Center for Management Science Research
ISSN: 3006-5291 3006-5283 Volume 4, Issue 3, 2026

GENDER-TARGETED CASH TRANSFERS AND GIRLS' EDUCATIONAL ENROLMENT: DISTRICT-LEVEL EVIDENCE FROM PUNJAB, PAKISTAN

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DOI: https://doi.org/10.5281/zenodo.22094271

Keywords
Conditional Cash Transfers; Female Education; School Enrollment; Difference-in-Differences; Two-Way Fixed Effects (TWFE); Panel Data Econometrics; Sub-National Policy Evaluation; Punjab, Pakistan.
JEL Codes: *I21; I28; I38; J16*

Article History
Received: 01 January 2026
Accepted: 07 March 2026
Published: 30 March 2026

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Abstract
This paper examines the effectiveness of gender-specific Conditional Cash Transfer (CCT) programs in increasing girls' school enrolment in Punjab, Pakistan. Although access to education has been increasing, gender inequalities in education persist in most districts, especially in low-income households, where financial constraints have been a major determinant of schooling decisions. The Government of Punjab has tried to overcome these obstacles by introducing stipend programs that focus on the enrolment of girls in state schools. Based on district-level panel data spanning 2021-2023 for 36 districts, this research paper assesses the effectiveness of the stipend program in increasing girls' enrolment. The sample size is 108 district-years, and the education variables, such as girls' enrolment, school-to-teacher ratios (girls), and schools and facilities, are obtained from the Program Monitoring and Implementation Unit (PMIU) school census. Census-based projections are used to include district population data as control variables. The study uses a Fixed Effects Difference-in-Differences (DID) econometric framework to explain unobserved heterogeneity across districts. The empirical data show that the percentage change in girls' enrolment in stipend districts was statistically significant, with an increase of about 6.2 per cent in 2023 compared to non-stipend districts, although the difference in 2022 was not statistically significant. The results indicate that targeted financial rewards can be significant in alleviating economic constraints to female education and in enhancing school attendance among girls in the developing world.

1. INTRODUCTION

Education is an important constituent of human capital and long-term economic growth. In developing countries, access to education, especially for girls, is a top policy priority. Women's education not only benefits personal well-being but also societal well-being, with health gains, fewer births, and higher economic gains. Despite increased access to education worldwide, gender gaps in education still persist in many developing economies, with financial constraints and societal and institutional barriers restricting girls' access to education (Burney and Irfan, 1995).

Pakistan has undertaken substantial efforts to increase access to education over the last 20 years, but in some areas, gender disparity in education has been a consistent problem. Girls' enrolment rate in Punjab, the biggest Pakistani province, has been slowly increasing, but in many families, especially among the low-income families, there is still an economic constraint that discourages investment in girls' education. The expenses of attending school, like transportation, uniforms,

books, and the opportunity cost of time of the children, cause the families to prefer sending boys to school rather than girls to school. Consequently, the disadvantaged districts have higher chances of girls experiencing low enrolment and high dropout rates.

To address these issues, governments in most developing nations have implemented Conditional Cash Transfer (CCT) initiatives to encourage school attendance by providing financial aid to households. Such programs normally provide financial aid to families, provided their children attend school regularly. CCT programs will lead to higher educational participation rates, especially among underprivileged populations, by reducing the direct and indirect costs of schooling. The experience with countries such as Brazil, Mexico, and Bangladesh indicates that these programs can greatly enhance school enrolment and attendance among children in low-income households (Ahmed & Sharmeen, 2004).

In 2004, the Government of Punjab launched stipend schemes for female students in Pakistan as part of the overall reforms of the education sector. The female stipend scheme was meant to promote the education of girls in areas with relatively low literacy levels by offering financial support to families whose daughters are studying in public schools. The rationale for the policy is that financial incentives will offset the opportunity costs of schooling and encourage households to keep their daughters in school.

Some studies have found these programs to be highly effective in enhancing female education. For example, Chaudhury and Parajuli (2010) analysed the Female School Stipend Program in Punjab and found that conditional cash transfers were highly effective in increasing girls' enrolment in public schools. Equally, Alam, Baez, and Del Carpio (2011) reported that money can also be used to influence schooling choices and enhance educational attendance among girls. The significance of targeted financial interventions in reducing gender disparities in education has also been highlighted by other studies conducted in South Asia.

Though the current literature has offered useful information on the role of stipend programs in advancing girls' education, there is still a need for empirical data based on more recent, district-level data. The conditions of education, the work of policies, and socio-economic processes change over time; thus, it is significant to reconsider the efficiency of such programs using the latest statistics. Additionally, the district-level analysis enables the researchers to identify heterogeneity in educational outcomes and policy effects across regions.

The study is relevant to the literature because it examines the effects of the Conditional Cash Transfer (CCT) program on girls' school enrolment in Punjab, using recent district-level panel data. The data are based on 36 Punjab districts during 2021-2023, yielding a sample size of 108 district-years. The variables of education, such as enrolment of girls, number of schools, student-teacher ratios (girls), and facilities of schools, are obtained through the Program Monitoring and Implementation Unit (PMIU) school census, and the population of the district is used as the control variable through the estimates of the population projected through the census.

To determine the effect of the stipend program, the research uses a Fixed Effects Difference-in-Differences (DID) econometric design, which allows it to control for unobserved district-specific factors and estimate the policy's causal effect. Empirical evidence shows that stipend districts experienced statistically significant growth in girls' enrolment in 2023 compared to non-stipend districts, suggesting that the program has helped increase girls' enrolment in education.

2. Literature Review

2.1 Global Evidence on Conditional Cash Transfer Programs

Conditional Cash Transfer (CCT) is a significant policy instrument in most developing nations to overcome education challenges and curb poverty. These programs provide financial benefits to households that require their children to attend school or participate in education. The rationale is that families are usually deterred by financial constraints and opportunity costs from investing in education, especially for girls. Through targeted financial assistance, CCT programs are expected to raise school enrolment and attendance and decrease the dropout rate.

Some evidence from developing countries indicates that conditional cash transfers can have a substantial positive effect on education. For example, Ahmed and Sharmeen (2004) assessed a CCT scheme in Bangladesh and found that financial rewards increased school enrolment among both boys and girls, especially among female learners in low-income families. Research on larger-scale initiatives, including Mexico's Progresa/Oportunidades and Brazil's Bolsa Familia, has shown that conditional transfers can be effective in increasing school attendance and alleviating poverty among vulnerable groups.

Recent studies suggest that development outcomes are shaped by the interaction of economic growth, social conditions, and technological change. Evidence highlights the effects of growth on unemployment, regional disparities in food security and inclusive growth, and the growing influence of social media and artificial intelligence on consumer and labor market behavior (Ayyubi et al., 2024; Anwar et al., 2024; Ahsan et al., 2024; Zubair et al., 2024; Iqbal et al., 2025). These findings underscore the importance of innovation and inclusive policies for sustainable development (Shabeer & Rasul, 2025).

In addition to the enrolment effects, CCT programs have been linked to wider social effects. As Adato, Devereux, and Sabates-Wheeler (2018) emphasise, cash transfers can help to enhance educational involvement and social empowerment, especially among adolescent females. Besides that, Kilburn et al. (2020) demonstrate that multidimensional deprivation can be reduced and that educational attendance increases among young women with conditional financial support. Such findings indicate that monetary rewards may be significant in overcoming the monetary obstacles that inhibit household investment in education.

2.2 Evidence from South Asia

The issue of educational inequality, especially gender disparities in education, is a major problem in South Asia. In rural and low-income communities, schooling is often affected by socioeconomic factors, cultural norms, and limited household resources. Consequently, governments in the region have implemented various incentive-based initiatives to increase girls' participation in education.

South Asian research suggests that financial incentives may be highly effective in shaping household decisions about schooling. For example, Narayanan (2013) studied school enrolment choices in rural India and found that household economic status and perceived returns to education are significant determinants of enrolment decisions. School-based programs that lower the cost of education can thus significantly impact enrolment choices. In Bangladesh, the use of stipend and scholarship schemes to educate female students has been seen to increase female enrolment and gender balance in education. Such initiatives demonstrate that targeted funding can be a powerful tool for addressing gender inequality in education in developing countries.

2.3 Evidence from Pakistan

Gender inequalities in education are another significant issue in Pakistan, even though current policies have been aimed at increasing access to education. The poverty of households, social customs, and geographical inequalities are some of the factors that lead to low enrolment rates of girls in most regions of the nation. To address these issues, policymakers have put in place several programs to encourage girls' education, such as stipend schemes and conditional cash transfers. The Female School Stipend Program in Punjab is one of the most visible programs and was established to motivate girls to enrol in districts with lower-than-average literacy rates. One of the first empirical assessments of the program was conducted by Chaudhury and Parajuli (2010), who found that conditional cash transfers were effective in increasing girls' enrolment in public schools. Their analysis showed that monetary rewards can affect household decisions about female education and enhance access to schooling.

Alam et al. (2011) studied the long-term behavioural impacts of cash transfers to young women in Pakistan and reported that financial incentives could have a positive impact on school attendance. The female stipend program in rural Punjab was also analysed by Masood (2015), who stated that the program led to an increase in female school enrolment and enhanced girls' educational performance.

Gender-specific financial incentives have also been found to have a broader impact on educational uptake, as indicated by other studies. Javaid et al. (2021) studied the determinants of school enrolment in Punjab, Pakistan. Based on 2016 and 2018 panel data across all 36 districts, using Linear Mixed Multilevel Modelling, the study concluded that female stipend programs were significant in boosting enrolment in the recipient districts. Better school facilities also had a positive impact, but an increase in the student-to-teacher ratio (girls) decreased enrolment. The authors suggested increasing the number of stipend programs and infrastructure, and opening additional schools to stabilise teacher-to-student ratios (girls) and further increase enrolment

2.4 Research Gap

Despite previous studies providing useful evidence on the effectiveness of conditional cash transfer programs in promoting education among girls, gaps remain in the literature. To begin with, the current body of research covers the earlier stages of the female stipend program and relies on older datasets. The conditions in education, the implementation of policies, and socioeconomic dynamics are subject to change over time, so it is important to evaluate the effectiveness of such programs using more recent data. Second, a large part of the available literature is based on household-level surveys or previous administrative records, whereas fewer studies rely on recent district-level panel data, which can be used to study regional differences in educational outcomes. The analysis at the district level may also be useful for understanding how policy effects could vary across regions with different socioeconomic characteristics. To fill these gaps, this paper will analyse how the Conditional Cash Transfer program affects girls' enrolment in Punjab using recent district-level panel data from 2021-2023. The study will use a Fixed Effects Difference-in-Differences econometric model to present new evidence on the effectiveness of financial incentives in female education in Punjab.

3. Data and Methodology

3.1 Data Sources

This paper is based on district-level panel data on the 36 districts of Punjab, Pakistan, that span the years 2021-2023. The sample size is 108 district-years, allowing the analysis to examine how girls' school enrolment in various districts has changed over time. Education-related variables are sourced from the Program Monitoring and Implementation Unit (PMIU) of the Punjab School Education Department. PMIU also inspected public schools in the province through regular school censuses and administrative oversight. The datasets include indicators on school infrastructure, enrolment, and staffing. The main variables, such as enrolment of girls, schools attended, teacher-to-student ratio (girls), and school facilities, have been identified as important in this study.

District population data is used as a control variable to account for variations in district size and demographic factors. The population figures are based on census 2017 data and projected estimates for the study period. The population variable is logarithmized to minimise scale differences and improve econometric estimation.

3.2 Variables Description

The key dependent variable in this research is the school enrolment of girls, defined as the number of girl children enrolled in public schools across all districts. To stabilise variance and enable the interpretation of the coefficients, the enrolment variable is taken to the natural logarithm.

The most important explanatory variable is the Conditional Cash Transfer (CCT) stipend program, is expressed in the Difference-in-Differences framework using interaction terms. Treatment districts are those that participate in the stipend program, whereas the control group consists of districts that do not. Along with the treatment variable, several control variables are used to explain other variables that can affect school enrolment. These are the student-teacher ratio (girls), an indicator of classroom congestion and teaching capacity, and a school facilities index, indicating access to basic infrastructure and learning facilities in schools. District population is also taken as a control variable to account for demographic differences between districts.

3.3 Empirical Strategy

To assess the effect of the stipend program on girls' enrolment, this research uses a Difference-in-Differences (DID) design with district fixed effects. It is a technique that enables the analysis to compare changes in girls' enrolment across stipend and non-stipend districts at different times and to eliminate unobserved district-specific characteristics. Policy evaluation DID approach is a popular method of policy assessment that assists in isolating the causal impact of an intervention in a manner that allows for a comparison of pre-intervention versus post-intervention changes in treated and untreated groups. Here, the treatment group comprises districts that receive the stipend program, and the control group comprises districts that do not. To further adjust for unobserved heterogeneity across districts, such as long-term socioeconomic status, cultural beliefs, and administrative variations, the model includes district fixed effects. The effects of time are also to be considered, along with the common shocks that affect all the districts during the study period.

3.4 Econometric Model

The empirical specification used in this study can be expressed as follows:

$$\ln(ge_{it}) = \alpha + \beta_1 Post2022_t + \beta_2 Post2023_t + \beta_3 DID2022_{it} + \beta_4 DID2023_{it} + \gamma X_{it} + \mu_i + \varepsilon_{it}$$

where:

$$DID2023it = Treati \times Year2023t$$

- Treat$_i$ = 1 if district *i* is a stipend district, 0 otherwise.
- ge_{it} = girls' enrolment in district *i* during year *t*.
- $Year2022_t$= dummy variable equal to 1 for 2022, 0 otherwise.
- $Year2023_t$= dummy variable equal to 1 for 2023, 0 otherwise.
- $DID2022_{it}$ = interaction term $Treat_i \times Year2022_t$.
- $DID2023_{it}$ = interaction term $Treat_i \times Year2023_t$.
- X_{it}= vector of control variables (student-teacher ratio (girls), school facilities index, and log population).
- μ_i= district fixed effects capturing time-invariant district characteristics.
- ε_{it}= error term

The most important coefficient is the 3rd coefficient, which represents the causal effect of the stipend program on girls' enrolment (Wooldridge, 2010).

3.5 Estimation Approach

The model is estimated using a Fixed-Effects panel regression framework, which enables the analysis to control for time-invariant district features that may determine educational outcomes. The fixed-effects estimator will reduce potential bias from omitted variables that do not vary across districts, given the within-district time variation. The Difference-in-Differences interaction terms are added to the years 2022 and 2023 to reflect the differential effect of the stipend program on the study period. The panel data is subjected to robust standard errors to account for possible heteroskedasticity.

4. Empirical Results

4.1 Descriptive Statistics

Table 1 presents descriptive statistics for the major variables used in the analysis. The dataset included 108 observations, divided into 36 districts, for 2021-2023.

Table 1

Variable	Mean	Std Dev	Min	Max
Girls Enrolment (GE)	148,686	68,160	60,876	417,506
Boys Enrolment (BE)	148,492	61,502	68,946	389,640
Number of Schools	1,471	518	697	3,064
Student-Teacher Ratio (Girls)	34.37	19.13	18.05	211.85

Variable	Mean	Std Dev	Min	Max
School Facilities Index	1,426	490	682	2,756
Log Population	14.85	0.55	14.04	16.34

Source: Authors' calculations by using Stata

This analysis compares a sample of all 36 districts and years 2021 to 2023 in Punjab. The mean population of girls in schools across districts is about 148,686 students, and this varies widely among districts. The standard deviation is large, indicating that enrolment levels across districts vary significantly in terms of population size and educational facilities. Equally, the mean school size per district is 1,471, indicating a wide disparity in educational infrastructure across districts. The girls have an average student-to-teacher ratio of 34 students per teacher, indicating moderate classroom crowding. The school facilities index averages 1,426 schools with basic facilities, suggesting variation in infrastructure availability across districts.

The stipend variable data indicate that about 44 per cent of the districts are receiving the stipend program, and the rest are the control in the analysis.

4.2 Table: Difference-in-Differences Fixed Effects Estimation

Dependent Variable: Log of Girls' Enrolment (lnge)

Table 4.2: Difference-in-Differences Fixed Effects Estimation

Variables	Coefficient	Std. Error	t-value	p-value
Post 2022	-0.0885	0.0688	-1.29	0.207
Post 2023	0.0010	0.0102	0.10	0.921
CCT Impact 2022 (did22)	0.1145	0.0827	1.38	0.175
CCT Impact 2023 (did23)	0.0623*	0.0176	3.55	0.001
Student–Teacher Ratio (girls)	0.00092	0.00090	1.03	0.312
School Facilities Index	-0.00003	0.00018	-0.16	0.876
Log Population	0.0112	0.0254	0.44	0.661
Constant	11.663	0.335	34.80	0.000

Source: Authors' calculations by using Stata

The results in this table are obtained using the Difference-in-Differences fixed effects model, with the dependent variable being the log of girls' enrolment (lnge). The did23 coefficient is 0.0623, which is significant at the 1% level, indicating that The 2023 stipend program effect increased girls' enrolment by about 6.2% in the 23 stipend districts as compared to non-stipend districts. This shows that the Conditional Cash Transfer program had a positive impact on female school participation. The did22 coefficient is positive but not statistically significant, indicating that the program's effect did not manifest at the beginning of 2022 and may take time to emerge. All time effects are represented by the year dummy variables (post22 and post23). Although post22 shows a slight decrease in enrolment, the two-year effects are not significant, indicating no overall direction in enrolment across districts. Some of the control variables, such as the student-to-teacher ratio (girls), school facilities index, and district population, have no statistically significant effects during the study period. The model also yields a rho value of 0.919, indicating that the majority of the change in enrolment can be attributed to factors specific to the district,

which further justifies the use of the fixed effects approach.

Table 4.3 Difference-in-Differences Estimates Models

Variables	(1) Baseline DID	(2) + Student–Teacher Ratio	(3) Full Model
Year 2022	-0.0966**	-0.0966**	-0.0885
Year 2023	-0.00172	-0.00127	0.00102
CCT Impact 2022	0.133*	0.115	0.114
CCT Impact 2023	0.0699*	0.0659*	0.0623*
Student–Teacher Ratio		0.000922	0.000922
School Facilities Index			-0.0000285
Log Population			0.0112
Constant	11.82***	11.79***	11.66***
Observations	108	108	108

Source: Authors' calculations by using Stata

Table 4.3 DID Models indicates that the coefficient on CCT Impact 2023 is positive and statistically significant in all three specifications. It is estimated to be between 0.0623 and 0.0699, indicating that in 2023, girls' enrolment in stipend districts was between 6 and 7 percent higher than in non-stipend districts. This similarity in the models implies that the key finding is strong. The coefficient on CCT Impact 2022 is positive but with weak significance in the base model, and becomes insignificant after the introduction of controls. This implies that the program's impact was not immediate and became more evident over time. The control variables, such as student-to-teacher ratio, school facilities index, and district population, are not significant in the fuller specifications. Generally, the findings indicate that the stipend program positively influenced girls' school enrolment.

5. Discussion

The empirical data show that the Conditional Cash Transfer (CCT) stipend program has positively affected girls' school enrolment in Punjab. As in the Difference-in-Differences estimation, stipend districts registered a statistically significant increase in girls' enrolment in 2023 relative to non-stipend districts. Girls' enrolment was approximately 6.2% higher, suggesting that financial benefits can be significant in motivating women to attend school. The findings also indicate that the estimated effect in 2022 is positive but not significant, whereas the effect in 2023 is statistically significant. This trend suggests that the effect of the stipend program could be realised in the long term. The reaction of households to education policies is usually slow-moving because families need to be informed about the program and adjust their schooling decisions. Consequently, its influence on enrolment becomes apparent over time. The results are consistent with prior work that investigated the influence of financial incentives on girls' education.

A study conducted by Chaudhury and Parajuli (2010) revealed that the Female School Stipend Program in Punjab had a significant impact on increasing female enrolment in public schools. Alam et al. (2011) demonstrated that cash transfers can affect the household schooling decision by alleviating the cost of education. The observed positive effect in the present study thus aligns with the broader evidence that specific financial incentives can enhance female educational enrolment. Even though the control factors, including student-to-teacher ratio (girls), school facilities index, and the population of the district, are not statistically significant in the results of the regression, they are significant contextual variables influencing learning outcomes. Their insignificance could be attributed to the limited time period of the data or to district fixed effects that reflect long-term regional variations. On the whole, the results indicate that the conditional cash transfer initiative may help remove financial

impediments to girls' education and promote school enrolment, especially in districts where household economic constraints exist. Nonetheless, to improve girls' educational achievement, there is a need for complementary policies to enhance the quality of schools, infrastructure, and the number of teachers.

6. Conclusion and Policy Implications

This paper discusses how the Conditional Cash Transfer (CCT) stipend program has affected girls' school enrolment in Punjab, Pakistan. The analysis used district-level panel data from 36 districts between 2021 and 2023 and employed a Fixed Effects Difference-in-Differences (DID) framework to assess whether stipend districts experienced stronger growth in girls' enrolment than non-stipend districts.

The 108 district-year observations used in the empirical analysis were obtained from a dataset compiled from Program Monitoring and Implementation Unit (PMIU) administrative records and district population data. The empirical results show that the stipend program significantly and positively influenced stipend districts in 2023, with an estimated increase of around 6.2 percent in stipends compared to non-stipend districts. Conversely, the 2022 effect is estimated to be positive but no longer significant, indicating that the program's impact on schooling decisions may take time to manifest and is influenced by other COVID-19 crises. All in all, the findings indicate that economic barriers to girls' education can be alleviated using financial rewards offered under conditional cash transfer programs. Policy-wise, the findings show the relevance of specific financial aid in encouraging female educational attendance.

Many families in the developing world have limited resources that do not support the education of girls. Stipend programs will help motivate families to send their girls to school and keep them there by covering some of the direct and indirect costs of education. The extension of such programs in lower-educational-participation districts can thus help enhance gender equality in education and build human capital. Nevertheless, monetary rewards might not be enough to overcome all obstacles to girls' education. School infrastructure, teacher availability, and the quality of education also need to be improved to ensure future improvements in educational outcomes. Further studies may build on this research by using longer time-series data or household-based data to analyse the long-term impacts of stipend programs on school completion, educational attainment, and Labor market outcomes.

7. Limitations of the Study

There are several limitations to consider in this study. To begin with, the analysis is based on district-level panel data from 2021 to 2023, which is a rather short time frame. Educational policies tend to have effects that develop over time, and short panel data sets may not fully capture the long-term effects of policy interventions. Second, the research draws on aggregate district-level data; thus, it is not possible to analyse household-level decisions regarding the schooling of girls. Past studies indicate that household economic situation and parental preferences are key factors to consider when making a schooling decision (Burney and Irfan, 1995). Household-level data would provide a more comprehensive study of the effects of financial incentives on education attendance. Third, although the empirical model controls for district fixed effects and other observable variables, unobservable factors may still influence educational outcomes, such as local governance quality or differences in program implementation. According to the literature on program evaluation, empirical designs such as Difference-in-Differences can be used to reduce, but not eliminate, potential sources of bias (Angrist and Pischke, 2009). Further studies using extended time-series or household-based data would provide a more accurate estimate of the long-term effects of stipend programs on girls' education. The existing policies of school privatization have left a big gap in the study of the future.

A limitation of this study is that the data cover only a short period (2021–2023), with just one year before the policy and two years after it. This makes it harder to fully check whether treated and control districts were already following similar trends before the program limits, and how well we can observe longer-term effects. So, the results mainly reflect short-term changes in enrolment, and a longer time series would give a

clearer and more reliable picture of the program's impact over time.

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