ISSN 2522-6398 Vol. 9, Issue 5: 27-32, DOI: 10.25236/FER.2026.090505

The Impact of Volunteering on Academic Performance of University Students: An Empirical Analysis Based on the Volunteers of the 15th National Games of China

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Abstract: *Using the academic data of students from a university in Guangdong Province, China, this paper employs a propensity score matching and a difference-in-differences approach to identify the causal effect of volunteering on academic performance, drawing on volunteers of the 15th National Games of the People's Republic of China in 2025. Students who participated in volunteer activity are treated as the treatment group, while those who did not are treated as the control group. The results show that, on average, volunteer participation has no significant effect on students' grade point average (GPA). However, heterogeneous effects exist across different students: volunteer activities positively affect students with lower academic performance but negatively affect those with higher academic performance. This pattern suggests that volunteer participation simultaneously generates a positive effect through the compensation policy of course regular performance and the negative effect through the dilution of learning resources. Based on these findings, we recommend that universities improve the institutional design of support systems for volunteer activities, establish a mechanism for coordinating academic assistance with volunteering, and guide students toward a rational understanding of volunteer participation.*

Keywords: *academic performance; volunteer participation; university students; the 15th National Games*

1. Introduction

University students' participation in volunteer activities not only contributes to social and public welfare but also enhances their social awareness, teamwork skills, and personal resilience. Such participation holds multidimensional significance for students' holistic development and serves as an important criterion for comprehensive evaluation and merit-based awards during their university years. Consequently, student enthusiasm for volunteer activities has steadily increased, and the volunteer force has expanded considerably. For example, during the 15th National Games of the People's Republic of China in 2025, more than 156 thousand university students from 98 institutions in Guangdong applied to become volunteers.

However, there is still some doubt as to whether university students, who are in the crucial stage of knowledge acquisition, should allocate a significant amount of time and effort to long and intensive volunteer duties. Especially, such volunteering may adversely affect academic performance due to reduced study time. In the current context of higher education, which emphasizes educating through practice, correctly understanding and managing the potential tension between volunteer participation and academic development is particularly important.

The relationship between volunteer activities and academic performance of university students has already attracted academic attention. On the one hand, some studies find that volunteering significantly improves academic performance. A questionnaire survey of medical students in Saudi Arabia revealed that 92.7% of respondents did not perceive volunteer participation has a negative impact on their GPA[1]. Another study based on University of California students found that volunteering experience prior to college entry was positively correlated with academic performance. For each additional volunteer activity, first-year GPA significantly increased by 0.013[2]. Similarly, an empirical research from

ISSN 2522-6398 Vol. 9, Issue 5: 27-32, DOI: 10.25236/FER.2026.090505

Chinese universities also found a significant positive correlation between students' participation in volunteer activities and GPA. Compared with the low-participation group, the moderate- and high-participation groups showed GPA increases of 0.2 and 0.3, respectively, and were also more likely to achieve academic excellence[3]. Indeed, volunteer activities may enhance academic performance through psychological empowerment in the learning process, such as increasing well-being[4][5], fostering positive psychological traits[6], and promoting interpersonal interactions[7][8]. These psychological characteristics have been shown to be positively associated with academic performance[9][10]. On the other hand, some studies suggest that the effect of volunteer experience on academic performance is weak or even insignificant. A longitudinal survey from Australian youth aged 17–25 found that volunteering increased the probability of entering and completing university by only 1%[11]. Another survey found that the duration of community service (e.g., as volunteers) had no significant effect on students' academic performance, possibly because the sampled students devoted relatively little time to volunteer activities on average[12].

While these studies provide valuable perspectives, several limitations remain. First, due to the difficulty of obtaining micro-level individual academic data, research on the relationship between university students' volunteering and academic performance remains insufficient, and existing findings are divergent. Second, existing studies primarily rely on descriptive statistics or multiple regression to examine correlations and have not adopted more rigorous causal identification methods to address endogeneity issues such as omitted variables or self-selection bias. Thus, the causal relationship between volunteering and academic performance requires further investigation.

Drawing on students' course examination scores from a university, this study carries out analysis against the backdrop of the 15th National Games. The National Games is the largest and highest-level comprehensive sports event in China. Hosted jointly in Guangdong Province, Chinese Hong Kong and Chinese Macao, the 15th National Games took place from November 9 to 21, 2025, with around 45,000 volunteers recruited within Guangdong Province. This large-scale, high-standard, well-organized volunteer program, with its clearly defined compensation policy, provides an ideal quasi-natural experimental setting for identifying the causal relationship between university students' volunteering and academic performance. This paper aims to identify the causal effect of volunteer participation on students' academic performance, provide empirical evidence for a more objective cognition of voluntary activities, and offer theoretical and practical implications for the optimization of volunteer programs.

2. Research Design

2.1 Method

This paper aims to identify the causal effect of university students' volunteering on their academic performance. Because volunteer participation is not randomly assigned, two types of endogeneity issues must be addressed. The first is omitted variable bias. Factors other than volunteer participation that influence both the decision to volunteer and academic performance, such as individual heterogeneity in ability, motivation, or family socioeconomic status, as well as period differences in academic workload and available time across the academic calendar, may confound the relationship. We employ a difference-in-differences (DID) method to solve this problem. Students who participated in volunteer activities are treated as the treatment group, and those who did not are treated as the control group. By comparing the change in academic performance of the treatment group before and after participation with the change over the same period for the control group, the DID approach eliminates bias from time-invariant individual heterogeneity and common period-specific shocks.

The second issue is self-selection bias. Students may decide whether to participate in volunteer activities based on their prior academic performance. Meanwhile, the university, acting as a selector, may use prior academic performance as a criterion for recruiting volunteers. As a result, there may be significant baseline differences in academic performance between volunteers and non-volunteers. We employ a propensity score matching (PSM) method to solve this problem. We select non-volunteer students whose observable characteristics are highly similar to those of the treatment group to construct a matched control group, thereby increasing comparability and improving the credibility of causal inference.

2.2 Data and Sample

This study focuses on the 15th National Games volunteers at a university in Guangdong Province,

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China. This university provides bachelor's, master's and doctoral degree programs, covering 22 undergraduate majors spanning six disciplinary categories: education, economics, management, art, literature and medicine. Its total student enrollment exceeds 8,000. Following a preliminary selection and training process, 311 students from this university participated as volunteers for the 15th National Games. Among these volunteers, 14.1% were graduate students, 1.3% were senior undergraduates (fourth year), 31.2% were junior undergraduates (third year), 52.1% were sophomore undergraduates (second year), and 1.3% were first-year undergraduates. Volunteers served in three types of roles: (1) event volunteers (55.0%), primarily providing competition services and spectator guidance within competition venues; (2) city volunteers (40.2%), mainly offering traffic guidance and spectator information at key locations such as transport hubs, commercial areas, tourist attractions and cultural squares; and (3) award ceremony volunteers (4.8%), primarily providing process guidance and medal delivery during award ceremonies.

This paper conducts empirical analyses based on the largest volunteer cohorts at this university, that is, the sophomore and the junior undergraduate students. The university provided course examination data. Academic performance is measured by grade point average (GPA), calculated as GPA = Σ(Course Grade Point × Course Credits) / Σ Course Credits, where the course grade point is defined as (Course Score – 50) / 10 (with a grade point of 0 for scores below 60). The course score comprises a regular performance (40%) and a final examination score (60%). It is important to note that this university implemented a compensation policy for volunteer students, guaranteeing them the right to take course examinations as usual and a regular performance score of no less than 80, in order to mitigate the conflict between volunteer activities and academic assessment. This policy implies that the estimated overall effect of volunteer activities includes both the "true" effect on learning and the effect of the compensation policy. Although the available examination data do not allow us to separate regular performance scores from final examination scores, we leverage the clear compensation threshold of 80 for regular performance scores to attempt to disentangle the respective effects of the compensation policy and the "true" academic performance.

We construct a balanced two-period panel data at student-semester level as the research sample. Since the volunteer activities for the 15th National Games were conducted in the autumn semester of 2025, we focus on the two semesters of 2025 and using the spring semester as the pre-period and the autumn semester as the post-period. To screen control group students with characteristics as similar as possible to the treatment group, we implement a PSM method in two steps. First, we estimate the propensity score, defined as the conditional probability of volunteering, for each student using a logit model with volunteer participation as the dependent variable. Second, we match each volunteer student to a non-volunteer student with the nearest propensity score. Matching variables include a grade dummy variable Juniors (1 for juniors, 0 for sophomores), GPA in the spring semester of 2025, number of courses taken (Courses), total contact hours (ContactHours), and the average exam score (ExamScore) of three compulsory general education courses available to all majors: College English I, College English II, and Basic Principles of Marxism. We use 1:4 nearest neighbor matching within the common support region. The matched sample includes 993 students, with 255 in the treatment group and 738 in the control group.

The balancing test results for all matching variables are reported in Table 1. After matching, the standardized bias of all variables is less than 10%, and the t-tests do not reject the null hypothesis of no systematic difference between the treatment and control groups, indicating good matching quality. Figure 1 shows the kernel density distributions of propensity scores before and after matching. The overlap of the two density curves is substantially higher after matching, confirming improved similarity between the two groups.

Table 1. Balancing Test Results for PSM

Matching variables	Unmatched(U) Matched(M)	Mean		Bias%	t-test	p>|t|
		Treated	Control			
pre-period GPA	U	3.333	2.954	66.5	9.34	0.000
	M	3.333	3.329	0.7	0.09	0.929
Courses	U	12.600	11.582	36.9	5.8	0.000
	M	12.600	12.575	0.9	0.11	0.916
ContactHours	U	485.9	447.1	36.7	5.91	0.000
	M	485.9	483.2	2.5	0.29	0.774
ExamScore	U	76.38	71.56	62.4	8.74	0.000
	M	76.38	76.16	2.9	0.38	0.706
Juniors	U	0.380	0.523	-28.9	-4.37	0.000
	M	0.380	0.363	3.6	0.41	0.681

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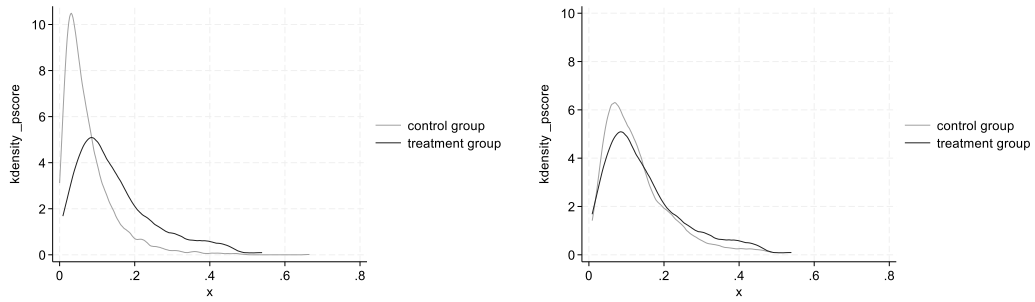

Figure 1. Kernel Density Distributions of Propensity Scores: Unmatched (Left) vs. Matched (Right)

2.3 Model

Based on the matched sample, we specify the following DID baseline model:

$$GPA_{it} = \alpha + \beta Treat\_Post_{it} + \gamma Controls_{it} + FE_i + FE_t + \varepsilon_{it} \quad (1)$$

Where the dependent variable GPAit is the GPA of student i in semester t. Treatit is a dummy variable for volunteer status, and Postit is a post-period dummy variable. Their interaction term Treat_Postit is the key independent variable, equal to 1 for volunteers in the post-period and 0 otherwise. Its coefficient β captures the causal effect of volunteering on academic performance. Control variables Controlsit include the number of courses, total contact hours, the average score of three general education courses interacted with the post-period (ExamScore_Postit), and grade interacted with the post-period (Juniors_Postit) to capture time-varying effects. FEi and FEt denote student fixed effects and time (semester) fixed effects, respectively. εit is the error term. We cluster standard errors at the class level to account for within-class correlation in academic performance.

3. Empirical Results

Model 1 in Table 2 reports the DID regression results using the matched sample. The coefficient of Treat_Postit is positive but close to zero (0.003) and statistically insignificant at the 10% level, suggesting that volunteering has no significant effect on GPA overall. Model 2 examines heterogeneous effects across volunteer types. We combine award ceremony volunteers (small in number) with event volunteers into one group, and creating two dummies variables: Type1 for event volunteers and award ceremony volunteers, and Type2 for city volunteers. Their interactions with Treat_Post are both insignificant, indicating no significant effect of volunteer type on academic performance.

Table 2. Regression Results

Independent Variables	Model 1	Model 2	Model 3
Treat_Post	0.003 (0.034)		
Treat_Post_Type1		-0.039 (0.041)	
Treat_Post_Type2		0.050 (0.050)	
Treat_Post_Q1			-0.191*** (0.051)
Treat_Post_Q2			-0.132*** (0.041)
Treat_Post_Q3			0.063 (0.058)
Treat_Post_Q4			0.247*** (0.065)
Courses	0.021 (0.014)	0.021 (0.014)	0.021 (0.013)
ContactHours	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
ExamScore_Post	-0.001 (0.002)	-0.001 (0.003)	0.003 (0.003)
Juniors_Post	-0.010 (0.049)	-0.013 (0.049)	0.001 (0.047)
Student FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
within-R^2	0.020	0.023	0.058
N	1986	1986	1986

Notes: Standard errors clustered at the class level are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

These results imply that volunteering has no significant net effect on students' GPA. Given the

ISSN 2522-6398 Vol. 9, Issue 5: 27-32, DOI: 10.25236/FER.2026.090505

compensation policy of course regular performance that directly boosts GPAs, the insignificant overall effect suggests the presence of an offsetting negative effect. We argue that this negative effect stems from long and intensive volunteer activities diluting the time and energy that student volunteers would otherwise devote to coursework. Additionally, scheduling conflicts between volunteer activities and class hours prevent students from accessing certain course resources.

To test the asymmetric effects of the compensation policy and resource dilution, we divide volunteer students into four quartiles based on the share of courses with total scores≥80 in pre-period:

Q1: top 25% (share > 87.5%)

Q2: 25%–50% (75.0%–87.5%)

Q3: 50%–75% (60.0%–75.0%)

Q4: bottom 25% (share ≤ 60.0%)

We then interact Treat_Postit with these quartile dummies. Model 3 shows that the interaction coefficients increase monotonically as pre-period performance declines. Specifically, volunteering significantly reduces GPA by 0.191 for Q1 students and 0.132 for Q2 students (both at the 1% level). Most courses of these high-performing students already scored above 80, so the compensation policy provides little benefit, while time and resource dilution dominate. However, the effect is insignificant for Q3 students, meaning positive compensation effects fully offset negative dilution effects. Finally, volunteering significantly increases GPA by 0.247 for Q4 students (bottom 25%). The minimum 80-point usual-performance rule strongly lifts their grades, outweighing the dilution effect. These results confirm heterogeneous effects: volunteering benefits low-performing students because of the positive effect through the compensation policy of course regular performance, but harms high-performing students because of the negative effect through the dilution of learning resources.

To ensure robustness, we conduct a placebo test with 1,000 random reshuffles of the treatment status among the 993 matched students. The placebo effects should center around zero. As shown in Table 3, the coefficients for Treat_Post_Q1, Treat_Post_Q2, and Treat_Post_Q4 are significantly different from placebo distributions (two-sided and one-sided p-values ≤ 0.01), while the one for Treat_Post_Q3 is not significantly different. These results validate the robustness of our main findings.

Table 3. Results of Placebo Test

Independent Variables	Coefficient	p-value		
		Two-sided	Left-sided	Right-sided
Treat_Post_Q1	-0.191	0.000	0.000	1.000
Treat_Post_Q2	-0.131	0.010	0.005	0.995
Treat_Post_Q3	0.063	0.186	0.913	0.087
Treat_Post_$Q4_{it}$	0.281	0.000	1.000	0.000

4. Conclusions

This study examines the impact of students volunteering on academic performance using academic data from a university in Guangdong during the 15th National Games. The main conclusions are as follow. On average, volunteer participation has no significant effect on student GPA, and volunteer position does not matter. However, heterogeneous effects exist. Volunteering benefits low-performing students because of the positive effect through the compensation policy of course regular performance, but harms high-performing students because of the negative effect through the dilution of learning resources.

Based on these findings, we propose three recommendations. First, universities should improve the top-level design of volunteer support systems by institutionalizing temporary measures and establishing a classification system based on activity scale, intensity, duration and impact, with clear academic compensation standards for each tier. Second, universities should build flexible collaborative mechanisms tailored to student heterogeneity, such as differentiated grade compensation, deferred exams, and coursework substitution with high-quality volunteer reports, rather than imposing one-size-fits-all rules. Third, universities should guide students toward rational volunteering decisions by strengthening information about volunteer duties.

ISSN 2522-6398 Vol. 9, Issue 5: 27-32, DOI: 10.25236/FER.2026.090505

Acknowledgments

This paper was supported by 2024 Guangdong Province Undergraduate Teaching Quality and Educational Reform Project: Exploration and Application of Flipped Classroom Teaching in Econometrics Courses at Sports Universities.

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