A Comprehensive Analysis of Remittances and Basic Level Government School Enrollment in Nepal

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ABSTRACT

This study aims to examine the factors that impact student enrollment in government schools at the basic level in Nepal. The data were collected from secondary sources publication over the periods of 2000-2022. The Autoregressive Distributed Lag (ARDL) model was applied to analyze the correlations between enrollment and economic factors, such as per capita GDP, population growth, and remittances, in both the short-term and long-term. The results suggest that remittances have a significant negative impact on enrollment, raising concerns about the absence of parents due to working abroad. On the other hand, the level of per capita GDP had a positive effect on the accessibility of education, highlighting the importance of economic development. The population growth did not have a significant impact in this model. The co-integration test suggests a strong and lasting connection between the variables, while the Granger causality tests reveal that remittances and per capita GDP had a significant impact on enrollment. These findings offer valuable insights for policymakers aiming to improve access to high-quality education for every child in Nepal. The paper also discussed potential areas for future research, such as investigating the underlying causes of the negative impacts of remittances and addressing the issue of serial correlation in the model.

1. INTRODUCTION

Extensive research has been conducted by economists and scholars on the correlation between remittances and school attendance in Nepal. Financial transfers made by non-citizens to their countries of origin, known as remittances, can have both positive and negative effects on a nation's economy and society, including its education system. Remittances can significantly boost family income and support investments in education. Remittance revenue can help cover school fees and the cost of supplies, thereby promoting better school attendance. In

households where a substantial amount of income comes from remittances, children may have lower expectations to participate in work and contribute financially. This could potentially improve children's enrollment in schools, thereby reducing their involvement in manual labor.

Remittances play a crucial role in making school transportation and other fees more accessible, thereby improving educational opportunities. It is especially important in rural areas as schools are often situated far away from homes. Adhikari (2021) examined how remittance may affect social development, using health and education as indices. This study examined how remittances affect school attendance and home-based families' health. It uses updated district-level educational enrollment and nutrition statistics from 2009 A.D. The findings could be important for governments and policymakers, particularly those that rely significantly on remittances. The research found that remittances may boost educational enrollment and social growth.

Gajurel and Niroula (2024) examined how remittance affects Nepalese schooling. That study analyzed 1981–2021 time-series data using statistical methods. Autoregressive distributed lag (ARDL) estimations, Granger causality analysis, FEVD, and impulse response functions were used. The study found that remittance improved Nepalese education. Short-term assistance for secondary education and long-term support for higher education in Nepal have been attributed to remittance. Granger causality study showed a one-way association between remittance and educational outcomes.

Murakami (2021) examined how international migration affects Tajikistani schoolchildren's enrollment. A nationwide household survey provided data for the research. The findings imply that children in households with migrants had 10.3 percentage points lower school attendance. Parents' migration has more impact than other family members whereas remittances alone cannot mitigate migration's harmful effects.

Bowman et al. (2024) explored how school location and rules effect ESN placement. That study examined the geographic distribution of educational institutions in different states and localities, the relationship between their proportions and placement rates, and the establishment of special education charter schools in various states. Independent schools and school placement varied by state area. Private schools in suburbs were much higher than the national average. Few independent charter schools provided special education.

The distribution of remittance income may vary depending on the home or community. When certain individuals or areas receive an imbalanced and disproportionate amount of remittances, it can result in economic inequality and disparities in education. Relying too heavily on remittances could discourage investment in education and other industries. If there is a sudden drop in remittance inflows, families who rely on them may face challenges in funding school expenses. Remittances can potentially boost enrollment rates, although they do not necessarily enhance the overall quality of education. The effectiveness of education is impacted by various factors, including the expertise of educators, the standard of infrastructure, and the advancement of the curriculum.

Remittances contribute to increased family income and help reduce economic barriers to education, thereby promoting school attendance in Nepal. However, it is important for authorities to consider socioeconomic factors and implement long-term solutions to improve the quality and availability of education. This research aims to investigate the intricate relationship between remittances and school enrollment in Nepal, with a focus on understanding the causal processes and socio-economic implications of this connection.

This research has extensively examined the impact of remittances on educational achievements in Nepal. This essay thoroughly analyzes the different

effects of remittances from within the country and from abroad on school enrollment and academic performance. This study provides valuable insights for policymakers regarding the most effective distribution of funds for education, improving educational facilities, and maximizing the influence of remittance earnings on the growth of human capital in Nepal.

1.1 LITERATURE REVIEW

The relationship between migrant remittances and school attendance is complicated and requires an understanding of the elements that impact a household member's migration and educational choices. Due to more economically disadvantaged pupils enrolling in elementary schools, numbers have increased. Compared to annual cross-sectional data, stratified panels are dependable. It reduces bias by minimizing the influence of poor instruments and ignored trends.

Bourlès et al. (2012) created a comprehensive theoretical framework linking parental health risk, education decisions, and children's future income. This study demonstrates that kid income remittances as insurance assets may affect illness rates and education investments. Data from 17 Sub-Saharan African nations' 2003-2010 Demographic and Health Survey (DHS) was used to test the hypothesis. Study participants were 6–22 years old. Multilevel analysis helps manage data hierarchies. Appropriation affects prevalence, with rural and females benefiting and others suffering.

The research by Goudar and Skaff (2023) focused on low-income countries and female and male enrollment rates. They explored several socio-economic factors to explain the worldwide fall in secondary school female enrollment. They also examined per capita GDP, government education expenditure as a percentage of GDP, and US dollar education expenditures. Analysis was done on the four factors and secondary school female enrollment. In contrast, Pearson's product moment correlation coefficient (r) measures linear relationships. Female enrollment rates were negatively correlated with fertility rates (r = -0.798) and positively correlated with government education spending (Spearman's coefficient of 0.799). According to their analysis, reducing teenage pregnancies and spending $100–200 per person to education might boost female participation by 50%–75%.

Rehman et al. (2023) explored gender inequalities in Pakistani school attendance and completion. Pakistan Social and Living Standards Measurement Survey (PSLM) and Pakistan Education Statistics reports provided secondary data. Geography is examined to determine why education discrepancies exist in the four provinces and their districts. This research examined gender differences in school attendance, secondary education completion, and enrollment. Statistics on school enrollment and dropout rates in different regions were examined from several Pakistani locations. This research illuminates Pakistan's significant gender education gaps.

Dual enrollment (DE) programs allow high school students to take college courses and gain college credit (Hu & Ortagus, 2022). By 2016, virtually every state had a complete Distance Education (DE) policy, with just three states outliers (ECS, 2019). Previous research has linked digital engagement (DE) to student learning. College preparedness, academic achievement, learning commitment, and degree completion are aims. DE courses' financial effects have not been well studied in higher education research, despite their prominence in US higher education access issues.

Al-Islam et al. (2022) examined how remittances affect Bangladeshi school attendance. Researchers used 2016 cross-sectional Household Income and Expenditure Survey data. As expected, probit regression shows a strong positive association between school attendance and remittances. The research indicated that two- and three-child households are more likely to send their children to school than

one- or four-child families. The study implies that the government may benefit from introducing extra incentives to remittance-receiving children. Roy et al. (2023) found that this tragedy increased Flint children's special education needs. The study investigated special education results for public school pupils from 2011-12 to 2019-20. This study revealed no correlation between Flint children's blood lead levels and special education participation. Media portrayals of brain damage may have harmed mental health, creating a nocebo effect. The results show that complicated crises like the Flint Water Crisis require better media coverage.

Shekhar et al. (2023) discovered that higher education entrepreneurship education programs (EEPs) affect entrepreneurial training participation. Engineering schools currently provide more Engineering Education Programs (EEPs), notably for undergraduate and graduate students. This research examined the association between engineering students' GPA and engineering education participation. Quantitative methods used student GPA as an independent variable. This study lays the framework for future research in engineering education's underexplored entrepreneurship education topic. Forster et al. (2020) evaluated student expectations and academic performance. The study compared US and German educational systems, which use distinct institutional frameworks. German data comes from the National Educational Panel Study. According to their analysis, US expectations are often greater. Additionally, students in all these nations have comparable odds to succeed. SES's impact on improved results was mostly determined by expectations.

Hanif and Arshed (2016) developed a framework to explain GDP growth factors. For production functions that use physical capital and labor as inputs, the Cobb-Douglas model is often used. That tudy examined SAARC's human capital using three measures. According to dynamic panel data models, higher education participation affects economic growth more

than basic and secondary education. Ramsdal and Wynn (2022) reviewed school dropout studies and focused on reentering school. Researchers used attachment theory and thoroughly analyzed the data. The researchers found five primary problems in achieving educational objectives when confronted with chronic dropout concerns: poor connections, self-discipline issues, bouncing back from prior failures, negative learner identities, and stress management. Ultimately, finding a location and having a good support system were the biggest hurdles.

Nguyen et al. (2021) examined the relationship between neighborhood deprivation and child obesity, concentrating on SEP. The investigation included neighborhood deprivation and parental education. Parental education affected neighborhood disadvantage and child obesity. The association was greater for parents with higher education levels compared to those with moderate or low education ($p<.001$). Research reveals that poor children are more likely to be obese. Identifying disadvantaged groups, structural interventions, and parental health literacy are crucial.

Dietz et al. (2015) examined migration and children's schooling in Tajikistan, a nation with severe economic problems and a heavy reliance on foreign help. A three-wave home panel study found that children attend fewer schools when family members depart. Remittances don't help. Families with low educational backgrounds and older children may struggle to attend school if siblings move. That study showed the academic hurdles Tajikistani children who remain despite emigration confront. Yousaf et al. (2023) examined how remittances and poverty affect Gulf Cooperation Council economic growth. A panel ARDL analysis shows several significant connections with GCC economic progress over time. Economic growth has linked to labor, gross fixed capital production, secondary school enrollment, remittances, and poverty. Many variables impact remittances, labor, gross fixed capital formation, and poverty.

Remittance influx boosts GCC economies, according to this study.

Khan and Khan (2016) examined how remittances affect Pakistani 4–15-year-olds' attendance and academic achievement. Remittance-receiving households have more schoolchildren, according to the instrumental variable probit model. Remittances affect school attendance, especially for females and rural households. Remittances help narrow Pakistan's gender and regional educational inequalities. Remittances' impact on children's academic achievement is examined using an IV censored ordered probit model. Joseph and Wodon (2014) examined how remittances affect poverty and human development. They used matching methods, a nationwide household survey, and weather data. The indicators included school enrollment, immunization rates, and malnutrition. Estimates are made nationally in various climates. Remittances affect school attendance in environmentally concerned communities. The data show that lower-income families spend remittances for basic necessities, whereas higher-income families invest them in education.

Murakami (2019) explored how international migration affects Tajikistani children's schooling. That study used an exhaustive home survey to cover the nation. A switching probit model addresses endogeneity and self-selection in migration, remittance, and school enrollment studies. To study how migration and remittances affect children in various homes, counterfactual scenarios are devised. Remittance-receiving households, mixed-migrant families, and migrant-parent households fall under these categories. The study shows that migrant household members lower children's school attendance by 10%. Parents' migration affects the home more than others. Remittances lessen migration's negative consequences by 1-3 percentage points.

Stanley and Fleming (2019) stressed the relevance of migration and remittances for Nepal, despite its economic woes. National labor movements can help more school-aged children enroll and invest in their education. Understanding microeconomic processes boosts earnings. Nepalese children's school attendance is affected by local and foreign remittances. Migration and remittances were analyzed for positives and downsides. They used data from a large sample of school-aged children in the Nepal Living Standards Survey (NLSS III). An external method calculates enrollment marginal effects. Money contributed by expatriates increases school enrollment by 2%, according to research.

Gyimah-Brempong and Asiedu (2015) examined how remittances affect Ghanaian education funding. Remittances influence families' enrollment in primary and secondary schools, advancing education. International remittances affect primary and secondary school admissions. Research shows that remittances to women-led households affect education investment more than those headed by males. That study shows that international remittances boost human capital and promote long-term economic growth, reducing poverty. Yousaf et al. (2023) explored how remittances and poverty affect GCC economic growth. The study used 2000–2021 panel data by using unit root tests, ARDL models, and Granger causality tests. That study shows that remittances boost economic growth in Gulf Cooperation Council nations. It also stresses how poverty hinders progress.

Sami and El-Aziz (2018) examined how remittances affect Egyptian children aged 6–21's schooling. Schoolchildren and university students are influenced. That study examined how remittances affect educational success, unlike prior studies that focused on enrollment. Remittance receipt and educational achievement were examined using an Ordered Probit Model using an Instrumental Variable method. Remittances seem to assist university students overcome financial restrictions and excel academically. Research reveals remittances have little impact on pupils. Nguyen and Purnamasari (2011) examined how female migration affected child outcomes and labor supply in the families

where the women came from. Instrumental variable estimation was used to analyze Indonesia Family Life Survey data. Movement and remittance revenues are quantified using historical movement networks. The impacts of foreign migration on Indonesian households vary by migrant gender, according to studies. Women's migration and money transfers to their home nations diminish child labor. The migration and remittance impact on school enrollment were not statistically significant.

Bhandari (2020) examined private school admissions, tutor use, tutoring service investment, and school tuition prices to assess education quality. The flexibility of families to migrate and the habit of sending money home make it difficult to measure remittances' influence on these elements. The regression was often used to assess migrant households and solve these issues. After controlling for family and child characteristics and geography, there is no evidence linking remittance to private school enrollment or tutoring. Remittance somewhat affects private and school tuition.

2. RESEARCH METHODOLOGY

This study employed a quantitative approach, utilizing descriptive and analytical methods. The variables were measured, and the effects of independent variables on the dependent variable were quantified, using secondary data. This study has been included all government schools which were collected through the secondary sources. The acquired data was then analyzed using the EViews statistical package, version 10, to interpret the findings.

2.1 CONCEPTUAL FRAMEWORK OF STUDY VARIABLES

Dependent variable: Basic Level Govt. School Enrolment

Independent variables: Per Capita GDP (in USD), Population growth (annual %), and Remittance (in million rupees)

Figure 1: *Relationship between Dependent and Independent Variables*

Independent variables Per Capita GDP (in USD), Population growth (annual %), and Remittance (in million rupees)	→	Dependent variable Basic Level Govt. School Enrolment
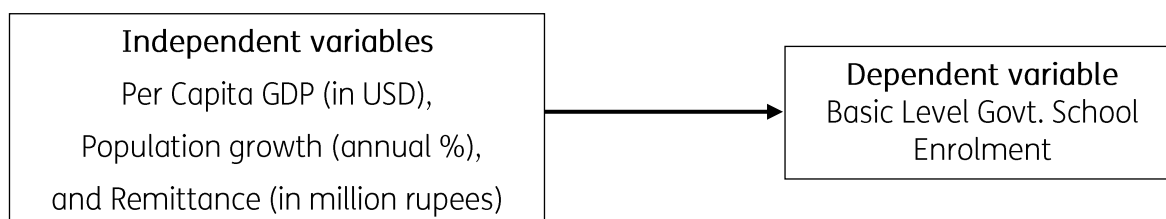
$LNGOVTBL = \beta_0 + \beta_1 t + \beta_2 LNPCGDP + \beta_3 LNPG + \beta_4 LNREM + e_t$ ....(i)

Where,

LNGOVTBL= Natural Logarithms of Basic Level Govt. School Enrolment

LNPCGDP = Natural Logarithms of Per Capita GDP (in USD),

LNPG = Natural Logarithms of Population growth (annual %),

LNREM= Natural Logarithms of Remittance (in million rupees)

e_t = error term

β_i = constant coefficient

2.2 SOURCES OF DATA

This research uses both descriptive and analytical methods and only used secondary data. Instead, available literature from books, journals, and the Nepal Rastra Bank had used in accordance with the study objectives. Data pertaining to students enrollments from the period 2000- 2022 were sourced from various issues of Economic Survey of Ministry of Finance of Nepal, data of per capita GDP (in USD) and remittances (in million rupees) were sources Quarterly Economic Bulletin 2023-Oct of the Nepal Rastra Bank and the data of Population growth (annual %) as well the sources from World Bank(2024).

2.3 ECONOMETRIC METHOD

To examine the primary objective of the study, which is to explore the relationship between School enrolment, Per Capita GDP (in USD), Population growth (annual %) and Remittance (in million rupees) the following procedures were employed for the time series method studies.

2.3.1 STATIONERY TEST

Most time series econometric methods work under the presumption that the variables in the time series are stationary. As a result, the dynamic time series model was tested and estimated using standard methods.
"Integrated to the order one," or I (1), is the term used to characterize a series with a unit root process. Conversely, an I (0) process is the name given to a stationary process. Time series are categorized using this nomenclature in a common way according to their stationarity characteristics.

2.3.2 AUTO-REGRESSIVE DISTRIBUTIVE LAG (ARDL)

The autoregressive distributive lag (ARDL) was used to examine the short term and long-term relationship between the, Per Capita GDP (in USD), Population growth (annual %) and Remittance (in million rupees) on Basic Level Govt. School Enrolment. Before using co-integration, we need to find the order of integration of each dependent and independent variable under study. If the order of integration is I (2) or more in that condition can't be used in ARDL model.

2.3.3 CO-INTEGRATION TEST

Co-integration analysis was carried out to determine the existence of long-run relationship that exists between the dependent and independent variable. When one or all of the variables is/are non-stationary at level which means they have stochastic trend which need to be convert into stationary by differentiation or log transformation. Essentially, it is used to check if the independent variables can predict the dependent variable now (short-run) or in the future (long-run). The long run relationship among the variables was examined using Johansen Co-integration framework.

2.3.4 ARDL BOUNDS TEST

ARDL bounds test to find the long run relationship between independent and dependent variables which is better than others classical co-integration tests (Bahmani-Oskooee & Ng, 2002). For this, there needs to determine whether the data are I (0) or I (1). Regarding this, the Error Correction Model (ECM) was used for data analysis.

2.3.5 ERROR CORRECTION MODEL (ECM)

Error Correction representation of Autoregressive Distributive Lag Model Co-integration in the variables which can be assess thought of error correction model (ECM). Individual Co-efficient of the lagged values was used to find short run dynamics while.
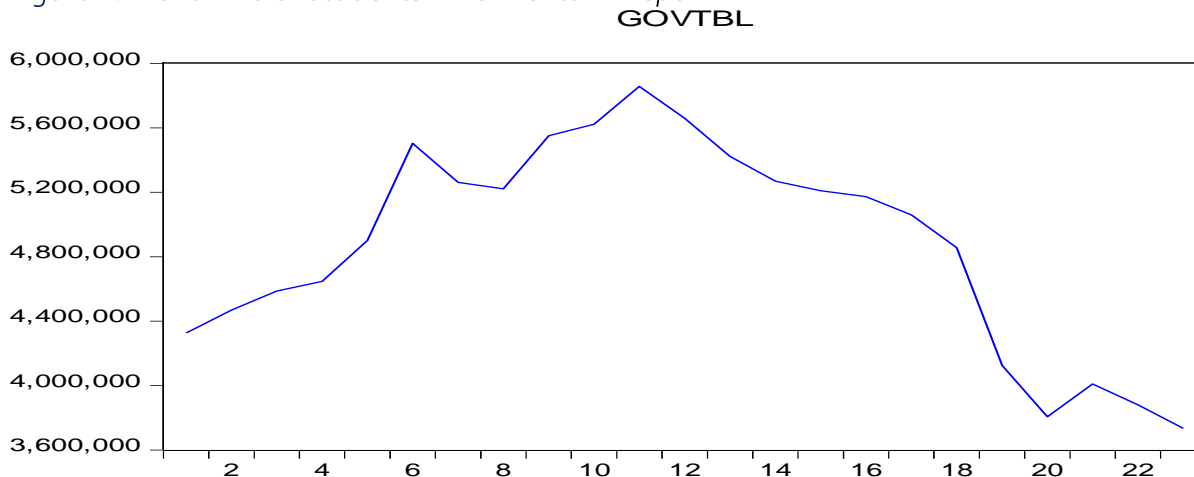
4. RESULTS
4.1 STUDENTS ENROLMENTS

In Nepal, government primary schools enroll the majority of students, but private schools become more popular in lower secondary and secondary levels, likely due to the perception of better educational quality in private institutions. This trend highlights the need for continued

investment in public schools to ensure quality education options at all levels.

Figure 2: *Trend Line of Students Enrolments in Nepal*

Source: *Results from data analysis*

4.2 PER CAPITA GDP (IN USD)

Nepal's GDP per capita in USD has been on the rise. This growth suggests a gradual improvement in the average standard of living in Nepal. However, it's important to remember that $1399 is still a relatively low number compared to many other countries, indicating there's room for further economic development.

Figure 3: *Trend Line of Per Capita GDP*
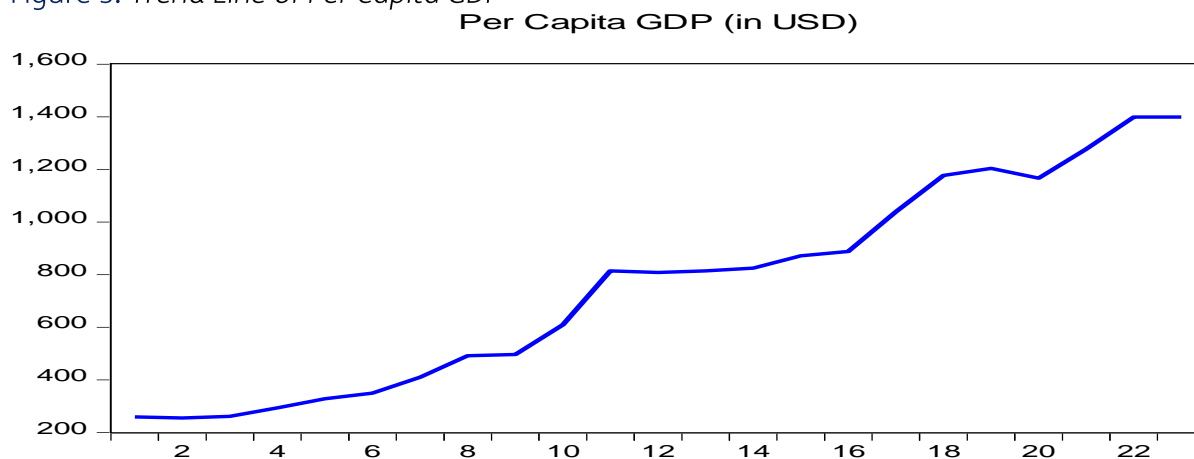
Source: *Results from data analysis*

4.3 REMITTANCES

Remittances can positively contribute to household income and potentially increase school enrollment rates in Nepal, it's essential to address the potential negative impacts, such as parental absence and child labor, through targeted policies and interventions aimed at promoting educational opportunities for all children.

Figure 4: *Trend Line of Remittance (Rs. in Million)*

Remittance (in million rupees)
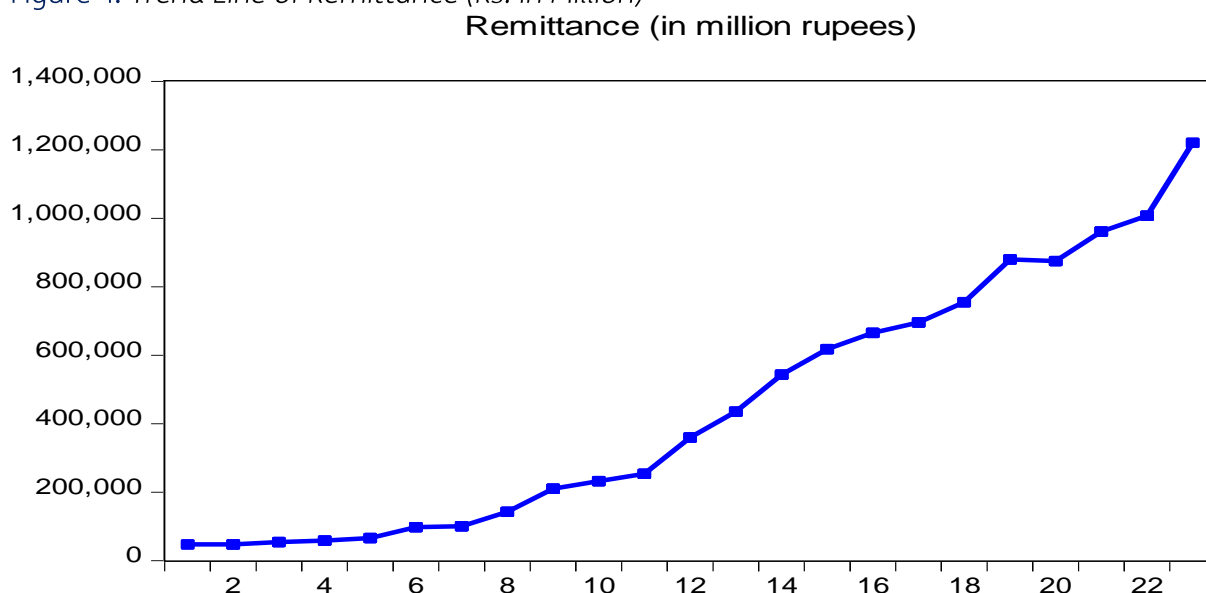
Source: *Results from data analysis*

4.4 ECONOMETRIC ANALYSIS
4.4.1 UNIT ROOT TEST

The data's stationarity is evaluated using the unit root test. As a unit root test, the ADF test helps ascertain whether the variables satisfy the stationarity requirement (Poudel, 2022).

Table 1: *Unit Root Test*

Series	On Level		On First Difference	
	t-Stat	Prob-Value	t-Stat	Prob-Value
LNGOVTBL	-0.1824	0.9274	-3.1881	0.0352**
LNPCGDP	-0.9502	0.7521	-3.8814	0.0082*
LNREM	-1.0067	0.7322	-4.4415	0.0024
LNPG	-1.9052	0.0559**	-1.5738	0.1064

Source: *Author's calculations performed using E-Views*
* Shows that the result is highly significant at the 1% significance level and **. shows that the result is highly significant at the 5% significance level.

The following conclusions are reached by the Augmented Dickey-Fuller (ADF) test at a significance level of 5%: (i) The null hypothesis, which postulates that a unit root exists in the level series of every variable, is accepted; nevertheless, (ii) it is rejected in the case of the variables' first difference. This suggests that all series are integrated of order one since they all become stationary when differenced once. As a result, it is possible that the variables have a long-term relationship as they are co-integrated (Poudel et al., 2024).

4.4.2 VAR LAG ORDER SELECTION CRITERIA

Before conducting the co-integration test, it is necessary to determine the appropriate lag length. The table below indicates that most of the criteria recommend selecting 1 lag. Therefore, we proceed with further tests using lag (1).

Table 2: *VAR Lag Order*

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-343.3809	NA	6.10e+08	31.58008	31.77845	31.62681
1	-233.8126	169.3329*	127347.2*	23.07387*	24.06573*	23.30752*

Source: *Results from data analysis*

4.4.3 ARDL MODEL-I RESULT

The Auto Regressive Distributed Lag (ARDL) model was used for estimating the long-run and short-run relationships between variables in a time series context (Poudel, 2024).

Table 3: *ARDL Model-I Result*

Selected Model: ARDL(1, 1, 1, 1)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GOVTBL(-1)	0.585651	0.166015	3.527706	0.0033
LNREM	1068240.	517296.9	2.065043	0.0580
LNREM(-1)	-1277469.	442167.1	-2.889109	0.0119
LNPCGDP	1474921.	691488.6	2.132965	0.0511
LNPCGDP(-1)	-1436310.	865040.9	-1.660395	0.1191
LNPG	133747.0	226098.8	0.591542	0.5636
LNPG(-1)	-393573.7	229633.9	-1.713918	0.1086
C	4049854.	1232547.	3.285760	0.0054
R-squared	0.940642	Mean dependent var		4901164.
Adjusted R-squared	0.910963	S.D. dependent var		654058.0
S.E. of regression	195165.0	Akaike info criterion		27.47637
Sum squared resid	5.33E+11	Schwarz criterion		27.87311
Log likelihood	-294.2400	Hannan-Quinn criter.		27.56983
F-statistic	31.69379	Durbin-Watson stat		2.116172
Prob(F-statistic)	0.000000			

Source: *Results from data analysis*

ARDL (1, 1, 1, 1) – This indicates an ARDL model with one lag of the dependent variable, one lag of the independent variables, one constant in the co-integrating equation, and one lag in the error correction term.

In this case, the dependent variable was the natural logarithm of basic level government school enrollment (LNGOVTBL). The results show that the model explained 94.06% of the variation in LNGOVTBL. The coefficient of LNGOVTBL(-1), which was the lagged value of LNGOVTBL, was statistically significant, indicating that government school enrollment had a positive impact on itself in the future. But lag value of Per capita GDP (LNPCGDP-1), LNPG (-1) and remittance (LNREM-1) had negative impacts on government school enrollment. Remittance (LNREM-1) had statistically significant negative impacts on government school enrollment

4.4.4 CO-INTEGRATING EQUATION IN ARDL MODEL

In the context of an ARDL model, the co-integrating equation represents the long-run relationship between the variables involved in the model. The co-integrating equation is derived when there is evidence of co-integration among the variables, suggesting that they share a common stochastic trend (Poudel, 2023).

Table 4: *F-Bounds Test*

Null Hypothesis: No levels relationship	Value of Statistics
Computed F- Statistics	5.423643
5% Critical Value	
Value in Lower Bound	2.79
Value in Upper Bound	3.67

Source: *Results from data analysis*

The null hypothesis of this test was that there's no co-integrating relationship, meaning the variables don't move together in the long run. The computed F-statistic (5.423643) was greater than the upper bound critical value (3.67) for a 5% significance level. This indicates that rejects the null hypothesis. Based on this F-bounds test, there's evidence to suggest that the variables in the model had a co-integrating relationship, meaning they likely trend together over the long run (Upadhyay et al., 2022).

4.4.5 ECM MODEL

Error Correction Model (ECM) was used to find the short and long run relationship among variables in time series regression model. The finding of ECM is shown as:

Table 5: *Estimated Long-run Coefficient: ARDL (1, 1, 1, 1) Selected by Schwarz*

Variable	Coefficient	Std.Error	t-statistic	p-value
ECM	-0.414349	0.070172	-5.904767	<0.0001

Source: Results from data analysis.

Table 5 indicates that the error correction coefficient was -0.414349, significant at both the 10% and 5% levels with a p-value of less than 0.001. This finding suggests a rapid convergence towards equilibrium, highlighting the robustness of the model's adjustment process.

4.4.6 GRANGER CAUSALITY TEST

In the ARDL framework, the Granger Causality Test is often applied to assess the direction of causality between the variables included in the model. A significant result in the Granger Causality Test suggests that the lagged values of the potential predictor variable contain information that helps predict the dependent variable (Poudel et al., 2023).

Table 6: *Pairwise Granger Causality Tests*

Null Hypothesis:	Obs	F-Statistic	Prob.
LNREM does not Granger Cause GOVTBL	22	9.37828	0.0064
GOVTBL does not Granger Cause LNREM		2.15026	0.1589
LNPCGDP does not Granger Cause GOVTBL	22	9.76056	0.0056
GOVTBL does not Granger Cause LNPCGDP		1.68474	0.2098
LNPG does not Granger Cause GOVTBL	22	0.15922	0.6943
GOVTBL does not Granger Cause LNPG		9.14502	0.0070
LNPCGDP does not Granger Cause LNREM	22	12.2393	0.0024
LNREM does not Granger Cause LNPCGDP		2.41218	0.1369
LNPG does not Granger Cause LNREM	22	0.98249	0.3340
LNREM does not Granger Cause LNPG		3.64906	0.0713
LNPG does not Granger Cause LNPCGDP	22	0.12476	0.7278
LNPCGDP does not Granger Cause LNPG		1.91801	0.1821

Source: *Results from data analysis*

The results suggest mixed evidence regarding Granger causality between the variables in the specified pairs. Some pairs showed significant Granger causality, while others did not. The p-values provide a measure of the statistical significance of the tests, and the decision to reject or fail to reject the null hypothesis depends on the chosen significance level (e.g., 0.05). The Granger causality tests indicate that LNREM significantly Granger causes LNGOVTBL (Natural Logarithms of Basic Level Govt. School Enrolment) at a 1% significance level, suggesting that changes in remittance influence school enrollment. Additionally, LNPCGDP significantly Granger caused LNGOVTBL, implying a relationship between per capita GDP variations and school enrollment. However, LNPG did not significantly Granger caused LNGOVTBL, indicating that population growth may not directly impact basic level Govt. school enrollment.

4.4.7 LONG RUN CAUSALITY

In an Auto Regressive Distributed Lag (ARDL) model, the concept of long-run causality refers to the existence and direction of a causal relationship between variables over an extended period, typically beyond short-term dynamics. ARDL models are particularly useful for examining long-run relationships because they allow for the analysis of both short-run and long-run effects. The approach to evaluating long-run causality in ARDL involves the examination of the coefficients associated with lagged values of variables in the model. Before exploring long-run causality, it's essential to test for co-integration among the variables. Co-integration implies the presence of a stable long-run relationship between variables. If co-integration is confirmed, it suggests that there is a meaningful and lasting connection between the variables, and they move together in the long run.

4.4.8 SHORT-RUN CAUSALITY

ARDL models include lagged values of variables to capture short-term dynamics. These lagged terms represent the effects of past values of variables on their current values.

Table 7: *Wald Test*

Null Hypothesis: C (1) =0,C(2)=0,C(3)=0,C(4)=0,C(5)=0,C(6)=0, C(7) =0			
Test Statistic	Value	df	Probability
F-statistic	31.69379	(7, 14)	0.0000
Chi-square	221.8566	7	0.0000

Source: *Results from data analysis.*

The Wald test examines if all seven coefficients (C (1) to C (7)) were jointly zero. F-statistic (31.69379) and Chi-square statistic (221.8566) are very significant (p-value of 0.0000 for both). This strong evidence leads us to reject the null hypothesis. At least one of the lagged independent variables (D(LNPCGDP), D(LNPG), D(LNREM), or Coint Eq (-1)) had a statistically significant impact on the current change in government school basic level enrollment. This suggests that past values of these variables helped to explain short-run changes in government school basic level enrollment.

4.4.9 MODEL DIAGNOSIS

Model diagnosis is a continuous process, and researchers may need to revisit and improve their models based on diagnostic results. It is essential to guarantee that the selected model accurately reflects the underlying economic relationships in the data.
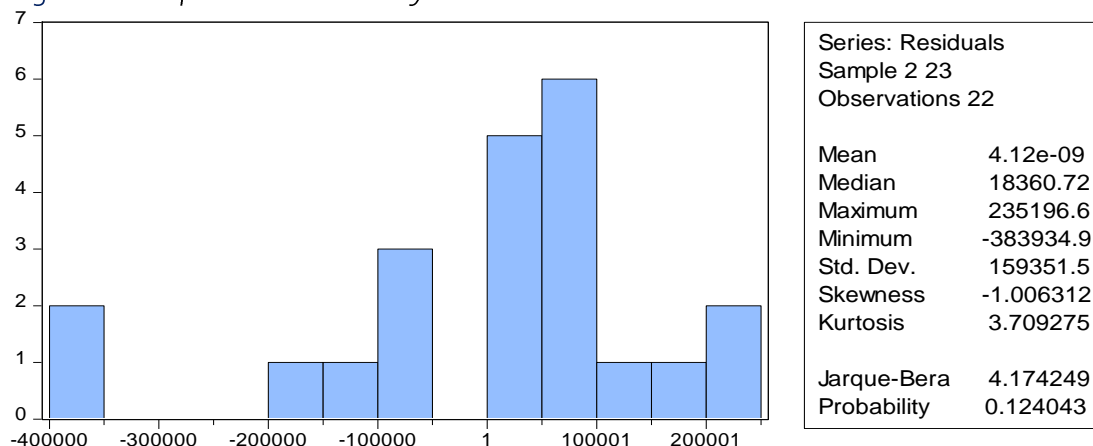
4.4.10 F-TEST

With an R-squared value of 94.06 percent and F-statistic p-value of less than 1 percent, our model is considered well-fitted. The significance of the F-statistic p-value is within the 1 percent threshold, indicating its statistical significance in assessing the overall model fit.

4.4.11 NORMALITY TEST

The Jarque-Bera test is used to evaluate whether the distribution of the model's variables meets the normality assumption. This test is important because it suggests that the variables adhere to a normal distribution. Here are the test results:

Figure 5: *Jarque-Bera Normality Test*

Series: Residuals	
Sample 2 23	
Observations 22	
Mean	4.12e-09
Median	18360.72
Maximum	235196.6
Minimum	-383934.9
Std. Dev.	159351.5
Skewness	-1.006312
Kurtosis	3.709275
Jarque-Bera	4.174249
Probability	0.124043

Source: *Results from data analysis*

The outcome of the Jarque-Bera test suggests that the null hypothesis was upheld, as the test's probability exceeded the 5% significance level. Since the probability value for Jarque-Bera (0.124043) was higher than 5 percent, it indicates that the residuals of the model adhered to a normal distribution.

4.4.12 HETEROSKEDASTICITY TEST

The Bruesch-Pagan-Godfrey test is specifically crafted to detect heteroskedasticity, a complication in econometric regression analysis. The results of this test are presented in the table below.

Table 8: *Heteroskedasticity Test: Breusch-Pagan-Godfrey*

| F-statistic	0.899477	Prob. F (7,14)	0.5332
Obs*R-squared	6.824850	Prob. Chi-Square (7)	0.4473
Scaled explained SS	3.743923	Prob. Chi-Square (7)	0.8088

Source: *Results from data analysis*

The results of the heteroskedasticity test are displayed in Table 7. Based on the results, it can be concluded that the model did not exhibit heteroskedasticity since the null hypothesis of homoscedasticity did not rejected at a 5% significance level. Put simply, the p-value of the observed R-squared was found greater than 5 percent, indicating that the data exhibits homoscedasticity.

4.4.13 STABILITY TEST IN ARDL MODEL

A stability test in an ARDL model is a crucial step to verify whether the estimated relationships remain valid over time. It helps researchers and analysts assess the reliability of the model's predictions and identify potential issues with parameter stability. The CUSUM test involves examining the cumulative sum of the differences between the estimated coefficients and a reference value.
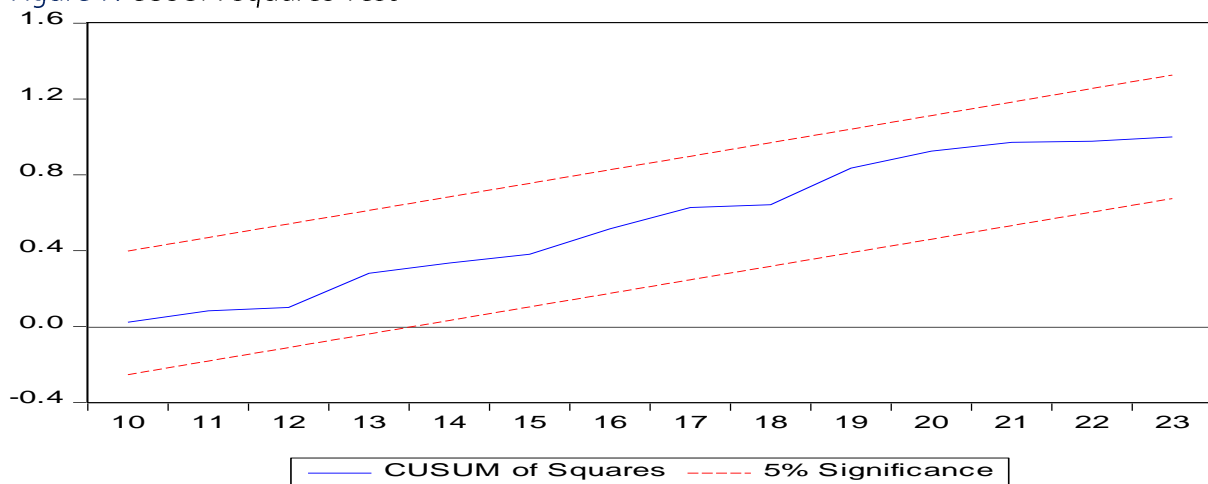
Figure 6: *CUSUM Test*
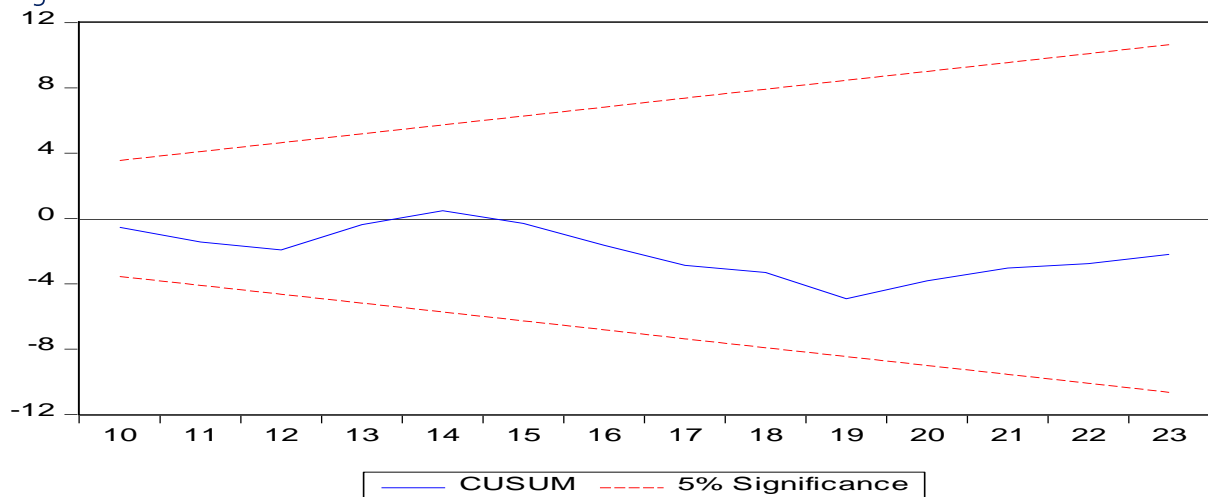
The two red lines represent the upper and lower bounds of the 5% confidence interval for the CUSUM statistic. The blue line represents the actual CUSUM statistic. Here, the blue line remained within the red bounds throughout the time series; it suggests that the model's parameters were found stable.

Figure 7: *CUSUM Squares Test*

The two red lines represent the upper and lower bounds of the 5% confidence interval for the CUSUM statistic. The blue line represents the actual CUSUM of squares statistic. Here, the blue line remained within the red bounds throughout the time series; it suggests that the model's parameters were found stable.

5. DISCUSSIONS

This research examined the relationship between basic level government school enrollment in Nepal and several economic factors: per capita GDP, population growth, and remittances. The ARDL model is a valuable tool for analyzing relationships in time series data, particularly when dealing with mixed integration and the need to understand both short-run and long-run dynamics. The model explains a significant portion of the variation in government school enrollment (R-squared = 94.06%).

Remittances (lagged) have a statistically significant negative impact on government school enrollment, suggesting potential issues like parental absence due to work abroad. Per capita GDP (both current and lagged terms) has a positive influence on enrollment, highlighting the

importance of economic development for education. Population growth doesn't show a statistically significant impact on enrollment in this model. The findings of this study is similar to the findings of Al-Islam et al. (2022), Roy et al.(2023), Khan and Khan (2016) whereas the findings of this contrast with the finding of Yousaf et al.(2023), Bowman et al.(2024) and Joseph and Wodon (2014).

The co-integration test suggests a long-run relationship between the variables, meaning they tend to move together over time. Granger causality tests indicate that remittances and per capita GDP Granger cause government school enrollment, implying their influence on enrollment decisions. this study provides valuable insights into the factors affecting government school enrollment in Nepal. The findings can inform policy decisions aimed at improving access to education and ensuring quality education for all children.

6. CONCLUSIONS

Nepal has experienced a significant increase in remittance inflows, with remittances accounting for approximately 27.3% of the country's GDP in 2019, up from 24.7% in 2009. This indicates a substantial upward trend in remittance inflows into Nepal over the specified period. This study investigated the determinants of basic level government school enrollment in Nepal using an ARDL model. The model revealed that remittances have a negative impact on enrollment, possibly due to parental absence. Per capita GDP shows a positive influence, highlighting the importance of economic growth for education.

Population growth wasn't statistically significant in this model. The analysis suggests a long-run relationship between these factors and enrollment, implying they influence each other over time. These findings can inform policy decisions to improve access to education and ensure quality schooling for all children in Nepal, while future research should explore the reasons behind the negative

impact of remittances and ways to address serial correlation in the model.

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