one for students and another for teachers. These surveys offered valuable insights into potential mechanisms and explanations underlying the results observed in the administrative data. The student survey garnered a substantial response, with 722 participants, while the teacher survey, taking a more qualitative approach, collected 21 observations. I specifically utilize the teacher survey to show that, as expected, teachers do not alter the difficulty of exams due to soccer matches held the previous day. Both surveys were administered at the School of Business, the University's largest school. The project and survey instruments received approval from the University's Research Ethics Committee.

The student survey was conducted in paper format and online during the last two weeks of the first semester of 2015, coinciding with the Copa América in Chile. The aim was to leverage this tournament to gain insights into the channels and impacts

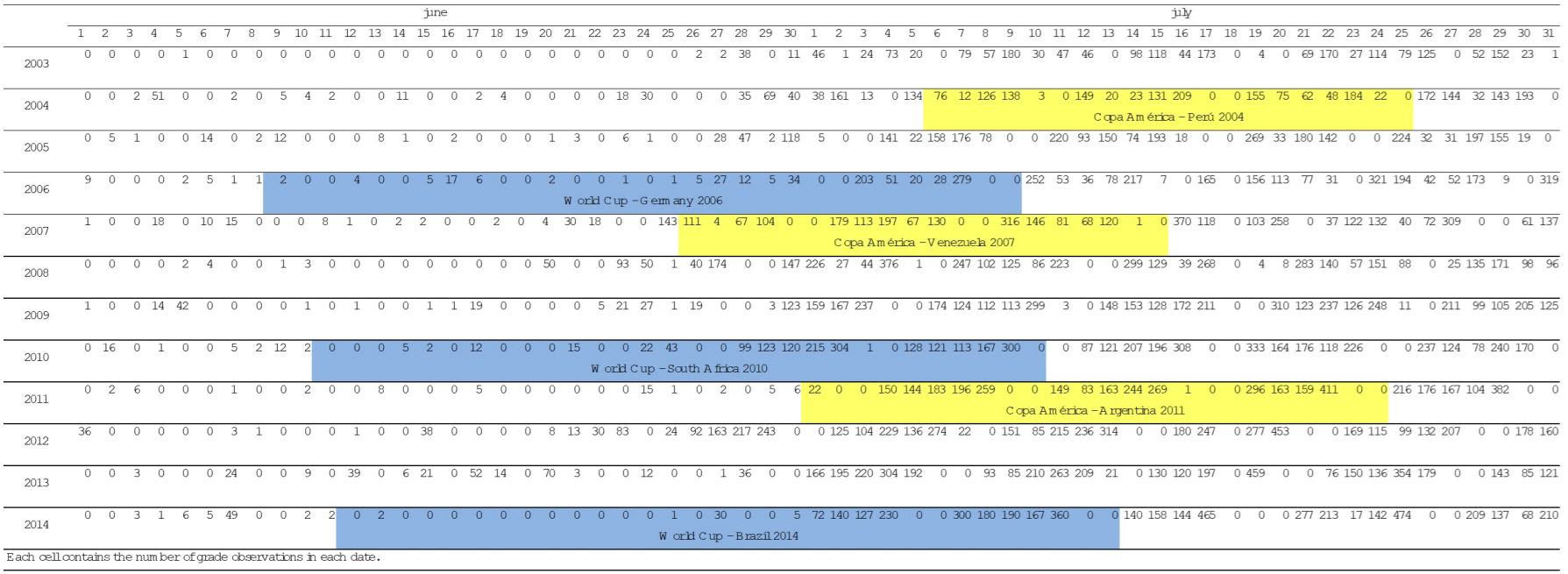
estimated from previous tournaments. Importantly, my intervention—explaining the project's objectives and distributing questionnaires in the classrooms—did not influence the main results. This mitigated the potential Hawthorne effect, where students might change their behavior due to awareness of being observed. We distributed paper questionnaires during classes and received 518 responses. Due to the inability to interrupt all required courses—requiring teacher authorization—and some students being absent during the classes that allowed intervention, we addressed this by reaching out via email and placing banners on the intranet website for these specific students. Subsequently, 204 additional students participated by filling out the online questionnaire. To encourage participation and truthful responses, an incentive was provided: students who accurately predicted the tournament winner were entered into a raffle for two tickets to the next match of our National Team at Estadio Centenario.

***Empirical strategy***

The empirical strategy hinges on the temporal alignment of exams and major sporting events. Figure 1 illustrates the research design, by focusing on the months of June and July from 2003 to 2014, encompassing three World Cups (Germany 2006, South Africa 2010, and Brazil 2014) and three Copa América tournaments (Perú 2004, Venezuela 2007, and Argentina 2011). Over this 12-year period, we have six tournament years, where some periods are treated, and others serve as controls, and six non-tournament years, where all months belong to the control group. Additionally, the natural experiment provides variation not only across tournament years but also in the day of the month when they start. While exams typically occur around the same day each year, there is no clear overlap between exam dates and tournament start dates. For instance, Copa América 2004 took place from the 6th to the 25th of July, while Copa América 2007 started earlier in the calendar year, spanning from the 26th of June to the 15th of July. Consequently, the same exam may be treated in one year (coinciding with a tournament), not treated in a non-tournament year, but also be a non-treated exam in another tournament year.

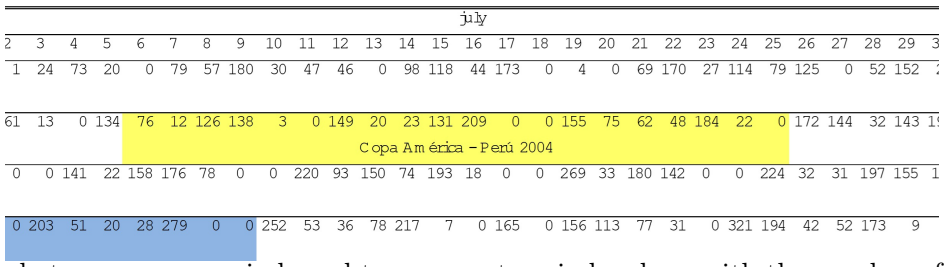
Figure 1: Treatment: overlap of exams and Major Sport Events

(a) Panel A: Zoom in June-July, 2003-2014




Each cell contains the number of grade observations in each date.

(b) Panel B: Zoom in July, 2003-2006



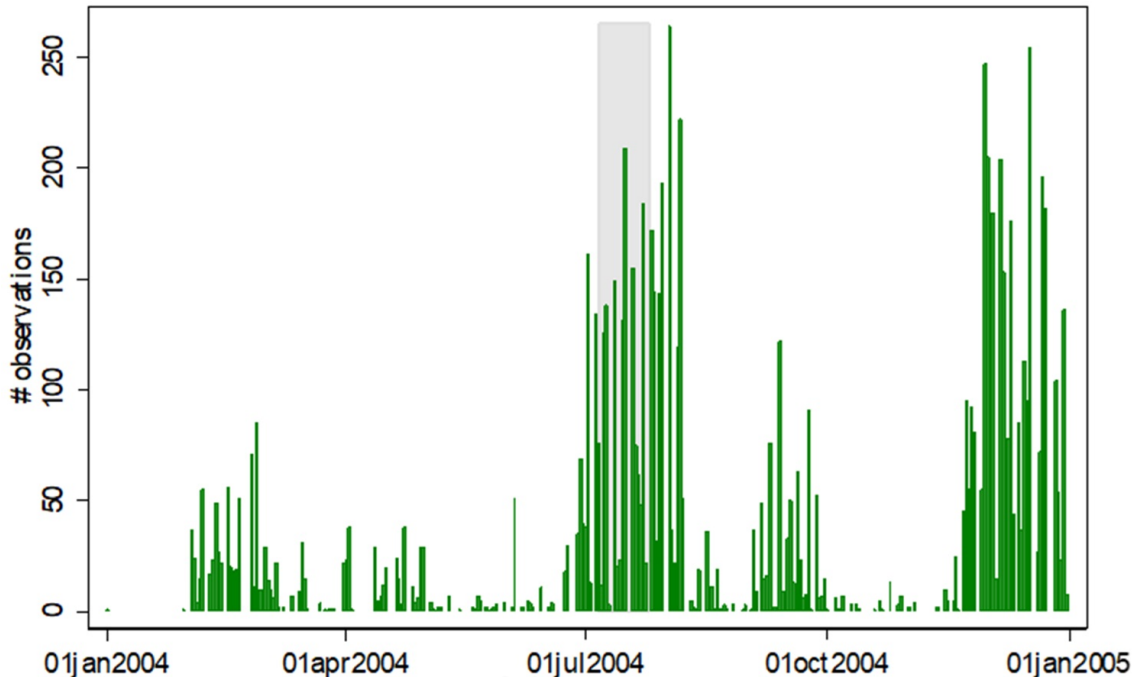

Notes: These panels show the overlap between exam periods and tournament periods, along with the number of exam-level observations on each day within a selected time frame.

Figure 1 also displays the distribution of exam-level observations for each day. For example, the initial cell indicates zero exams on June 1, 2003, while on July 9, 2013, there were 180 observations (Panel A). In 2004, the year of the Copa América in Peru, there were 134 observations on the day just before the tournament's commencement and 76 exams on the first day (Panel B).

The first specification of the model involves comparing grades in exams conducted during Major Tournaments, where the value of leisure increases relative to studying. Thus, comparing average outcomes in shaded areas with average outcomes in control periods. A more detailed analysis leverages daily information. The improvement will be to focus on the exact day of the match, instead of broad periods. Exams held exactly the day after a Uruguayan National Team game are considered treated, since students may have lost study hours due to the shock in the relative cost of leisure. A natural placebo analysis will compare results of exams held the day before a soccer match. Lastly, student fixed effects models are employed to control for individual unobservable heterogeneity, both in the first specification using "tournament periods" and in the second specification using the "exact day of the match". Identification in the fixed effects setting relies on students who had within-variation, meaning at least one exam during a tournament period and one exam outside that period, if we consider the "tournament periods" sample. When applying student fixed effects to the "exact day of the match" sample, this specification uses less variation in the data, as it requires that a student had at least one exam exactly the day after a match. Only 2.4% of the exams in the database were held the day after a Nationals Team match. On average, a student has 1.01 exams the day after a match, 3.16 exams during a tournament, and a total of 32.9 exams taken.

While Figure 1 provided a comprehensive view of the data for June and July over the entire 12-year period, depicting between-year variation in treatment, Figure 2 delves into within-year variation. This figure illustrates the number of daily observations for the treated year 2004, offering a glimpse of the variation within a specific year.

Figure 2: Daily exams and Copa América period in 2004




Notes. This figure illustrates the number of exams taken for each day in 2004. The treated period, shaded in grey, corresponds to the Copa América held in Perú (the first Major Tournament in the database). Exams outside that period serve as control observations, as the relative value of leisure was not affected by a match of the national team.

The primary exam periods occur in July (commencing in the last week of June) and December (beginning at the end of November). In Figure 2, the shaded area represents exams scheduled during Copa América 2004. Notably, there is variation in treatment within each year and inside the June-July exam period. Exams outside the shaded area serve as control exams. For a detailed graphic representation of the data for each year in the 2003-2014 period, refer to Figure A.1 in the Appendix.

More formally, I will estimate the following equation:

$$Grade_{ijt} = \alpha_0 + \alpha_1 Tournament_t + \boldsymbol{X_j'\theta_1} + \boldsymbol{Z_i'\delta_1} + \epsilon_{ijt} \tag{1}$$

where $Grade_{ijt}$ represents the grade for student $i$ in exam $j$ on day $t$, with grades standardized to a mean of zero and a standard deviation of one.$Tournament_t$ is a dummy variable equal to one if the exam took place during a tournament period $t$, and zero otherwise. Additionally, $X_j$ is a vector of exam-related dummies (such as year, semester, and period) and $Z_i$ is a vector of student pre-treatment characteristics (gender, major, earned credits, and high school location). The term $\epsilon_{ijt}$ represents unobserved factors. In this regression, standard errors are clustered at the 'subject x year' level. The underlying assumption is that the model errors are correlated within subject and year (within the same group, with the same professor, following

the same syllabus, etc), but uncorrelated otherwise.

The model, as depicted in Equation 1, implies a variation in the cost of studying between tournament and non-tournament periods (indicated by the treatment dummy switching on or off). The anticipated sign of $\alpha_1$ is negative, suggesting that during tournament periods, grades are expected to be lower compared to when a student prepares for an exam in non-tournament periods.

The second specification improves the analysis by leveraging on more detailed information, focusing on specific match days rather than broad periods. I hypothesize that the impact of soccer matches is not evenly distributed across the tournament period. Specifically, if a National Team match occurs precisely the day *before* an exam, the effect is expected to be more pronounced than if the match takes place 10 days before. I anticipate that, given a time constraint, if a student forgoes hours initially allocated for studying, there is minimal time left for recovery before the exam. Furthermore, this specification, where the cost of missed hours is not uniform, implies that if the match is scheduled for the day *after* an exam, the cost of missed hours for that exam would be zero, resulting in $\beta_1 = 0$. To implement this approach, I will estimate the following equation:

$$Grade_{ijt} = \beta_0 + \beta_1 Match_{ijt-1} + \boldsymbol{X_j'\theta_2} + \boldsymbol{Z_i'\delta_2} + \mu_{ijt} \tag{2}$$

where $Grade_{ijt}$, $X_j$ and $Z_i$ have the same definition as in equation 1. $Match_{ijt-1}$) is the main variable of interest. It is a dummy variable with value one if the exam $j$ of student $i$ took place on day $t$, *after* a match of the Uruguayan National Team (held on day *t-1*).

Finally, the third model specification takes advantage of the panel structure of the database, and thus I can purge equations 1 and 2 from unobservable student fixed heterogeneity.

$$Grade_{ijt} = \gamma_0 + \gamma_1 Treatment_{ijt1} + \boldsymbol{X_j'\theta_3} + f_i + \omega_{ijt} \tag{3}$$

where $f_i$ are student fixed effects, as in Lindo et al. (2012). The *Treatment* variable is a dummy indicating whether the exam took place during a tournament period (as in model 1) or the day *after* a match (as in model 2). Fixed effects regressions have the feature of controlling for individual unobserved (fixed) heterogeneity, such as a student's level of fanaticism with soccer or propensity for procrastination. As is customary in panel data models, model errors $\omega_{ijt}$ are clustered at the student level. Clustering at the individual level assumes that model errors in different time periods for a given student may be correlated, while model errors for different students are assumed to be uncorrelated.

The results of these regressions are interpreted as reduced form estimates of the

impact of major soccer tournaments on academic performance. Thus, I aim to dig deeper in the mechanisms by using data from the additional survey.

I will also explore heterogeneous effects by gender, recognizing that the impact of major soccer tournaments can differ between men and women due to varying levels of fanaticism or awareness of tournament calendars. These gender differences are evident from common knowledge, at least in this setting, even without specific data. However, I aim to substantiate these differences using the survey data collected from students (353 men and 356 women).

# 3 Main estimation results

Columns 1 and 2 of Table 2 present the results of estimating equation 1. I find no impact of a Tournament (World Cup or Copa América) on absenteeism or grades in the overall period.

Table 2: Estimates of the impact of Soccer matches on exam participation and grades.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | **Tournament periods** | | **Exact day of match** | |
| *No show* | -0.001 | 0.005 | 0.038** | 0.040** |
| | (0.009) | (0.009) | (0.017) | (0.016) |
| Observations | 172,050 | 172,050 | 172,050 | 172,050 |
| *Exam Grade (std)* | -0.035 | -0.014 | -0.147*** | -0.143*** |
| | (0.033) | (0.032) | (0.051) | (0.046) |
| Observations | 131,615 | 131,615 | 131,615 | 131,615 |
| Basic general controls | yes | yes | yes | yes |
| Student level controls | no | yes | no | yes |

Notes. General controls include a constant and a full set of dummy variables for year, semester, and period of the exam. Student level controls include credits achieved, and dummy variables for gender, major, and having studied at a high school in Montevideo. Standard Errors in parenthesis clustered at the subject*year level. *** p<0.01, ** p<0.05, * p<0.1.

However, the detailed nature of the data, combined with the exact day of each match of the Uruguayan National Soccer Team, allows for a more precise analysis of the effect of an exogenous shock to the relative cost of studying. Columns 3 and 4 show the impact of a soccer match held exactly the day before an exam. The treatment increases the probability of a student not showing up for an exam by 4pp over a basis of 24%. For those students who nonetheless attend the exam the day

after a match, estimates show a reduction of 14% of a standard deviation in grades[6]. The evidence gathered with the survey of students (Section 4) will show that the overwhelming majority of students watch the National Team matches. Therefore, it is plausible that the impact is larger when the exam is closer to the match and there is less margin to recover the lost study hours (which are not less than three since these matches are typically watched with friends, so time spent is more than 90+15 minutes).

Students who do not show up to the initial exam period exhibit three characteristics linked to lower exam performance: they maintain course grades 0.65 standard deviations lower than their attending counterparts, are predominantly male, and come from rural areas—both demographics correlated with poorer academic outcomes. Had they participated in the exam, the detrimental impact on grades would likely have been more pronounced. Thus, the observed effects on exam grades represent a lower bound: they would have been lower if exam participation had not decreased.

***Heterogeneity***

In this subsection, I will highlight the gender differences that are obscured in the previous average estimated impacts. Although both boys and girls are negatively affected, the effects are much stronger for female students.

Table 3: Heterogeneous effects by gender

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | **Tournament periods** | | **Exact day of match** | |
| | Male | Female | Male | Female |
| *No show* | 0.004 | 0.007 | 0.042** | 0.038** |
| | (0.011) | (0.01) | (0.018) | (0.018) |
| Observations | 84,022 | 88,028 | 84,022 | 88,028 |
| *Exam Grade (std)* | -0.006 | -0.019 | -0.114** | -0.173*** |
| | (0.036) | (0.035) | (0.052) | (0.05) |
| Observations | 63,269 | 68,346 | 63,269 | 68,346 |
| Basic general controls | yes | yes | yes | yes |
| Student level controls | yes | yes | yes | yes |

Notes. Same as in Table 2.

Table 3 shows gender differences in response to soccer treatment. Males exhibit a slightly higher rate of absenteeism compared to females. In terms of academic

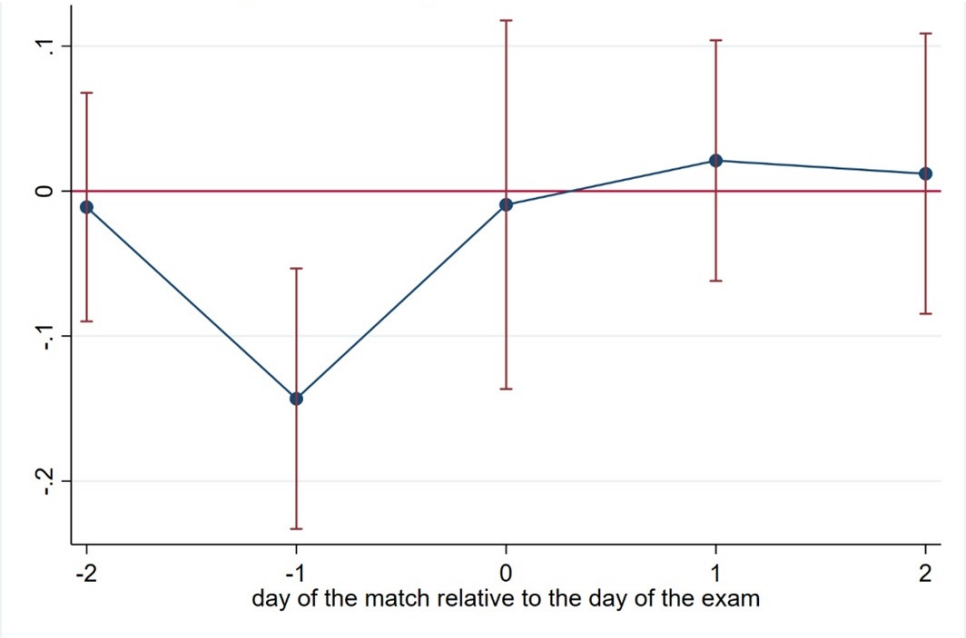
[6]Metcalfe et al. (2019) find an average impact on exam grades of -12% of a sd, and -20% for the most affected groups.

performance, female students experience a decline in grades equivalent to 17% of a standard deviation, relative to the overall impact of -14% (as shown in column 4 of Table 2). The 6-percentage point difference between males and females is equivalent to one-third of the gender difference in grades, with female students typically achieving grades averaging $0.22\sigma$ higher than their male counterparts.

***Placebo***

The exact-day-of-the-match analysis naturally leads to the notion that, since the impact of a match is larger if it is held just the day before an exam, then the impact should be zero if it were to be held just the day after the exam. Figure 3 shows the point estimates from five regressions (with the same specification as column 4 from Table 2), for the effect on grades. The largest negative impact occurs if the match is played the day before an exam. If the match is two days before or the same day as the exam, then the impact is slightly negative but not statistically different from zero. In any case, what is more interesting is that if the match is scheduled *after* the exam, then the match won't have an impact on study hours and on grades.

Figure 3: Change in exam grades and day of the match




Notes. This figure shows the estimated coefficient $\beta_1$ from equation 2 calculated when varying the day of the match relative to the day of the exam. If the match is held one day before the exam, then t = -1. The coefficient $\beta_1$ for t=-1 is reported in Table 2 column 4. The vertical lines represent the 95% confidence interval with standard errors clustered at the 'subject x year' level. Each coefficient corresponds to a different regression, where the number of days between matches and exams vary. The coefficient in t=-2 corresponds to the impact on grades of a National Team match on the exams that were held two days after. Conversely, a soccer match on t=2 corresponds to the impact on grades at t=0 of a match held at t=2 (after the exam, so there should be no effect).

The rationale behind the results presented in Figure 3 prompts a broader placebo strategy, in the spirit of Monte Carlo simulations. This involves simulating fake match days by adjusting the date of a match. A placebo match on day t-1 is expected to have no impact on an exam conducted on day t. Consequently, I will generate placebo treatments by shifting each match from 1 to 365 days ahead. Table 4 displays the average results from 365 regressions, maintaining the same specifications as in column 4 of Table 2 (these placebo estimates will exclude days with actual matches). Concerning tournament periods, I will fabricate fake tournament periods by progressively moving the shaded areas from Figure 1, one day at a time, into non-tournament periods (where no impact is anticipated). Specifically, I will transfer the 2004 tournament to the year 2003, 2006 to 2005, 2007 to 2008, and so forth. Each of the six tournament periods will be shifted to the six non-tournament periods, one day at a time, allowing for the estimation of 365 regressions. Results in Table 4 present the average coefficient (along with average p-values) derived from these 365 regressions, for exam grades (the main outcome) and other variables.

Table 4: Placebo treatments

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | **Tournament periods** | | | **Exact day of match** | | |
| | coef | p-value | obs | coef | p-value | obs |
| 1 *Didn't sit for the exam* | -0.01 | 0.24 | 159,226 | -0.01 | 0.37 | 159,226 |
| 2 *Exam grade (std)* | 0.11 | 0.13 | 121,156 | 0.12 | 0.27 | 121,156 |
| 3 *Exam grade* | 0.27 | 0.13 | 121,156 | 0.28 | 0.27 | 121,156 |
| 4 *Female* | 0.01 | 0.30 | 159,226 | 0.01 | 0.36 | 159,226 |
| 5 *Total credits* | 3.59 | 0.37 | 159,226 | 3.65 | 0.45 | 159,226 |
| 6 *Montevideo* | 0.00 | 0.46 | 159,226 | 0.00 | 0.44 | 159,226 |
| 7 *Number of exams* | 0.07 | 0.44 | 159,226 | 0.02 | 0.48 | 159,226 |
| 8 *Credits attempted* | -0.08 | 0.40 | 159,226 | -0.08 | 0.45 | 159,226 |
| 9 *Credits gained* | 0.02 | 0.40 | 159,226 | 0.02 | 0.42 | 159,226 |
| 10 *Passed the exam* | 0.02 | 0.22 | 121,156 | 0.03 | 0.35 | 121,156 |

Notes. Each row in this table presents the results obtained by averaging estimates from 365 regressions calculated for tournament periods [$\alpha_1$ from equation 1] in column 1 and 365 regressions for the exact day of the match specification [$\beta_1$ from equation 2] in column 4. Additional rows represent regressions with variations in the outcome variable. Column 1 (and 4) displays the average of the 365 estimated coefficients, while column 2 (and 5) shows the average of the 365 corresponding p-values.

This analysis reveals that there is no impact of the placebo treatment on outcomes (lines 1 and 2), or on control variables.

***Student fixed effects***

Now, I will explore another dimension of the database by repeating the main models but incorporating student fixed effects in a panel data setting. The improvement

relative to the two previous methodologies is that equation 3 will control for individual fixed heterogeneity such as innate ability, fanaticism with soccer or propensity for procrastination.

Table 5: Student Fixed Effects estimates

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | **Tournament periods** | | | **Exact day of match** | | |
| | All | Male | Female | All | Male | Female |
| *No show* | 0.006 | 0.005 | 0.006 | 0.036*** | 0.037*** | 0.034*** |
| | (0.004) | (0.006) | (0.005) | (0.007) | (0.01) | (0.008) |
| Observations | 172,050 | 84,022 | 88,028 | 172,050 | 84,022 | 88,028 |
| Number of students | 4,053 | 1,926 | 2,127 | 4,053 | 1,926 | 2,127 |
| *Exam Grade (std)* | -0.013 | -0.012 | -0.014 | -0.141*** | -0.101*** | -0.177*** |
| | (0.009) | (0.014) | (0.013) | (0.015) | (0.023) | (0.021) |
| Observations | 131,615 | 63,269 | 68,346 | 131,615 | 63,269 | 68,346 |
| Number of students | 4,000 | 1,901 | 2,099 | 4,000 | 1,901 | 2,099 |

Notes. This Table presents results from estimating the within students fixed effect model from equation 3. Standard Errors in parenthesis clustered at the student level. Controls include dummy variables for the year, semester and period of the exams. *** p<0.01, ** p<0.05, * p<0.1

The fixed effects panel data models confirm, to a large extent, the findings presented in Tables 2 and 3. The estimated impact is consistently negative, both with a higher rate of absenteeism and lower grades for those who show up. The tournament period analysis (columns 1-3) indicates a null aggregate impact, possibly reflecting students' adaptive behavior within these periods. Conversely, the day-of-the-match regressions (columns 4-6) yield negative outcomes closely aligned with prior estimates. In terms of impact on grade, female students exhibit a more pronounced effect compared to males, with the two coefficients statistically different from each other at the 5% significance level.

# 4 Why is the negative impact larger for female students?

This section presents the results of a survey designed to explore gender differences among students regarding soccer, offering suggestive evidence for possible channels and mechanisms causing divergent impacts by gender. The survey took place during Copa América 2015.

Table 6 reveals that more than 90% of Uruguayan students included in the sample express a fondness for watching soccer, highlighting the sport's preeminence in the country. The National Team, boasting renowned players such as Forlán, Suárez, and

Cavani, under the leadership of Coach Tabárez, was a major attraction during these years. Given the team's stature and the fervor surrounding its matches, particularly during major tournaments, it is conceivable that these events could influence the trade-off between studying and leisure activities.

Table 6: Gender differences in student behavior as soccer viewers

| | (1) Men | (2) Women | (3) Dif (1-2) | (4) SE | (5) t-value | (6) p-value | (7) Obs |
|---|---|---|---|---|---|---|---|
| 1 Likes to watch soccer | 0.96 | 0.90 | 0.06 | 0.02 | 3.16 | 0.00 | 707 |
| 2 Watched Uruguay vs Jamaica | 0.83 | 0.68 | 0.15 | 0.03 | 5.85 | 0.00 | 708 |
| 3 Watched Uruguay vs Argentina | 0.90 | 0.79 | 0.12 | 0.02 | 5.24 | 0.00 | 708 |
| 4 Watches Countries Leagues | 0.74 | 0.36 | 0.37 | 0.03 | 13.82 | 0.00 | 707 |
| 5 Knows next opponent | 0.95 | 0.81 | 0.14 | 0.02 | 5.54 | 0.00 | 681 |
| 6 Fanaticism with Copa América | 0.84 | 0.66 | 0.18 | 0.02 | 8.49 | 0.00 | 707 |
| 7 Will study less because of matches | 0.35 | 0.23 | 0.12 | 0.02 | 5.20 | 0.00 | 704 |
| If Uruguay plays the day before an exam: | | | | | | | |
| 8 I watch the entire match for sure | 0.59 | 0.36 | 0.23 | 0.04 | 6.26 | 0.00 | 706 |
| 9 I watch a part and continue studying | 0.15 | 0.32 | -0.17 | 0.03 | -5.36 | 0.00 | 707 |
| 10 I anticipate study hours to watch the game | 0.49 | 0.45 | 0.04 | 0.04 | 1.16 | 0.25 | 707 |
| 11 Maybe I'll leave the exam for the next period | 0.02 | 0.01 | 0.00 | 0.01 | 0.32 | 0.75 | 707 |
| 12 I do not watch the game to study | 0.07 | 0.17 | -0.10 | 0.02 | -4.05 | 0.00 | 707 |
| 13 I do not watch, for any other reasons | 0.04 | 0.06 | -0.02 | 0.02 | -1.38 | 0.17 | 707 |

Notes. This Table presents data from the survey to students. Variables are self-explanatory, except for row 6 (fanaticism with Copa América). It can assume the following values: 1 if the student plans to watch all matches involving the national soccer team in the current tournament and will also watch all other matches that he can; 0.8 if they intend to watch all matches featuring Uruguay and those in the final stages; 0.5 if only watching all Uruguayan matches; 0.2 if watching some but not all Uruguayan matches; and 0 if they do not plan to watch any matches from the tournament.

The second conclusion is that there are gender differences in almost all dimensions related to soccer. When designing the survey, and based on prior conversations with research assistants (RAs) at the department, they indicated that women generally had less interest in soccer compared to men. However, despite this, they watched the National Team. The survey reveals that boys watch more national league matches, particularly Uruguayan and European games. Smaller differences are also observed in watching National Team matches just before the survey took place (against Jamaica and Argentina during Copa America 2015 in Chile). These variations in behavior highlight significant differences not only between genders but also within genders for different types of competitions. Female students watch fewer regular season matches during the year (36%) relative to high-profile National Team matches, which are the focus of this natural experiment (79% during the match against Argentina). This behavioral difference and the associated "surprise" shock are smaller for men (74% vs. 90%). Male students are also more aware than females

about the next rival in the Cup[7].

Additionally, a question was designed to measure students' fanaticism with the Copa América, based on their behavior as spectators[8]. The variable *fanaticism with Copa América* (line 6 from Table 6) indicates that men are significantly more interested in the tournament than women. However, on average, female students still plan to watch at least all the matches featuring the National Team.

Lastly, the survey explored students' behavior when faced with the trade-off between watching a match and studying. Perhaps surprisingly, only 59% of males reported that they would definitely watch the entire match if it were played the day before an exam (a lower figure than anticipated). In contrast, 36% of females indicated that they would watch the entire match in a similar scenario. Anecdotal evidence from research assistants and focus groups suggests that female students may initially not plan to watch the match (due to a sense of responsibility and a preference for studying), but when the match day arrives and they are invited to watch it with friends, they are likely to accept. The strong attraction and national sentiment associated with the national soccer team are crucial factors influencing these changes in behaviors, and the actual percentage of women watching a Uruguayan match may be closer to 70% (rows 2 and 3) than the reported ex-ante 36%.

Based on the summary statistics and discussions with RAs, it appears that female students constitute a significant portion of the soccer TV audience. They exhibit unexpected high viewership of the National Soccer Team, particularly during major tournaments, largely exceeding their engagement during the regular season. While their knowledge of the exact timing and opponents of upcoming matches may not be as precise as that of male students, they still will watch them with a high probability (larger than their ex-ante reported likelihood). It seems that that the impact of a match on the study schedule of female students is more substantial and unexpected, especially when the match is scheduled the day before an exam, leaving minimal time for recovering lost study hours.

Additionally, a brief survey was conducted with a small group of teachers (n=21) to explore the hypothesis that exam difficulty and grading practices remained unchanged between tournament and non-tournament periods. All respondents (anonymously) confirmed that (i) the exam difficulty remained unchanged, and (ii) they

[7]This question was open-ended, and the accuracy of responses was subsequently verified by research assistants. Verification was contingent upon the timing of the survey completion and the identification of the next opponent in the tournament (which varies by date of the survey).

[8]It can assume the following values: 1 if the student plans to watch all matches involving the national soccer team in the current tournament and will also watch all other matches that he can; 0.8 if they intend to watch all matches featuring Uruguay and those in the final stages; 0.5 if only watching all Uruguayan matches; 0.2 if watching some but not all Uruguayan matches; and 0 if they do not plan to watch any matches from the tournament.

did not alter their grading practices due to Uruguayan matches[9]. The survey also included two questions to gauge teachers' perspectives on students' study habits during the Tournament[10]. Notably, 52% of teachers indicated an expectation that students would study fewer hours for an exam during a tournament period. This percentage increased to 67% when considering the scenario where the National Soccer Team match coincided exactly with the day before the exam for their course. While the sample size of the teacher survey is limited, the qualitative insights align with the findings from the main quantitative analysis, suggesting a more pronounced decrease in grades when exams follow a match day, compared to a general tournament period."

# 5 Conclusion

In this paper, I leverage the timing of Uruguay's National Soccer Team matches as a natural experiment to explore the effects of changes in the relative cost of studying on academic performance. The study draws on data from university students spanning a 13-year period, encompassing three World Cups and three Copa América tournaments. The results indicate a negative impact on performance, manifested through increased absenteeism and lower grades on final exams, particularly when the exam follows a match day. Both male and female students are affected, with female students exhibiting more significant declines in grades.

To investigate the underlying mechanisms, I conducted a survey among 722 students during the Copa América 2015. The results reveal distinct gender patterns regarding soccer fanaticism and viewing behavior. Surprisingly, despite their lower knowledge of the tournament schedule and reported lower soccer fanaticism, female students watched the matches at a higher rate than anticipated, possibly making the treatment more disruptive for them.

There are various inputs in the production function of human capital. Student-level variables, such as effort, are influenced by the relative cost of studying versus leisure. I have shown that an exogenous increase in the value of leisure has an impact on academic performance, with gender-specific effects.

[9] In this regard, respondents diverged from Prof. Mankiw's approach in his Harvard course following Trump's election (albeit his situation involved a midterm, not a final exam).

[10] The exact wording of the four survey questions for teachers is provided in Appendix 5

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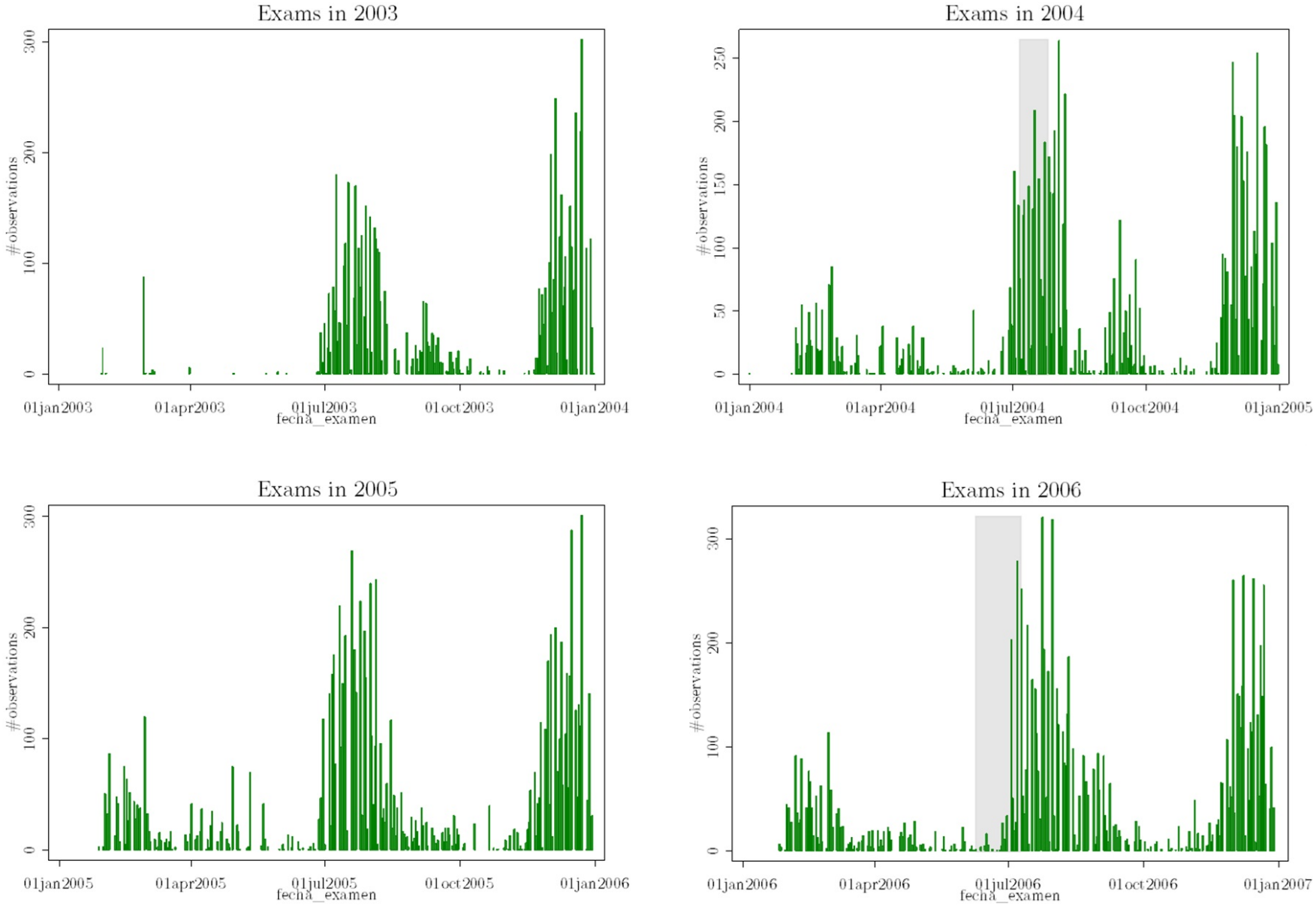
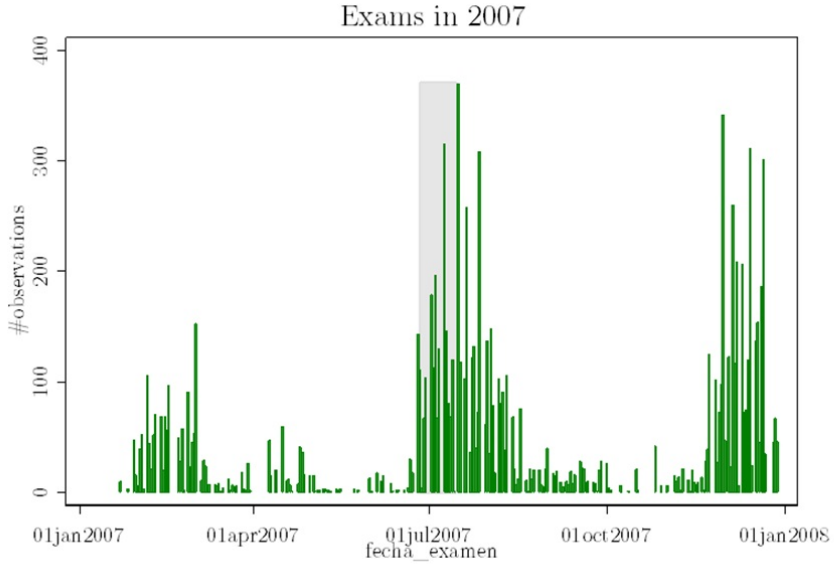
# Appendices

Figure A.1: Daily exams and Tournament Periods for each year, between 2003-2014

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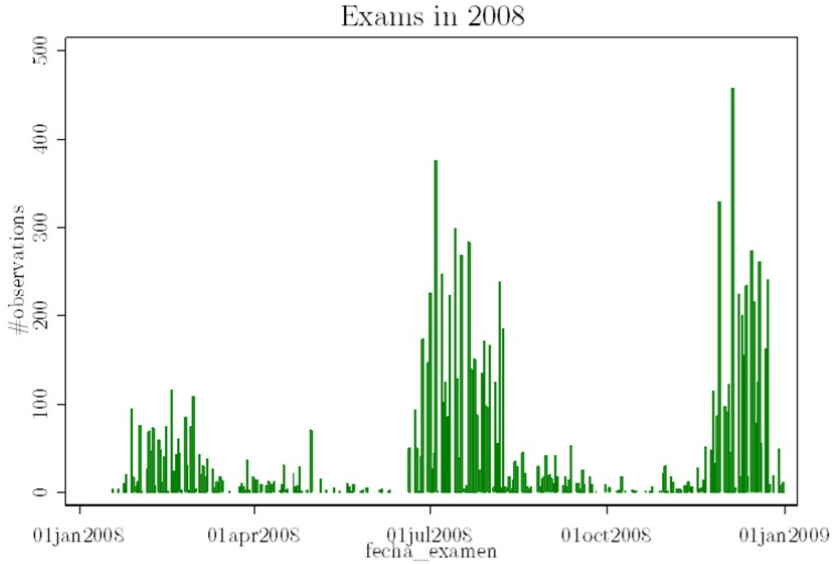
01jul2007
01oct2007
01jan2008
fecha_examen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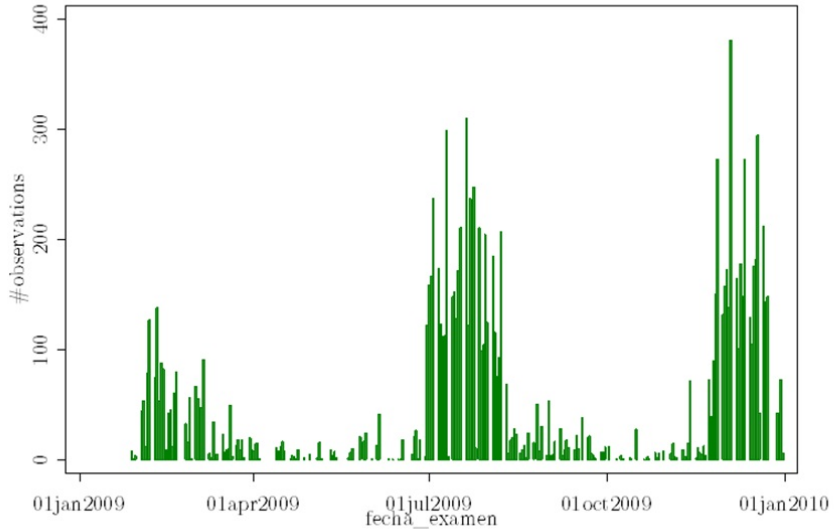
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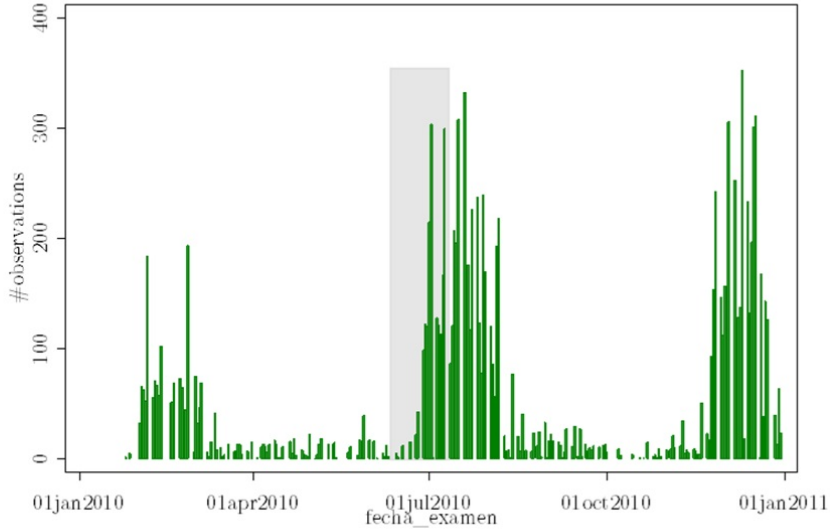
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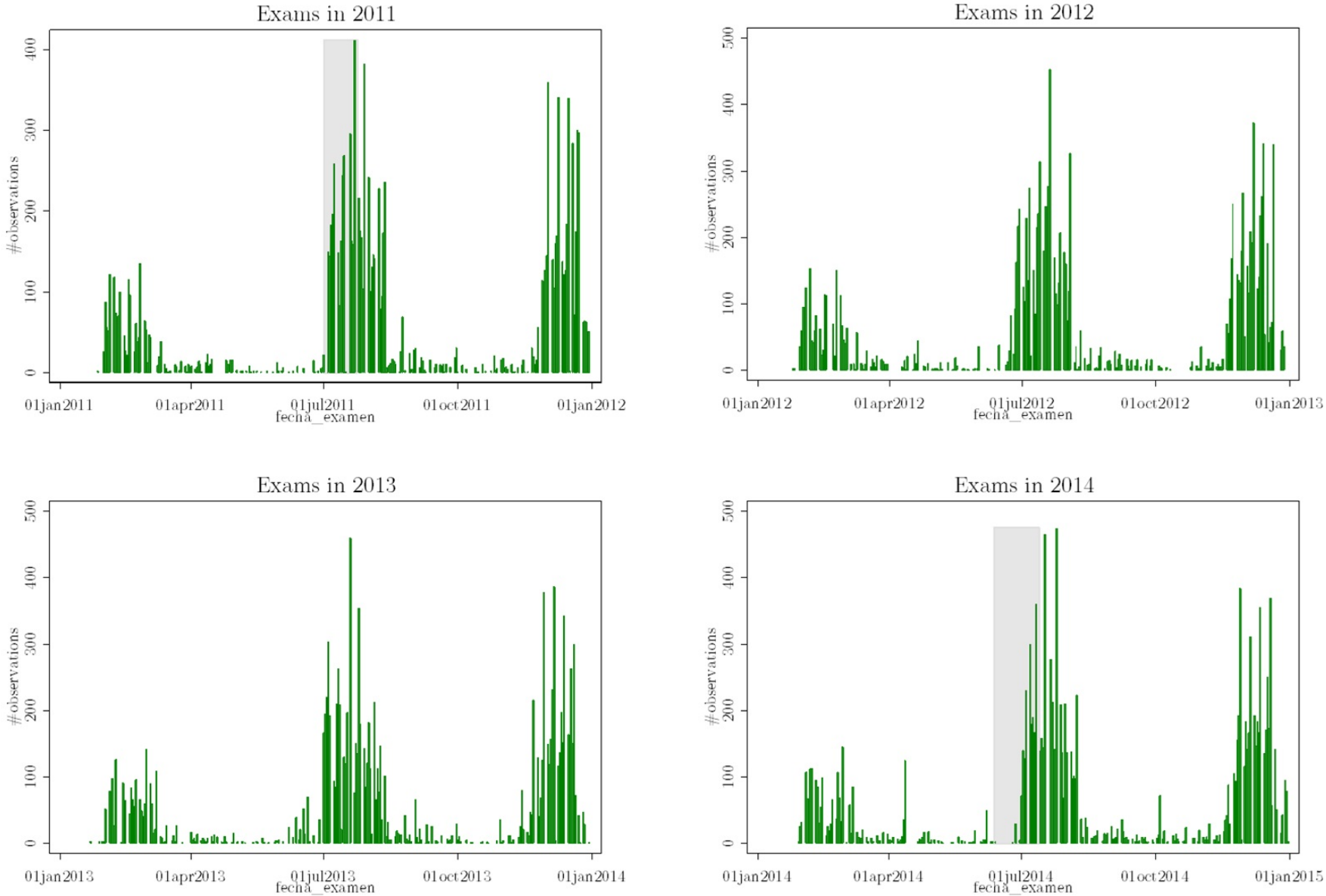


Note: This figure shows the distribution of exams conducted on each day across the sample years. Shaded in grey are the treated periods coinciding with Copa América or FIFA World Cups. Exams held outside these periods serve as control observations, unaffected by matches involving the national team and thus preserving the relative value of leisure.

## Survey for teachers

This is the exact wording (translated from Spanish to English) for the four questions in the survey for teachers.

1. If the exam period coincides with the Copa América or the World Cup, do you think that students:
   (a) Study LESS for exams than in a "normal" period.
   (b) Study the SAME whether there is soccer or not.
   (c) Study MORE when there is soccer than when there isn't.
2. If the Uruguayan national team's match is just the DAY BEFORE the exam, do you think that students:
   (a) Study LESS for the exam.
   (b) Study the SAME for the exam.
   (c) Study MORE for the exam.

Think now about the preparation and correction of exams.

3. When you prepare the questions and exercises for an exam, if Uruguay plays the day before the exam:
   (a) The exam is easier when Uruguay played than in another period.
   (b) A match does not influence the difficulty of the exam.
   (c) The exam is more difficult when Uruguay played than in another period.
4. When you correct an exam, does it influence in any way if there was a Uruguay match the day before the exam:
   (a) I am more "lenient" in the correction.
   (b) A match does not influence how I correct.
   (c) I am more "demanding" in the correction.