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JUNTOS program and school enrollment in high-poverty Peruvian regions: a propensity score matching analysis

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Abstract. This study analyzes the association between participation in the JUNTOS conditional cash transfer program and school enrollment among children and adolescents in poor households in selected high-poverty Peruvian regions: Ayacucho, Cajamarca, Loreto, and Puno. Two samples were constructed from the 2023 National Household Survey (ENAH0) database: the treatment group, composed of beneficiaries of the JUNTOS program, and the control group, constructed using Propensity Score Matching (PSM) to select non-beneficiaries with similar characteristics. A Logit model was also estimated as a robustness check. The results indicate a positive association between program participation and school enrollment. These findings suggest that conditional cash transfer programs in Peru may contribute to improving educational access for minors in poverty-stricken regions.

Keywords: conditional transfer programs, JUNTOS, school enrollment, propensity score matching, social public policy, Cusco, educational inclusion

JEL classification: I21; I28; I38; H75; C21

1. Introduction

The JUNTOS program, implemented in Peru in the early 2000s, is a conditional transfer program focused on rural areas with high levels of poverty and extreme poverty. Its aim is to reduce poverty by providing transfers conditional on increased access to education and health services for minors in households. This program operates in the regions with the highest poverty rates in the country, including Cusco, Ayacucho, Cajamarca, Loreto, and Puno—the regions analyzed in this study.

To be eligible for the JUNTOS program, a household must belong to a district with a poverty rate greater than 40%. The number of enrolled households in the selected regions has shown an upward trend, from 28,203 households in 2007 to 48,116 in 2018 (JUNTOS, 2023). At the same time, the percentage of students with delayed schooling has decreased significantly, from 30.5% in 2000

to 3.7% in 2018. There have also been improvements in attendance and completion of secondary education.

Although several studies have shown that conditional transfer programs such as JUNTOS are associated with poverty reduction and increased access to education and health services, a knowledge gap still exists regarding their impacts in specific regional contexts like those analyzed in this study. Most research focuses on national-level assessments or general approaches, without considering territorial particularities, geographic dispersion, and the role of family factors such as parents' age or educational attainment. This gap limits a comprehensive understanding of the associations between the program and educational outcomes in highly vulnerable rural areas.

This research seeks to answer a set of key questions regarding the association between participation in the JUNTOS program and educational outcomes in the selected regions. In particular, it examines: To what extent is program participation associated with improved educational attainment of minors in beneficiary households? What is its association with school dropout in areas characterized by high poverty rates? In addition, it explores how other variables, such as parents' age and educational attainment, are related to educational outcomes of children and adolescents.

The main objective of this study is to analyze the association between participation in the JUNTOS program and educational outcomes of minors in high-poverty areas of Peru. Specifically, it aims to: (i) evaluate the differential associations of the program in the poorest and most remote areas of the selected regions; (ii) measure its association with school dropout; and (iii) examine the role of family factors, such as parents' age and educational attainment, in the observed outcomes.

This study contributes to the literature on conditional cash transfer programs by providing a subnational, regionally disaggregated analysis of the JUNTOS program in four high-poverty regions of Peru—Ayacucho, Cajamarca, Loreto, and Puno. Unlike previous national-level studies, it examines context-specific associations between program participation, household characteristics, and school enrollment, highlighting heterogeneity in outcomes across regions and households. These findings not only advance academic understanding of how conditional transfers function in diverse local contexts but also provide evidence to inform policy design aimed at improving educational access and retention in vulnerable areas.

2. Literature review

The literature on the determinants of school dropout and the effectiveness of conditional cash transfer programs in the region and in Peru provides a broad but heterogeneous panorama with sometimes contradictory results. Studies consistently highlight the role of parental and household characteristics in shaping educational outcomes. Alcázar et al. (2002) found that parental age and educational attainment are crucial factors explaining children's school dropout, a finding consistent with Rodríguez et al. (1998), who also showed that parents' low educational attainment and age increase the likelihood of school abandonment, as early entry into the labor market is often prioritized.

Despite being conducted over two decades ago, these studies remain relevant, showing that poverty and parents' educational limitations affect children's school attendance and

reproduce intergenerational inequalities. Following this line, Trivelli et al. (2015) and Ñopo et al. (2002) argue for comprehensive social policies that combine educational access with the fulfillment of basic needs, highlighting the need for multisectoral interventions rather than isolated educational measures.

Conditional cash transfer programs such as JUNTOS are designed with this rationale in mind, drawing on both human capital theory and the capabilities approach. From a human capital perspective, increased educational attainment leads to higher productivity and future income (Salinas, 2014; Pérez and Baltazar, 2021), while the capabilities approach emphasizes that education expands substantive freedoms by enabling access to employment, income, and basic services. Empirical evidence, however, shows that program impacts are heterogeneous and context dependent.

In Peru, studies evaluating JUNTOS report mixed results. Ponce (2020) found positive effects on household consumption, health access, and school attendance, particularly in the transition to secondary school, aided by the provision of school supplies. By contrast, Chávez et al. (2017), using PSM, Probit, and nearest neighbor matching in Huánuco (2012–2016), found no significant improvements in enrollment and even some setbacks, indicating that program effects are neither uniform nor linear. Intermediate studies support this ambivalence: Díaz et al. (2009) observed improvements in student and teacher attendance and reductions in dropout in poor regions (Apurímac, Huancavelica, Huánuco), coinciding with Sánchez et al. (2016), who documented a decrease in child labor.

Mendoza (2015) reported increases in primary (5.3%) and secondary (6.6%) school attendance in Yanaoca (Cusco), while Aguilar (2017) confirmed cognitive improvements in mathematical reasoning. Conversely, Salcedo (2020), using binomial Probit and PSM with ENAHO data, found a 3.7% reduction in enrollment among beneficiaries in 2018, suggesting unintended effects potentially linked to implementation challenges, perverse incentives, or targeting deficiencies.

International evidence shows more consistent positive effects. Mexico's Progreso increased enrollment by 8% for boys and 14% for girls (Schultz, 2000), and Skoufias et al. (2001), using difference-in-differences, found significant gains in attendance, particularly among 12–13-year-olds. Brazil's Bolsa Familia reduced grade repetition by up to 11% (Oliveira et al., 2013) and promoted progressive year approval (UNESCO, 2013).

While Cireno et al. (2013) confirmed lower dropout among beneficiaries. Colombia's Familias en Acción improved outcomes in both rural and urban areas, particularly for young children (Attanasio et al., 2006). Other Latin American programs such as Paraguay's Tekopora (Veras et al., 2008), the Dominican Republic's Solidaridad (Cecchini, 2014), and Jamaica's PATH (Levy et al., 2007) also increased attendance and enrollment, though effectiveness varied according to sociocultural context, institutional capacity, and condition intensity.

Recent studies further nuance these findings. Venegas-Cantillano et al. (2024) show that transfer effects are stronger for school reintegration than persistence, while Jiang (2024) highlights the importance of exposure duration and long-term economic benefits. Barbado et al. (2024) note that household size, distance to schools, and social perceptions condition results, and Wabukala et al. (2024) and Sessou et al. (2024) stress governance, fiscal resources, and

sociocultural context.

In Peru, Cahuana et al. (2024) report reductions in dropout (4.9%) and malnutrition (3.9%) in Apurímac, and Onsay et al. (2025) describe increases in enrollment and lower dropout in preparatory school, whereas Haman (2025) notes that greater attendance and parental involvement do not necessarily improve academic performance, highlighting that coverage alone does not guarantee quality.

Studies on institutional conditions reinforce this perspective. Shah and Gennetian (2024) argue that social targeting and state management capacity are crucial, while Dodd et al. (2024) warn that lack of transparency, payment delays, and limited transfer amounts reduce effectiveness. O'Connor (2024) and Stacy et al. (2024) emphasize the benefits of early exposure and combining transfers with extracurricular activities. Magalhães et al. (2024) and Robson et al. (2024) document gains in food security, child mortality, and employability but caution against disincentives for employment with overly generous transfers. In contrast, Utami et al. (2024) and Beuermann et al. (2024) find no impact when programs lack conditions or monitoring.

In summary, the main hypothesis is that participation in the JUNTOS program is positively associated with school enrollment among children and adolescents in the poorest areas of the four selected regions of Peru. In addition, household characteristics, such as parents' age and educational attainment, are expected to influence educational outcomes in these high-poverty contexts.

3. Method

This study follows a quantitative, non-experimental, cross-sectional design to examine the relationship between participation in the JUNTOS conditional cash transfer program and school enrollment among children and adolescents in Peru in 2023. The analysis is motivated by the role of conditional transfers in supporting human capital accumulation in contexts of persistent poverty. Given the observational nature of the data, the results are interpreted as associations rather than definitive causal effects.

3.1. Data source and sample construction

The empirical analysis is based on data from the 2023 ENAHO, conducted by the National Institute of Statistics and Informatics (INEI). ENAHO is the main household survey in Peru and offers detailed, nationally representative information at the household and individual levels, with consistent coverage across regions and urban-rural areas. Its rich set of modules on education, health, employment, income, and social programs makes it particularly suitable for evaluating policies such as JUNTOS.

The year 2023 provides an appropriate context for this analysis, as both educational activities and the implementation of the JUNTOS program had returned to normal operation after the

disruptions caused by the COVID-19 pandemic. This allows the study to assess program performance under stable institutional and schooling conditions, without the confounding effects of emergency policies or school closures.

3.2. Sample construction and eligibility criteria

The unit of analysis is children and adolescents aged 5 to 18 years, corresponding to the compulsory schooling ages in Peru and to the population directly targeted by the educational conditionalities of the program.

A central feature of the empirical strategy is the explicit incorporation of the program's eligibility rules into the sample design. Since JUNTOS is targeted exclusively to households living in poverty, the analysis is restricted *ex ante* to households classified as poor according to the official poverty definition used in ENAHO. This restriction is applied prior to any estimation or matching procedure. After applying this eligibility criterion and restricting the sample to children aged 5–18, the final analytical sample consists of 874 observations, of which 476 correspond to beneficiary households and 398 to eligible non-beneficiary households.

By construction, both treated and control units belong to the same pool of potentially eligible households, ensuring that comparisons reflect the relevant counterfactual faced by program beneficiaries.

3.3. Regional focus

Although ENAHO is a nationally representative survey, this study does not seek to estimate an average national effect of the JUNTOS program. Instead, the analysis concentrates on regions where the program is likely to be most relevant from both a social and empirical perspective, specifically, areas with high levels of poverty and where school enrollment has not yet reached full saturation.

To inform this choice, regional poverty rates and school enrollment levels for children aged 5–18 were calculated using ENAHO 2023 data prior to any econometric estimation. As shown in Table 1, these indicators display substantial variation across regions. While several departments report poverty rates exceeding 40%, in many of them school enrollment is already close to universal, leaving little scope for identifying additional gains associated with program participation.

This combination of high enrollment and low remaining variation gives rise to a ceiling effect in the outcome variable. When enrollment rates approach full coverage, even effective policies are unlikely to generate large or precisely estimated impacts, simply because most children are already enrolled. In such contexts, small or insignificant estimates may reflect limited empirical room for improvement rather than a lack of program effectiveness.

Based on this preliminary assessment, the empirical analysis focuses on regions that meet two conditions simultaneously: a high incidence of poverty and school enrollment rates that remain below full saturation. In particular, Ayacucho, Cajamarca, Puno, and Loreto stand out as regions where poverty rates exceed 39 percent, while enrollment rates range between approximately 92 and 95 percent. These figures indicate that, despite high participation in schooling, a non-negligible share

of children remains outside the education system, making these regions especially informative for evaluating the association between JUNTOS participation and school enrollment among eligible households.

After restricting the sample to poor households with children aged 5–18 residing in these regions, the final analytical sample comprises 874 observations for the logistic regression analysis and 823 observations within the region of common support used in the propensity score matching estimations. This approach prioritizes internal validity and policy relevance over national representativeness, allowing the analysis to focus on contexts where conditional cash transfers are more likely to influence schooling decisions at the margin.

Table 1. Poverty and School Enrollment Rates: Selected Regions vs. Rest of Peru (ENAHO 2023).

Group of regions	Poverty rate (mean)	School enrollment rate (mean)
Ayacucho, Cajamarca, Loreto, y Puno	0.428	0.935
Remaining regions	0.247	0.937
National average	0.228	0.934

Notes: Selected regions correspond to departments with high poverty incidence and non-saturated school enrollment among children aged 5–18.

Source: ENAHO 2023 (INEI).

3.4. Variables and operationalization

The main outcome variable is school enrollment, which is used as a proxy for school dropout. It is defined as a binary indicator that takes the value of one if the child or adolescent was enrolled in school in 2023, and zero otherwise. While this measure does not capture the dynamic nature of dropout processes—such as temporary interruptions or delayed enrollment, it is a standard indicator in cross-sectional household surveys and is widely used in the empirical literature to study schooling outcomes. Given the structure of ENAHO, this operationalization allows for consistent comparisons across households and regions.

The key explanatory variable is participation in the JUNTOS program. This variable equals one if the household reports having received benefits from JUNTOS and zero otherwise, based on information from the Social Programs module of ENAHO. As JUNTOS is targeted to poor households with school-age children, this variable captures exposure to the program among the population that is potentially eligible for its educational conditionalities.

The analysis includes a parsimonious set of control variables capturing core household and household-head characteristics that are plausibly related to both program participation and schooling decisions. These controls include: (i) area of residence (urban or rural), (ii) age of the household head, (iii) educational attainment of the household head, (iv) household size, and (v) access to health services.

Given the reduced sample size after applying eligibility and regional restrictions, the number of covariates is intentionally limited in order to preserve statistical power and reduce the risk of overfitting. This choice reflects a trade-off between model richness and estimation precision.

Table 2. Operationalization of study variables (ENAH0 2023).

Type of variable	Variable	Conceptual definition	Operational definition	Coding	Source
Dependent	School enrollment	Participation in formal education during the school year	Enrollment status in 2023	1 = enrolled; 0 = not enrolled	Education module
Main independent	JUNTOS participation	Household beneficiary of JUNTOS	Household reports receiving JUNTOS	1 = beneficiary; 0 = non-beneficiary	Social Programs module
Control	Area of residence	Geographical location of household	Urban or rural residence	1 = rural; 0 = urban	Household module
Control	Age of household head	Age of household head	Years completed	Continuous	Household module
Control	Education of household head	Educational attainment of household head	Educational level	Categorical	Education module
Control	Household size	Number of household members	Total members in household	Continuous	Household module
Control	Access to health services	Household access to health care	Reported access	1 = yes; 0 = no	Health module

Note: The analysis is restricted to poor households with children aged 5–18 residing in selected regions.

Source:

3.5. Empirical strategy

The empirical strategy combines Propensity Score Matching (PSM) with logistic regression models. This dual approach allows for both nonparametric comparisons between treated and control households and parametric estimation as a robustness check.

Let Y_i denote the school enrollment status of child i , where $Y_i = 1$ if the child is enrolled in school in 2023 and $Y_i = 0$ otherwise. Participation in the JUNTOS program is modeled as a binary treatment variable. The estimated effects of JUNTOS on school enrollment are presented using marginal effects and predicted probabilities, rather than the raw logistic coefficients, to ensure correct interpretation and avoid overstating the magnitude of the relationships:

$$D_i = \begin{cases} 1 & \text{if household } i \text{ reports receiving JUNTOS benefits} \\ 0 & \text{otherwise} \end{cases}$$

The probability of school enrollment is first estimated using a logistic regression model:

$$\Pr(Y_i = 1 \mid D_i, X_i) = \frac{1}{1 + \exp(-(\beta_0 + \beta_1 D_i + X_i' \gamma))}$$

where X_i is a vector of observed household characteristics. The coefficient β_1 captures the association between participation in JUNTOS and the likelihood of school enrollment, conditional on observed covariates.

In the PSM framework, propensity scores are estimated as the conditional probability of treatment given covariates, $p(X_i) = \Pr(D_i = 1 \mid X_i)$. Several matching algorithms are implemented, including nearest-neighbor, caliper, radius, kernel, and local linear regression matching. Balance diagnostics and common support are examined to assess the quality of the matching procedure, and the Average Treatment Effect on the Treated (ATT) is estimated for school enrollment outcomes.

As a complementary analysis, parsimonious logistic regression models are estimated using the same eligible sample. These models provide an alternative summary of the relationship between JUNTOS participation and school enrollment and serve as a robustness check for the matching results. Throughout the analysis, findings are interpreted cautiously, with explicit recognition of the limitations inherent to cross-sectional observational data.

4. Results

The results indicate a positive and statistically significant association between participation in the JUNTOS program and school enrollment among children and adolescents living in poor households in the selected regions. After balancing the treatment and control groups using PSM, it is observed that beneficiaries of the program consistently display higher enrollment rates than comparable non-beneficiaries. The complementary Logit model confirms the relevance of JUNTOS participation, as well as the role of household characteristics such as area of residence, age of the household head, and household size in shaping schooling outcomes. Overall, the findings suggest that JUNTOS is associated with higher school attendance in contexts where poverty remains widespread and school enrollment is not fully saturated.

4.1. Descriptive Statistics

The data reported in Table 3 come from the 2023 ENAHO and correspond to poor households with children aged 5 to 18 residing in the selected regions. For each variable, descriptive statistics are presented separately for two groups: (i) the treatment group (T), composed of households that participate in the JUNTOS program, and (ii) the control group (C), composed of comparable non-beneficiary households. As shown in Table 2, the total analytical sample consists of 919 observations, of which 537 correspond to the treatment group and 382 to the control group. Although the sample is more balanced than in the national data, some differences in group size remain. This initial imbalance motivates the use of PSM techniques in the subsequent analysis in order to ensure

comparability between treated and non-treated households.

Regarding the main outcome variable, school enrollment (*Matricu*), enrollment rates are high in both groups, but remain higher among JUNTOS beneficiaries. The average enrollment rate is 0.961 for the treatment group, compared to 0.916 for the control group, suggesting a positive raw difference in favor of program participants prior to matching.

Turning to household characteristics, the average age of the household head (*Edajh*) is slightly lower among treated households (approximately 42 years) than among control households (around 44 years), with comparable levels of dispersion. The age of children (*Edaal*) is highly similar across groups, with average values close to 11.5 years in both cases, indicating that treated and control households are comparable in terms of children's age composition.

Table 3. Descriptive Statistics by Treatment (T) and Control (C) Groups, 2023.

Variables	Group	Obs.	Mean	Std. Dev.	Min	Max
Access to education (<i>Matricu</i>)	T	537	0.9609	0.1940	0	1
	C	382	0.9162	0.2774	0	1
Head language (<i>Lenjh</i>)	T	476	0.7080	0.4552	0	1
	C	348	0.6782	0.4679	0	1
Area of residence (<i>Area</i>)	T	537	0.2160	0.4119	0	1
	C	383	0.4413	0.4972	0	1
Age of household head (<i>Edajh</i>)	T	511	41.96	10.42	20	86
	C	364	43.86	11.51	18	81
Student age (<i>Edaal</i>)	T	537	11.40	3.75	5	18
	C	383	11.55	3.89	5	18
Head gender (<i>Genjh</i>)	T	278	0.2122	0.4096	0	1
	C	220	0.2864	0.4531	0	1
Marital status (<i>Estci</i>)	T	511	0.3190	0.4665	0	1
	C	364	0.3736	0.4844	0	1
Education of household head (<i>Edujh</i>)	T	511	0.2074	0.4293	0	2
	C	364	0.3516	0.5530	0	2
Household size (<i>Mieho</i>)	T	537	5.09	1.66	2	13
	C	383	4.99	1.97	2	14
Health access (<i>Salud</i>)	T	537	0.2533	0.4353	0	1
	C	383	0.3159	0.4655	0	1

Note: Sample restricted to poor households with children aged 5–18 residing in selected regions.

Source: ENAHO 2023. Own elaboration.

4.2. Propensity Score Matching (PSM)

Regarding the dichotomous variables, school enrollment (*Matricu*) exhibits high average values in both the treatment and control groups, although enrollment remains consistently higher among JUNTOS beneficiaries. Prior to matching, the mean enrollment rate is 0.961 for the treatment group and 0.916 for the control group, with standard deviations of 0.194 and 0.277, respectively. This raw difference suggests a positive association between program participation and school enrollment, but

also highlights the need to address pre-existing differences between groups.

Other key covariates also display systematic differences before matching. For instance, households in the treatment group are more likely to reside in rural areas, as reflected by a lower average value of the Area variable (0.216) compared to the control group (0.441). Similarly, treated households tend to have lower educational attainment of the household head and slightly larger household size, which is consistent with the program's targeting toward poorer and more vulnerable populations.

Among the main strengths of the PSM approach are its capacity to reduce selection bias and improve the comparability between treatment and control groups. By conditioning on observable characteristics, PSM allows the construction of a counterfactual group that closely resembles beneficiary households in terms of socioeconomic and demographic attributes. Figure 1 illustrates this process by showing the distribution of propensity scores before and after matching. While the pre-matching distributions differ noticeably across groups, the post-matching distributions overlap closely, indicating a substantial improvement in balance and common support.

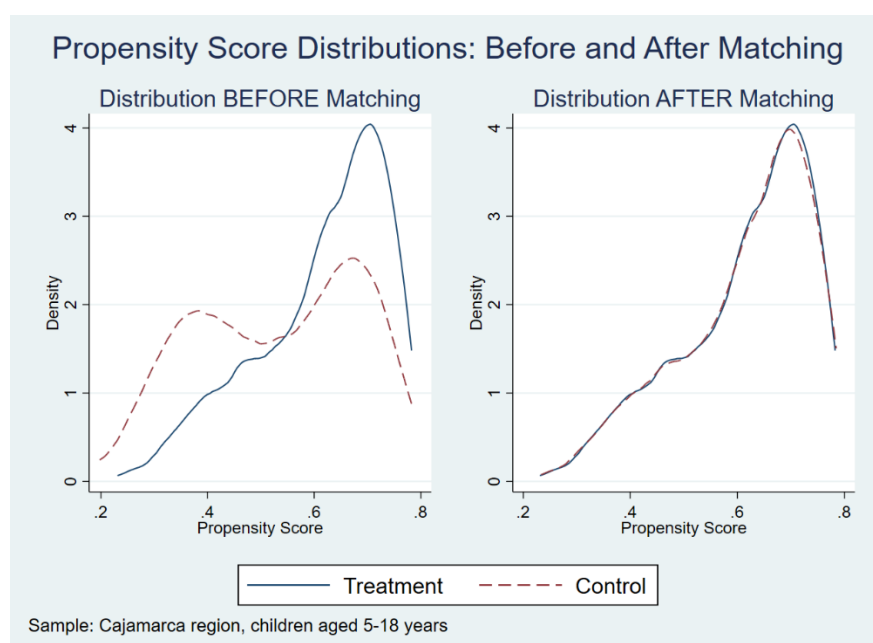


Figure 1. Propensity Score Matching Before and After Treatment. *Source:* Own elaboration

4.3. Comparison of dropout rates by algorithm

The balancing of covariates through PSM results in two groups of households with similar observable characteristics, which enables a more credible comparison of school enrollment outcomes between JUNTOS beneficiaries and non-beneficiaries. To assess the robustness of the estimated effects, five different matching algorithms are implemented: (i) nearest neighbor matching, (ii) caliper matching, (iii) radius matching, (iv) kernel matching, and (v) local linear regression matching. The corresponding results are reported in Table 4.

Across all matching methods, the estimated Average Treatment Effect on the Treated (ATT)

is positive, indicating higher school enrollment among beneficiary households relative to matched controls. Under nearest neighbor matching, the enrollment rate among treated children is 0.966, compared to 0.920 among controls, yielding a difference of 0.046. Similar magnitudes are obtained with radius, kernel, and local linear regression matching, with ATT estimates ranging between 0.040 and 0.046. In contrast, the caliper matching specification produces a smaller and statistically weaker estimate, with an ATT of 0.042 that does not reach conventional levels of significance. This sensitivity reflects the stricter matching criterion imposed by the caliper, which reduces the effective comparison set and increases standard errors.

Table 4. The Different PSM Matching Methods, 2023

Method	Treated	Controls	Difference	S.E.
Nearest neighbor	0.966	0.92	0.046	0.021
Maximum distance	0.966	0.924	0.042	0.027
Radius	0.966	0.926	0.04	0.018
Kernel	0.966	0.924	0.042	0.018
Local linear regression	0.966	0.921	0.045	0.021

Source: Own elaboration

Overall, the consistency of positive ATT estimates across most matching algorithms provides robust evidence that participation in the JUNTOS program is associated with higher school enrollment among poor households in the selected regions. Standard errors are relatively small across specifications, suggesting that the estimated effects are not driven by a particular matching method.

4.4. Logistic regression results

Table 5 reports the results from the parsimonious logit model estimated on the eligible sample of poor households with children aged 5–18 residing in the selected regions. The dependent variable is school enrollment, used as a proxy for school dropout. This specification complements the PSM analysis by providing a parametric estimate of the association between JUNTOS participation and enrollment outcomes.

The coefficient on JUNTOS participation is positive and statistically significant at the 5% level. In odds-ratio terms, children living in beneficiary households are approximately twice as likely to be enrolled in school compared to those in non-beneficiary households, holding other factors constant. This finding is consistent with the results obtained through the matching estimations and reinforces the conclusion that the program is associated with improved schooling outcomes. Among the control variables, household size shows a negative association with school enrollment, although its statistical significance is marginal. The age of the household head does not appear to have a statistically significant effect in this specification. The overall model is jointly significant, as indicated by the likelihood ratio test, although the pseudo R^2 remains modest, which is typical in cross-sectional models of individual educational outcomes.

Taken together, the logit results corroborate the main findings from the PSM analysis: even

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after accounting for observable household characteristics, participation in the JUNTOS program is positively associated with school enrollment in contexts where poverty remains high and enrollment is not fully saturated.

Table 5. Logit Model of School Dropout, 2023

Logistic regression				Number of obs	874
				LR chi2(10)	11.19
				Prob > chi2	0.0107
Log likelihood = -961.17427				Pseudo R2	0.0288
	Coef.	Std. Err.	z	P>z	[95 % Conf. Interval]
Juntos	0.7232	0.2959	2.4400	0.0150	0.1432 1.3032
Edajh	-0.0127	0.0128	-0.9900	0.3230	-0.0379 0.0125
Estaci	-0.1300	0.0696	-1.8700	0.0620	-0.2665 0.0064
_cons	3.6586	0.6912	5.2900	0.5130	2.3038 5.0135

Notes: The sample is restricted to poor households with children aged 5–18 residing in selected high-poverty regions with non-saturated school enrollment. Coefficients are estimated using a logit specification. The constant represents baseline enrollment odds.

Source: Own elaboration

4.5 Summary

The results confirm that participation in the JUNTOS program is positively associated with school enrollment among children living in poor households in the selected regions. The estimated coefficient for JUNTOS participation is 0.723, indicating a positive association of the program on the probability of enrollment. This coefficient is statistically significant at the 5% level (p -value = 0.015), which implies rejection of the null hypothesis that participation in JUNTOS has no association with school enrollment.

Regarding the control variables, household characteristics continue to play an important role in explaining schooling outcomes. The coefficient associated with the age of the household head is negative (-0.0127), suggesting that as the household head becomes older, the probability that children are enrolled in school tends to decrease; however, this effect is not statistically significant. Household size emerges as a relevant factor. The estimated coefficient of -0.1301 indicates that an increase in the number of household members is associated with a lower probability of school enrollment for minors. This result is marginally significant (p -value = 0.062) and is consistent with the idea that larger households face greater economic constraints, which may limit educational investments and increase the risk of school exclusion.

The constant term is positive (3.6587) and statistically significant, reflecting a high baseline probability of enrollment among poor households in the selected regions. This result aligns with the descriptive evidence showing relatively high enrollment levels, while still allowing room for program-related differences at the margin.

The overall significance of the Logit model is confirmed by the likelihood ratio test, with a chi-square probability of 1.07%, leading to rejection of the null hypothesis that all coefficients are jointly equal to zero. Although the pseudo R^2 is modest (2.88%), this is expected in cross-sectional

binary choice models and does not undermine the relevance of the estimated relationships. Taken together, the results from the Logit model are consistent with the PSM estimates and support the conclusion that JUNTOS participation is associated with higher school enrollment in high-poverty, non-saturated regional contexts.

5. Discussion

The results of this research align with international evidence on the association between conditional cash transfer programs and educational outcomes. As documented by Skoufias (2001) and Schultz (2000), the Progresía program in Mexico generated significant increases in school attendance among children from beneficiary households, showing that economic transfers accompanied by co-responsibilities can influence educational behaviors. Similarly, Attanasio et al. (2008) found that the Familias en Acción program in Colombia was associated with higher enrollment rates, both in urban and rural areas, suggesting that this type of policy may have consistent effects across diverse social and economic contexts.

In Paraguay, Veras et al. (2008) also observed positive associations of the Tekoporá program with minors' school registration, and the Programa Solidaridad report (2008) in the Dominican Republic reported an increase of 14 percentage points in school attendance. Even in the case of Jamaica, PATH was associated with improvements in regular student attendance (Levy et al., 2007). These experiences reveal a common pattern: conditional transfers, when implemented with co-responsibility mechanisms, appear to reduce economic and cultural barriers to educational access. However, not all studies show homogeneous associations. Oliveira et al. (2013) report that in Brazil, the Bolsa Família program showed mixed outcomes, as it promoted access but was also associated with increases in school failure. This indicates that transfers, while potentially effective in encouraging enrollment, do not necessarily translate into improvements in educational quality or retention, highlighting the need to complement them with pedagogical interventions and institutional strengthening.

In the Peruvian case, the findings of this study are more closely aligned with the positive trends observed in most international studies. This suggests that the design of JUNTOS is more similar to successful models such as Progresía or Familias en Acción than to experiences with mixed results like Bolsa Família. At the national level, comparison with previous literature reinforces this interpretation. Perova et al. (2010) concluded that JUNTOS was associated with improved schooling outcomes, particularly in facilitating transitions from primary to secondary education. Díaz et al. (2009) reported higher enrollment rates and reduced dropout, as well as improved teacher attendance, which may indicate indirect effects on school functioning. Sánchez et al. (2016) emphasized that JUNTOS resources are mainly allocated to food and education, supporting the link between transfers and educational participation. These studies are broadly consistent with the present research, reinforcing the validity of the observed associations.

At the subnational level, the analysis focuses on Ayacucho, Cajamarca, Loreto, and Puno, regions characterized by high poverty incidence and non-saturated school enrollment. The results

suggest that the association between JUNTOS participation and school enrollment varies across contexts. Mendoza (2015) found positive associations in Yanaoca for primary education (2011–2014), and Aguilar (2017) observed improvements in mathematical reasoning. Conversely, Chávez et al. (2017) reported lower school attendance among 14-year-olds in Huánuco (2012–2016), and Salcedo (2020) identified setbacks in educational access for beneficiaries in 2018. These heterogeneities indicate that the program's effectiveness may depend on local educational supply, institutional capacity, and integration with other public services.

It is important to note the methodological limitations of this study. School dropout is proxied by non-enrollment in 2023, which captures status at a single point in time and does not reflect dynamic educational trajectories such as delayed enrollment, temporary interruptions, or grade repetition. Therefore, results should be interpreted as associations rather than causal impacts. Moreover, the empirical strategy combines Propensity Score Matching (PSM) and Logit models, which help reduce bias due to observable characteristics but cannot address unobserved heterogeneity or potential reverse causality. Marginal effects were used to summarize associations, and multiple matching algorithms were applied to examine robustness, but residual limitations inherent to cross-sectional observational data remain.

The balance of international, national, and subnational evidence suggests that conditional cash transfer programs, particularly JUNTOS in Peru, are associated with higher school enrollment and retention among children and adolescents living in poverty. Nonetheless, regional disparities and contextual factors highlight the need for complementary policies that address educational quality, urban-rural gaps, and sustainability. This comparative discussion underscores the relevance of JUNTOS while contributing to the regional debate on improving social policy instruments in Latin America to maximize their potential benefits for education.

6. Conclusions

The results of this study indicate that participation in the JUNTOS program is positively associated with school enrollment among children and adolescents living in poor households in four high-poverty regions of Peru—Ayacucho, Cajamarca, Loreto, and Puno—during 2023. Both Propensity Score Matching (PSM) and Logit regression results consistently show higher enrollment probabilities among program beneficiaries compared to non-beneficiaries with similar observable characteristics. These findings suggest that conditional cash transfers act as an important incentive to support school attendance in contexts where educational access is not yet fully saturated.

The analysis also highlights the relevance of household characteristics in shaping educational outcomes. Factors such as household size and the age of the household head are significantly associated with enrollment probabilities, indicating that the relationship between JUNTOS participation and schooling is heterogeneous across households. This heterogeneity emphasizes that, while JUNTOS contributes positively to school enrollment, structural constraints linked to household composition and resources continue to affect educational decisions among poor families.

Regional disparities are also evident. For example, Mendoza (2015) found positive

associations for primary education in Yanaoca, Ayacucho (2011–2014), while Aguilar (2017) reported improvements in mathematical reasoning in Cajamarca. In contrast, Chávez et al. (2017) observed lower school attendance among 14-year-olds in Huánuco, and Salcedo (2020) identified setbacks in educational access for beneficiaries in Puno in 2018. These results indicate that the program's effectiveness varies across regions and is influenced by local educational supply, institutional capacity, and integration with other public services.

It is important to note the methodological limitations of this study. School dropout is proxied by non-enrollment in 2023, capturing status at a single point in time and not reflecting dynamic educational trajectories such as delayed enrollment, temporary interruptions, or grade repetition. Consequently, the reported results should be interpreted as associations rather than causal effects. Moreover, while PSM combined with Logit models reduces bias due to observable characteristics, it cannot fully account for unobserved heterogeneity or potential reverse causality. Marginal effects and multiple matching algorithms were employed to summarize associations and assess robustness, but residual limitations inherent to cross-sectional observational data remain.

This study makes a novel contribution to the literature by providing a subnational and regionally disaggregated analysis of the JUNTOS program using recent ENAHO 2023 data. Unlike prior studies that focus on national averages, this research identifies the regional and household-level heterogeneity of program outcomes, offering practical insights for policymakers to improve targeting and complementarity with other social interventions.

The evidence suggests that JUNTOS contributes meaningfully to improving school enrollment and retention among children and adolescents living in poverty. Nonetheless, regional disparities and household heterogeneity highlight the importance of complementary policies that enhance educational quality, address urban-rural gaps, and ensure sustainability. By explicitly linking program participation with subnational educational outcomes, this study reinforces the relevance of JUNTOS while advancing the regional debate on optimizing conditional cash transfer programs in Latin America.

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