



MANAGEMENT DYNAMICS

A Peer-reviewed Journal of Management and Economics



Published by
Shanker Dev Campus
Tribhuvan University, Nepal

The Spending Equation: Unpacking Remittances, GDP, and CPI in Nepal's Private Consumption

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Article Info:

Received: 15 June 2023

Revised: 03 Sep. 2023

Accepted: 21 Oct. 2023

DOI: <https://doi.org/10.3126/md.v26i2.72320>

Keywords:

Private consumption, Remittances, GDP, Inflation, ARDL, Error Correction Model

JEL Classification: E21, F24, E31, O11, C32

ABSTRACT

This study examines the determinants of private consumption in Nepal, focusing on remittances, GDP, and inflation. Private consumption plays a critical role in economic growth, yet its drivers in Nepal remain underexplored, particularly concerning cross-border inflation impacts. Utilizing an ARDL framework, the study analyzes time-series data from 1975–2023. Unit root and F-Bounds tests were employed to ensure stationarity and confirm long-run relationships among variables. The Error Correction Model (ECM) captured short-run dynamics and adjustment speeds. Diagnostic tests ensured model robustness and stability. The findings reveal significant positive long-run effects of remittances (coefficient: 0.0256) and GDP (coefficient: 0.0433) on private consumption. Inflation exhibits mixed impacts, with Indian inflation negatively affecting consumption. The ECM demonstrated a rapid adjustment speed (−1.0095), indicating strong reversion to equilibrium. Diagnostic tests confirmed model stability and robustness. The results align with Keynesian theory, emphasizing income's role in consumption, and highlight the novelty of incorporating cross-border inflation dynamics. The findings emphasize the need for policies stabilizing remittance inflows, promoting inclusive growth, and managing inflation. This study offers novel insights into the interconnectedness of macroeconomic variables and provides a framework for future research on consumption behavior in Nepal.

1. INTRODUCTION

Private consumption is a vital component of economic activity, reflecting household spending and driving overall economic growth. In Nepal, private consumption has been significantly influenced by various macroeconomic factors, including remittances, GDP, and the Consumer Price Index (CPI). These relationships are particularly relevant in Nepal, where remittance inflows form a crucial source of income for many households, accounting for a substantial portion of the national GDP (Lamsal, 2023). Understanding the interplay between these variables is essential for policymakers seeking to enhance economic resilience and foster sustainable growth in a context characterized by high dependency on remittances and inflationary pressures (Joshi, 2022).

Remittances, which represent a significant share of Nepal's income, have transformed household consumption patterns by providing additional resources for spending on goods and services (Phillip & Selvamalai, 2018). Studies by Lamsal (2023) have shown that remittance inflows significantly increase household consumption, alleviating poverty and improving living standards. This phenomenon has been observed globally, as evidenced by research in Ghana (Asafo Agyei, 2021), South Asia (Phillip & Selvamalai, 2018), and Sub-Saharan Africa (Ali Bare et al., 2022). However, remittances also contribute to inflationary pressures, as increased demand for goods and services drives up prices, diminishing purchasing power over time (Joshi, 2022). This dual impact of remittances complicates their role in fostering sustainable consumption patterns in Nepal (Dahal, 2022).

GDP and CPI are equally important determinants of private consumption. GDP growth reflects an increase in economic productivity, directly impacting household income and spending capacity (Tokoya et al., 2022). However, the relationship between GDP and consumption is influenced by factors such as economic inequality and access to financial services, which remain challenges in Nepal. Meanwhile, CPI, as a measure of inflation, directly affects household purchasing power. Rising inflation, driven by external shocks and domestic inefficiencies, has been identified as a significant constraint on consumption in Nepal (Joshi, 2022). The interaction between GDP growth, inflation, and remittances thus creates a complex environment for understanding private consumption behavior (Lim et al., 2021).

Global studies also provide insights into these dynamics. Lim et al. (2021) highlight the macroeconomic consequences of remittances in labor-exporting economies, while studies in India and Bangladesh reveal the nuanced effects of remittances and inflation on consumption and investment (Masduzzaman, 2014). Additionally, research in Colombia, Ghana, and Sri Lanka underscores the importance of context-specific analyses to understand the interplay between remittances, inflation, and household consumption (Medina & Cardona, 2010; Asafo Agyei, 2021; Aslam & Sivarajasingham, 2021).

In Nepal's context, the reliance on remittances as a source of income and their implications for inflation and economic stability have been well-documented (Lamsal, 2023). However, the

lack of empirical studies that comprehensively analyze the interactions between remittances, GDP, CPI, and private consumption creates a critical knowledge gap. Addressing this gap is essential to inform policy decisions that aim to enhance household welfare and economic stability (Phillip & Selvamalai, 2018).

Private consumption is a cornerstone of Nepal's economy, reflecting the economic health and welfare of households. However, its determinants, particularly remittances, GDP, and CPI, present a complex and intertwined relationship. While remittances have become a significant source of household income, they simultaneously contribute to inflationary pressures and demand-side shocks, complicating their impact on private consumption (Lamsal, 2023; Joshi, 2022). Similarly, GDP growth and CPI dynamics interact with remittance inflows to shape household spending behavior, highlighting the need for a comprehensive understanding of these factors.

Despite their importance, there is limited empirical research that examines the short- and long-term effects of these variables on private consumption in Nepal. Existing studies have often analyzed these factors in isolation, overlooking their interdependence and cumulative impact on household welfare (Dahal, 2022; Lim et al., 2021). This gap in the literature hinders policymakers' ability to design effective interventions aimed at enhancing consumption-driven economic growth while addressing inflationary and structural challenges.

The main aim of this research is to analyze the short- and long-term impacts of remittances, GDP, and the Consumer Price Index (CPI) on private consumption in Nepal using the ARDL model, addressing the interdependencies and cumulative effects of these variables.

2. LITERATURE REVIEW

To understand the dynamics of private consumption in Nepal, it is essential to examine the interplay of remittances, GDP, and the Consumer Price Index (CPI). This review synthesizes findings from various sources, categorizing them into thematic areas that illuminate the roles of these factors in shaping consumption behavior and economic outcomes.

Theoretical Review

The study of private consumption and its determinants – remittances, GDP, and CPI – draws upon several economic theories and frameworks that explain household spending behavior and macroeconomic dynamics. This theoretical review explores the foundational concepts and models that underpin the relationships analyzed in this research.

Keynesian Consumption Theory

Keynesian economic theory posits that household consumption is primarily a function of disposable income. Keynes (1936) introduced the idea of the consumption function, where current income is the main determinant of consumption expenditure. This theory is particularly relevant to Nepal, where remittance inflows significantly boost household disposable income, leading to higher consumption. Studies such as those by Lamsal (2023);

Phillip and Selvamalai (2018) align with this framework, showing how remittances directly enhance household consumption. However, Keynesian theory also highlights the role of marginal propensity to consume (MPC), which varies across income levels, explaining disparities in consumption patterns in Nepal's rural and urban households.

Permanent Income Hypothesis (PIH)

The Permanent Income Hypothesis, developed by Friedman (1957), suggests that consumption is determined not by current income but by an individual's lifetime income expectations. This theory helps explain why remittance-receiving households in Nepal may smooth their consumption over time, anticipating future inflows (Lim et al., 2021; Dahal, 2022). Remittances, often seen as a stable source of income, enable households to make long-term consumption and investment decisions. Studies from Sub-Saharan Africa (Ali Bare et al., 2022) and South Asia (Phillip & Selvamalai, 2018) provide additional evidence supporting this hypothesis, suggesting that households tend to allocate remittances toward both immediate needs and future goals.

Life-Cycle Hypothesis (LCH)

The Life-Cycle Hypothesis, proposed by Modigliani and Brumberg (1954), expands on PIH by considering how individuals plan their consumption and savings across different stages of life. In Nepal, remittances often fund household expenditures at various life stages, such as education, healthcare, and retirement. Lamsal (2023) notes that remittance-receiving households allocate funds strategically across life-cycle needs. This behavior is consistent with findings from Ghana (Asafo Agyei, 2021) and Sri Lanka (Aslam & Sivarajasingham, 2021), where remittance inflows reduce financial constraints for households at critical life stages.

The Theory of Consumer Demand

Hicksian and Marshallian demand theories provide a framework for understanding how changes in prices (CPI) affect consumption patterns. According to these theories, rising prices reduce the real purchasing power of households, leading to a decline in consumption. In Nepal, CPI plays a significant role in shaping household spending behavior, particularly in remittance-dependent households (Joshi, 2022). Inflationary pressures, exacerbated by increased demand from remittance inflows, highlight the interaction between income and price levels in determining consumption.

Dual Gap Theory

The Dual Gap Theory, often applied in the context of developing economies, examines the gaps between savings and investment, as well as between imports and exports, to explain economic growth constraints. For Nepal, the remittance inflow functions as a key mechanism to bridge the savings-investment gap, enabling higher consumption and reducing poverty. However, the reliance on remittances also raises concerns about inflationary effects and reduced competitiveness in the export sector. These dynamics are consistent with findings from Bangladesh (Masuduzzaman, 2014) and Colombia (Medina & Cardona, 2010).

Macroeconomic Theories on Remittances

Macroeconomic theories on remittances focus on their dual role in fostering economic growth and driving inflation. The Dutch Disease theory, for instance, explains how remittance inflows can appreciate the real exchange rate, reducing export competitiveness and creating inflationary pressures (Lim et al., 2021; Dahal, 2022). In Nepal, this phenomenon is evident in the rising CPI and its impact on private consumption (Joshi, 2022). Additionally, the Dependency Theory highlights the risks of over-reliance on remittances, suggesting that such dependence can hinder the development of domestic economic sectors (Lamsal, 2023).

Endogenous Growth Theory

Endogenous Growth Theory emphasizes the role of human capital, innovation, and financial development in driving economic growth. This theory is relevant to understanding how remittances contribute to private consumption by improving access to education, healthcare, and other services that enhance human capital (Ali Bare et al., 2022). In Nepal, remittances often fund investments in these areas, indirectly boosting long-term consumption through improved productivity and income levels.

ARDL Modeling Framework

The Autoregressive Distributed Lag (ARDL) model provides a theoretical and methodological foundation for analyzing the short- and long-term relationships between remittances, GDP, CPI, and private consumption. This approach is particularly suitable for Nepal, given the dynamic interactions between these variables over time.

Conclusion

The theoretical frameworks discussed provide a comprehensive understanding of the factors influencing private consumption in Nepal. Keynesian and life-cycle theories explain household spending behavior, while macroeconomic and endogenous growth theories shed light on the broader impacts of remittances, GDP, and CPI. The ARDL model, informed by these theories, offers a robust analytical framework to examine the short- and long-term dynamics of private consumption, bridging gaps in the existing literature and informing policy decisions. This study builds on these theoretical foundations to explore the determinants of private consumption in Nepal, contributing to both academic knowledge and practical policy-making.

Empirical Review

Empirical studies have extensively analyzed the impact of remittances, GDP, and CPI on private consumption in Nepal and other developing economies.

The Role of Remittances in Private Consumption

Remittances are a major driver of private consumption in Nepal, contributing significantly to household income and reducing poverty levels. Lamsal (2023) underscores that remittance

inflows have consistently increased household consumption, enabling better access to goods and services. This aligns with findings by Phillip and Selvamalai (2018), who demonstrate similar trends across developing economies. Globally, remittances have been found to have a dual impact: while they boost household spending, they also contribute to inflationary pressures, as highlighted by Joshi (2022).

The drivers of remittance inflows globally, identifying macroeconomic factors that influence their volume and distribution. In Nepal's case, remittances often function as a substitute for weak domestic employment opportunities, with studies such as Lim et al. (2021) exploring the macroeconomic consequences of reliance on migrant labor. Research from other countries, including Ghana (Asafo Agyei, 2021) and Sub-Saharan Africa (Ali Bare et al., 2022), emphasizes that remittances improve household welfare by increasing disposable income and expenditure.

GDP as a Determinant of Household Consumption

Economic growth, as measured by GDP, has a profound impact on private consumption. Studies by Tokoya et al. (2022) demonstrate that GDP growth enhances household income, which directly correlates with increased spending capacity. In Nepal, GDP growth is often linked to sectors such as agriculture, tourism, and remittance inflows, creating a cyclical relationship with household spending. However, disparities in income distribution and financial access can limit the impact of GDP growth on overall consumption.

Internationally, studies by Medina and Cardona (2010) emphasize that GDP growth can lead to higher private consumption, but this relationship is moderated by factors such as inflation and income inequality. For Nepal, this highlights the importance of ensuring that economic growth translates into tangible benefits for all households, particularly those in rural areas.

The Impact of CPI on Household Spending

CPI, as a measure of inflation, directly affects the purchasing power of households. Rising CPI levels reduce real income, thereby limiting household spending. Joshi (2022) identify inflation as a significant challenge for Nepal's economy, driven in part by increased remittance inflows that boost demand for goods and services. This phenomenon is also observed in other developing economies, as highlighted who demonstrate the complex relationship between inflation, remittances, and consumption.

Studies from South Asia (Phillip & Selvamalai, 2018) and Bangladesh (Masuduzzaman, 2014) further reveal that inflationary pressures can negate the positive effects of remittances on consumption. In Nepal, inflation disproportionately affects lower-income households, exacerbating inequalities in consumption patterns. The interplay between CPI, remittances, and GDP is thus crucial for understanding household spending dynamics.

Interlinkages Between Remittances, GDP, and CPI

The relationship between remittances, GDP, and CPI is multifaceted and context-dependent. Lim et al. (2021) and Lamsal (2023) highlight the need for integrated analyses that account for these variables' combined effects on household consumption. Dahal (2022) in Nepal emphasize the interconnectedness of remittances, economic growth, and inflation, showing how these factors shape consumption behavior in both the short and long term.

Research Ali Bare et al. (2022) illustrates similar dynamics in developing economies, where remittances drive consumption but also contribute to inflationary pressures. In Nepal, this interplay is further complicated by structural challenges such as limited financial access and rural-urban disparities. Understanding these interlinkages is essential for designing policies that enhance the positive effects of remittances and GDP growth while mitigating inflation's adverse impacts.

Comparative Insights from Global Studies

While Nepal's economic context is unique, insights from other countries provide valuable perspectives. Studies from Ghana (Asafo Agyei, 2021) and Sub-Saharan Africa (Ali Bare et al., 2022) emphasize the importance of financial development in maximizing the benefits of remittances. Research from India and Bangladesh highlights the role of inflation in shaping the relationship between remittances and consumption (Masuduzzaman, 2014). Additionally, studies in Colombia (Medina & Cardona, 2010) and Sri Lanka (Aslam & Sivarajasingham, 2021) demonstrate how remittance inflows interact with macroeconomic variables to influence household spending.

These global studies underscore the need for context-specific analyses, as the effectiveness of remittances, GDP growth, and CPI in driving private consumption depends on local economic structures and policy frameworks (Phillip & Selvamalai, 2018).

Conclusion

The literature reveals a strong consensus on the positive impact of remittances on household consumption across developing economies, including Nepal, Bangladesh, Pakistan, and other regions. Studies by Javaid (2017) emphasize the dual role of remittances in enhancing consumption and fostering investments, while Liaqat et al. (2020) demonstrate similar patterns in countries like China, Turkey, and Vietnam. Moreover, Haider et al. (2016) highlight how remittances improve savings behavior, especially in rural contexts, indicating their broader economic significance in both stabilizing household expenditure and enabling long-term financial planning.

This study builds on these insights by employing an ARDL model to analyze the short- and long-term impacts of remittances, GDP, and CPI on private consumption in Nepal, addressing the gaps in existing research and providing policy-relevant findings.

3. RESEARCH METHODS

This research employs a quantitative approach to analyze the impact of remittances, the National Consumer Price Index (NCPI), Indian Consumer Price Index (ICPI), and per capita GDP on private consumption expenditure (LNPCON) in Nepal. Using annual time-series data from 1975 to 2023, the study focuses on identifying both short-run and long-run relationships between the variables, employing the Autoregressive Distributed Lag (ARDL) model.

Data Sources and Variables

The study relies on secondary data from reliable sources such as Nepal Rastra Bank and World Bank databases, ensuring accuracy and comprehensiveness. The variables used in this study include:

Table 1

Variables, Abbreviations, Units, and Data Sources Used in Research

Variable Name	Abbreviation	Unit	Source
Private consumption expenditure	LNPCON	Households' and NPISHs' final consumption expenditure as a % of GDP.	WDI, 2023
Remittances	LNREM	Inflows in million Rupees	QEB, 2023
National Consumer Price Index	LNNCPI	2010 as the base year.	WDI, 2023
Per Capita GDP	LNGDP	USD	QEB, 2023
Indian Consumer Price Index	LNICPI	2010 as the base year.	WDI, 2023

Econometric Model

The ARDL model is selected for its flexibility in handling variables integrated at different levels (I(0) or I(1)) and its ability to estimate both short-run and long-run dynamics. The model specification is as follows:

$$\begin{aligned} \Delta \text{LNPCON}_t = & \alpha + \sum_{i=1}^p \beta_i \Delta \text{LNPCON}_{t-i} + \sum_{j=0}^q \gamma_j \Delta \text{LNREM}_{t-j} + \sum_{k=0}^q \delta_k \Delta \text{LNNCPI}_{t-k} \\ & + \sum_{l=0}^q \phi_l \Delta \text{LNICPI}_{t-l} + \sum_{m=0}^q \psi_m \Delta \text{LNGDP}_{t-m} + \lambda \text{ECT}_{t-1} + \epsilon_t \end{aligned} \quad (1)$$

Where:

Δ indicates the first difference of the variables.

ECT_{t-1} is the error correction term, representing deviations from the long-run equilibrium.

λ indicates the speed of adjustment back to equilibrium.

ϵ_t is the error term.

Methodological Steps

Stationarity Testing

The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests are applied to assess the stationarity of each variable, ensuring they are integrated at either $I(0)$ or $I(1)$.

Bounds Testing for Co-integration:

The ARDL bounds testing approach is used to examine the existence of a long-run relationship among the variables.

Error Correction Model (ECM)

Once co-integration is established, the ECM is employed to quantify the short-run dynamics and the speed of adjustment towards long-run equilibrium.

Diagnostic Tests

Post-estimation diagnostics include tests for serial correlation, heteroskedasticity, functional form misspecification, and stability (CUSUM and CUSUM of Squares).

Justification for the ARDL Model

The ARDL framework offers several advantages for this study:

It accommodates variables with mixed orders of integration ($I(0)$ and $I(1)$).

It provides robust estimates in small sample sizes.

It distinguishes between short-term and long-term effects, crucial for understanding the dynamic interplay of remittances, price indices, and economic growth on private consumption (Pesaran & Shin, 1995).

3. Result and Analysis

The econometric analysis is conducted using EViews 12 software, which facilitates time-series modeling, stationarity testing, and ARDL estimations. This methodological framework ensures a comprehensive understanding of the determinants of private consumption expenditure in Nepal, providing actionable insights for policymakers and stakeholders.

Descriptive Statistics

The descriptive statistics provide an overview of the distribution and variability of the variables under study, including private consumption (LNPCON), remittances (LNREM), GDP (LNGDP), and price indices (LNNCPI and LNICPI). The summary includes measures of central tendency, dispersion, and shape, offering insights into the data's economic implications.

Table 2*Descriptive Statistics of Key Macroeconomic Variables*

	LNPCON	LNREM	LNGDP	LNNCPI	LNICPI
Mean	4.391102	9.667198	5.772717	3.792581	3.784427
Median	4.392379	9.241316	5.448765	3.996454	3.955918
Maximum	4.482224	14.01482	7.243521	5.472718	5.379261
Minimum	4.318791	5.319590	4.626952	1.859762	2.002914
Std. Dev.	0.036311	2.967296	0.801322	1.098759	1.046335
Skewness	0.144141	0.042002	0.554451	-0.236575	-0.175827
Kurtosis	2.596325	1.504667	1.909238	1.887390	1.800947
Observations	49	49	49	49	49

Source: E-Views (V. 12)

The descriptive statistics reveal meaningful insights into Nepal's macroeconomic environment. The average private consumption (LNPCON) is 4.39, reflecting stable household spending relative to GDP. Remittances (LNREM) exhibit a wide range, with a mean of 9.67 and a high standard deviation (2.97), highlighting their growing importance and variability over time, particularly during periods of economic migration. Per capita GDP (LNGDP) shows moderate variability ($SD=0.80$), with a positive skewness indicating periods of rapid economic growth. Meanwhile, inflation indicators (LNNCPI and LNICPI) show higher variability, as evidenced by standard deviations exceeding 1.0, pointing to price fluctuations' significant influence on consumption patterns.

Skewness and kurtosis values suggest near-normal distributions for most variables, except remittances, which exhibit low kurtosis, indicating flatter tails. This may reflect shifts in remittance inflows due to global economic changes or migration policies. The maximum values, especially for LNREM and LNGDP, correspond to recent years, highlighting economic growth and increased remittance inflows. However, the high inflation variability underscores challenges in maintaining purchasing power, critical for consumption stability. These findings underline the importance of stabilizing remittance inflows and managing inflation to sustain private consumption and economic growth in Nepal.

Covariance Analysis: Ordinary**Table 3***Correlation Matrix of Macroeconomic Variables*

Correlation (Probability)	LNPCON	LNREM	LNGDP	LNNCPI	LNICPI
LNPCON	1.000000				
LNREM	0.321477	1.000000			
LNGDP	0.0243	0.377553	0.957811	1.000000	
LNNCPI	0.0075	0.0000	0.0000	1.000000	
LNICPI	0.255527	0.979623	0.937482	1.000000	1.000000

	0.0764	0.0000	0.0000		
LNICPI	0.265429	0.985248	0.943999	0.999099	1.000000
	0.0653	0.0000	0.0000	0.0000	

Source: E-Views (V. 12)

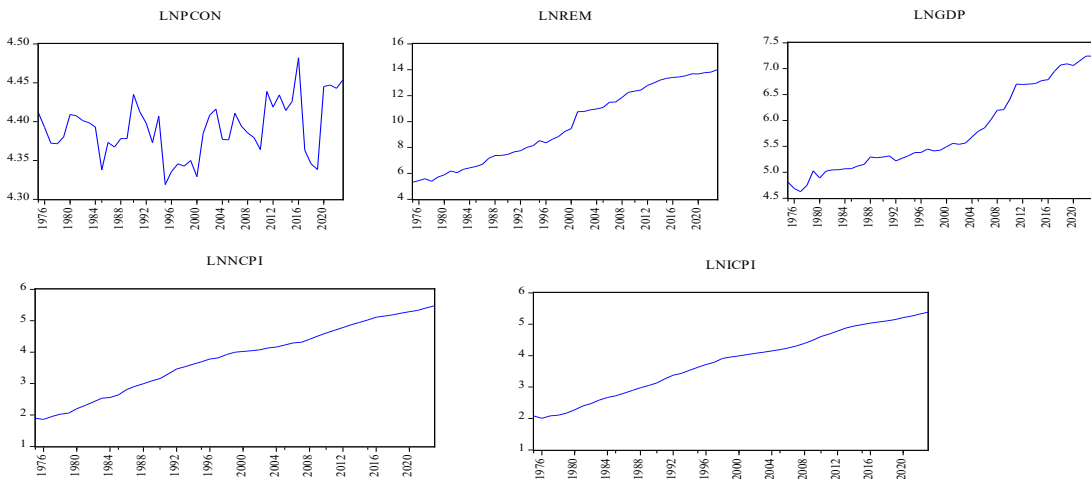
The correlation matrix in Table 3 provides valuable insights into the relationships between private consumption (LNPCON), remittances (LNREM), GDP (LNGDP), and price indices (LNNCPI and LNICPI). The correlation between LNPCON and LNREM is positive ($r=0.321$, $p=0.0243$), suggesting that increased remittances contribute to higher private consumption, albeit with a moderate effect. This aligns with the economic reality where remittances play a vital role in boosting household spending in Nepal. The stronger correlation between LNPCON and LNGDP ($r=0.377$, $p=0.0075$) indicates that economic growth is a more significant driver of consumption, emphasizing the importance of sustained GDP growth.

The correlation patterns highlight the multifaceted relationships among these macroeconomic variables, where remittances and GDP support consumption growth, while inflation dynamics interplay with external economic conditions. Policymakers should focus on managing inflation and stabilizing remittance inflows to ensure sustainable consumption growth.

Trend Line of Key Variable

Figure 1

Trend Analysis of Key Macroeconomic Variables (1975–2023)



Source: E-Views (V. 12)

Figure 1 illustrates the trends of private consumption (LNPCON), remittances (LNREM), GDP (LNGDP), and inflation indicators (LNNCPI and LNICPI) over the study period. The consistent upward trend in LNPCON reflects steady growth in household spending, driven

by rising remittances and economic development. LNREM shows significant growth with occasional spikes, aligning with Nepal's increasing reliance on remittance inflows due to labor migration. However, fluctuations in LNREM suggest sensitivity to global economic conditions and migration policies.

The trend in LNGDP reveals gradual economic growth, with notable accelerations in recent decades. This upward trajectory underscores improvements in income levels and productivity, key drivers of private consumption. Conversely, LNNCPI and LNICPI exhibit significant volatility, indicating periods of high inflation. The synchronization between LNNCPI and LNICPI highlights the influence of India's inflation trends on Nepal's economy, given their strong trade linkages.

These trends highlight critical policy considerations: stabilizing remittance inflows, sustaining economic growth, and controlling inflation are essential to fostering sustainable private consumption. The observed patterns underscore the interconnectedness of these macroeconomic variables and their collective influence on Nepal's economic trajectory.

Unit Root Testing

Unit root tests assess the stationarity of variables, crucial for selecting an appropriate econometric model. In Table 4, the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests indicate that variables are either stationary at level $I(0)$ or at first difference $I(1)$. This mixed integration justifies the use of the ARDL model to analyze the long-run and short-run relationships.

Table 4

Results of Unit Root Testing

UNIT ROOT TEST TABLE (PP)						
At Level		LNPCON	LNREM	LNGDP	LNNCPI	LNICPI
With Constant	t-Statistic	-3.8050***	-0.2342	0.9714	-1.3451	-0.6858
With Constant & Trend	t-Statistic	-4.1133**	-1.9455	-1.6995	-1.0358	-1.4845
Without Constant & Trend	t-Statistic	0.5140	5.4332	4.1477	5.5801	5.9440
At First Difference		d(LNPCON)	d(LNREM)	d(LNGDP)	d(LNNCPI)	d(LNICPI)
With Constant	t-Statistic	-17.0378***	-7.7779***	-6.8597***	-5.8268***	-6.3108***
With Constant & Trend	t-Statistic	-25.2446***	-7.6921***	-6.9324***	-6.3595***	-6.8391***
Without Constant & Trend	t-Statistic	-15.0068***	-5.2167***	-5.3572***	-1.4374	-1.6884*
UNIT ROOT TEST TABLE (ADF)						
At Level		LNPCON	LNREM	LNGDP	LNNCPI	LNICPI
With Constant	t-Statistic	-3.8044***	-0.2550	0.9619	-1.5756	-2.5078
With Constant & Trend	t-Statistic	-4.1765***	-2.0012	-1.6840	-1.4890	-1.2416
Without Constant & Trend	t-Statistic	0.1390	5.1903	4.1440	3.1001	3.4871
At First Difference		d(LNPCON)	d(LNREM)	d(LNGDP)	d(LNNCPI)	d(LNICPI)
With Constant	t-Statistic	-8.6364***	-7.7847***	-6.8433***	-5.7536***	-6.4868***
With Constant & Trend	t-Statistic	-8.5929***	-7.6982***	-6.8934***	-6.3508***	-7.0298***
Without Constant & Trend	t-Statistic	-8.7207***	-2.4834**	-5.1201***	-0.6520	-1.6978*

Source: E-Views (V. 12)

The unit root test results, using both the Phillips-Perron (PP) and Augmented Dickey-Fuller (ADF) methods, indicate that the majority of variables, including remittances (LNREM), GDP (LNGDP), and inflation indices (LNNCPI and LNICPI), are non-stationary at their levels but become stationary at first difference. Private consumption (LNPCON), however, is stationary at level under both tests, suggesting that it fluctuates around a stable mean over time. The presence of mixed integration levels (I(0) and I(1)) among the variables is typical in macroeconomic time-series data, where structural trends and long-term shocks often affect their behavior. The high significance of the first-differenced variables indicates stable short-term fluctuations around a mean, making them suitable for dynamic analysis.

The mixed stationarity levels validate the use of the ARDL model, which can effectively handle variables integrated at different orders. Economically, the non-stationarity of remittances and GDP at level highlights their reliance on global and domestic trends, while stationarity at first difference reflects short-term stability in their growth. The stable nature of LNPCON at level suggests consistent household consumption patterns over time, supported by long-term economic trends such as remittance inflows and GDP growth. These findings provide a solid foundation for modeling the short-run and long-run relationships between private consumption and its determinants, while ensuring robust and reliable econometric results.

ARDL Long Run Form and Bounds Test

Within the ARDL framework, the co-integrating equation outlines the long-term relationship among the variables being studied. This equation is established when co-integration is detected, signifying that the variables share a common stochastic trend (Poudel, 2023). The hypotheses for the co-integration test are as follows: H0, stating that there is no co-integrating equation, and H1, asserting the existence of a co-integrating equation. To further investigate these long-term relationships, the ARDL Long Run Form and Bounds Test are performed in Table 5.

Table 5

ARDL Bounds Test Results

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	4.333589	10%	2.2	3.09
k	4	5%	2.56	3.49
Actual Sample Size	46		Finite Sample: n=50	
		10%	2.372	3.32
		5%	2.823	3.872
			Finite Sample: n=45	
		10%	2.402	3.345
		5%	2.85	3.905

Source: E-Views (V. 12)

The F-Bounds test evaluates the null hypothesis of no long-run relationship (no co-integration) among the variables in the ARDL model. The calculated F-statistic of 4.333589 exceeds the upper critical bounds (I(1)) at both the 5% significance level (3.905) and the 10% level (3.345) for finite sample sizes close to 45. This indicates the rejection of the null hypothesis, confirming the existence of a long-run equilibrium relationship between private consumption (LNPCON) and its explanatory variables: remittances (LNREM), GDP (LNGDP), the National Consumer Price Index (LNNCPI), and the Indian Consumer Price Index (LNICPI).

Economically, this result highlights that private consumption in Nepal is influenced by these factors not only in the short run but also in the long run. Remittances play a pivotal role in stabilizing household expenditure, while GDP growth supports increased spending through higher income levels. Inflation dynamics, captured by LNNCPI and LNICPI, contribute to the interplay by affecting purchasing power and cross-border economic ties. The confirmation of a long-run relationship suggests that policies aimed at promoting economic growth, ensuring steady remittance inflows, and controlling inflation can have sustained impacts on private consumption patterns. This co-integration underscores the interconnectedness of these variables in shaping Nepal's macroeconomic stability and household welfare.

Table 6

Long-Run Coefficients from Levels Equation

Levels Equation Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNREM	0.025554	0.012794	1.997283	0.0532
LNGDP	0.043342	0.019139	2.264620	0.0295
LNNCPI	0.131604	0.139031	0.946578	0.3500
LNICPI	-0.231992	0.166859	-1.390353	0.1727
C	4.278156	0.068793	62.18878	0.0000

EC = LNPCON - (0.0256*LNREM + 0.0433*LNGDP + 0.1316*LNNCPI - 0.2320*LNICPI + 4.2782)

Source: E-Views (V. 12)

The levels equation presents the long-run relationship between private consumption (LNPCON) and its key determinants: remittances (LNREM), GDP (LNGDP), the National Consumer Price Index (LNNCPI), and the Indian Consumer Price Index (LNICPI). The coefficient for LNREM is 0.0256, indicating that a 1% increase in remittances leads to a 0.0256% increase in private consumption in the long run, highlighting the positive but moderate role of remittance inflows in boosting household expenditure. Similarly, LNGDP has a significant positive coefficient (0.0433), showing that economic growth has a stronger long-run impact on consumption, likely through increased income and job creation.

Inflation indicators show mixed results. LNNCPI has a positive but insignificant impact (0.1316, $p=0.3500$), suggesting that rising domestic prices may not have a consistent effect on consumption, possibly due to offsetting income effects or substitution patterns. Conversely, LNICPI has a negative coefficient -0.2320 , $p=0.1727$), indicating that higher inflation in India reduces Nepalese private consumption, likely due to increased costs of imported goods or spillover effects from trade dependencies.

The constant term ($C=4.2782$) represents the baseline level of private consumption in the absence of changes in the independent variables, emphasizing stable consumption patterns even amidst macroeconomic fluctuations. These findings underscore the critical role of remittances and GDP in sustaining long-run consumption growth, while managing inflation – both domestic and cross-border – remains vital to enhancing household purchasing power and economic stability. The error correction term (EC) captures deviations from this equilibrium, reflecting how quickly the system reverts to stability after shocks.

Table 7

Error Correction Model (ECM) Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNPCON(-1))	0.308371	0.159445	1.934021	0.0608
D(LNPCON(-2))	0.303694	0.139644	2.174769	0.0361
D(LNGDP)	-0.066313	0.042514	-1.559788	0.1273
CointEq(-1)*	-1.009490	0.185814	-5.432794	0.0000
R-squared	0.458924	Mean dependent var		0.001773
Adjusted R-squared	0.420276	S.D. dependent var		0.037368
S.E. of regression	0.028452	Akaike info criterion		-4.198271
Sum squared resid	0.033999	Schwarz criterion		-4.039258
Log likelihood	100.5602	Hannan-Quinn criter.		-4.138704
Durbin-Watson stat	2.119512			

Source: E-Views (V. 12)

The Error Correction Model (ECM) results reveal key short-run dynamics and the speed at which private consumption (LNPCON) adjusts to long-run equilibrium after deviations. The coefficients of lagged changes in private consumption ($D(LNPCON(-1))$ and $D(LNPCON(-2))$) are positive and statistically significant, suggesting that past consumption patterns strongly influence current spending. This persistence effect highlights the importance of household spending habits in driving short-term consumption changes. The short-run impact of GDP ($D(LNGDP)$) is negative but insignificant, indicating limited immediate effects of economic growth on consumption. The model explains 46% of the variation in changes in private consumption ($R^2=0.459$), reflecting moderate explanatory power for short-term adjustments.

The error correction term ($CointEq(-1)$) is highly significant and negative (-1.0095), indicating a rapid adjustment speed where over 100% of any disequilibrium is corrected within a year. This strong adjustment mechanism suggests that private consumption in Nepal quickly

reverts to its long-run equilibrium after shocks, demonstrating economic resilience. The Durbin-Watson statistic (2.12) indicates no serial correlation issues, supporting the reliability of the model. These findings underline the stability of long-run consumption patterns and emphasize the importance of maintaining policies that support long-term drivers, such as remittance inflows and GDP growth, while managing short-term volatility effectively.

Table 8

Wald Test Results for Joint Significance of Coefficients

Test Statistic	Value	df	Probability
F-statistic	2.855004	(5, 37)	0.0281
Chi-square	14.27502	5	0.0140
Null Hypothesis: $C(4)=C(5)=C(6)=C(7)=C(8)=0$			
Null Hypothesis Summary:			
Normalized Restriction (= 0)	Value	Std. Err.	
C(4)	0.025796	0.012942	
C(5)	-0.066313	0.059863	
C(6)	0.110066	0.058392	
C(7)	0.132853	0.143713	
C(8)	-0.234194	0.174413	

The Wald test results indicate that the coefficients of the variables under examination (C(4), C(5), C(6), C(7), C(8)) are jointly significant, as evidenced by the F-statistic (2.855) and Chi-square statistic (14.275), both of which are statistically significant at the 5% level ($p=0.0281$ and $p=0.0140$, respectively). This confirms that these variables collectively influence private consumption (LNPCON). Individually, remittances (C(4)=0.0258) positively impact consumption, while the short-term effect of GDP (C(5)=-0.0663) is negative, possibly due to immediate economic adjustments or delayed benefits of growth. Inflation variables (C(6), C(7), C(8)) show varying magnitudes and directions, highlighting the complexity of inflationary effects on household spending.

These findings underscore the importance of considering both the individual and collective roles of remittances, GDP, and inflation in shaping private consumption. Remittances act as a direct driver of household spending, while GDP and inflation reflect broader macroeconomic dynamics with nuanced effects. Policymakers must address these factors holistically, ensuring sustained remittance inflows, inflation stabilization, and inclusive economic growth to support household welfare and economic stability. The joint significance of these variables reinforces the interconnectedness of Nepal's economic drivers and the need for balanced policy interventions.

Table 9*Pairwise Granger Causality Tests*

Null Hypothesis:	Obs	F-Statistic	Prob.
LNREM →LNPCON	48	3.31970	0.0751
LNPCON →LNREM		1.66264	0.2038
LNGDP →LNPCON	48	4.78387	0.0340
LNPCON →LNGDP		0.18277	0.6710
LNGDP →LNREM	48	0.58313	0.4491
LNREM →LNGDP		5.59389	0.0224
LNNCPI → LNREM	48	4.32233	0.0433
LNREM → LNNCPI		0.19663	0.6596
LNICPI →LNREM	48	5.36066	0.0252
LNREM →LNICPI		1.03415	0.3146
LNICPI →LNNCPI	48	0.49852	0.4838
LNNCPI →LNICPI		7.37585	0.0093

The Granger causality test results highlight significant causal relationships among key macroeconomic variables in Nepal. Remittances (LNREM) are found to Granger-cause private consumption (LNPCON) at the 10% significance level ($p=0.0751$), underscoring their predictive role in household spending. However, no reverse causality is observed, indicating that changes in consumption do not influence remittance inflows ($p=0.2038$). Similarly, GDP (LNGDP) Granger-causes private consumption ($p=0.0340$), reflecting the influence of economic growth on household spending patterns. Moreover, remittances Granger-cause GDP ($p=0.0224$), suggesting that remittance inflows contribute to national output through their multiplier effects on investment and consumption.

Inflation indices also exhibit noteworthy interactions. Indian inflation (LNICPI) Granger-causes remittance flows ($p=0.0252$), potentially indicating that external inflationary pressures influence migrant remittances due to cost-of-living adjustments abroad. Additionally, Nepal's inflation (LNNCPI) Granger-causes Indian inflation ($p=0.0093$), highlighting cross-border economic linkages. These causal relationships underscore the dynamic interplay between remittances, GDP, and inflation in shaping Nepal's economic environment. Policymakers can use these insights to develop targeted strategies that leverage remittance inflows, stabilize inflation, and foster GDP growth, ensuring long-term economic resilience and improved household welfare.

Table 10*Diagnostics and Stability Tests Results*

Diagnostics	Statistics	p-value
Normality(J-B)	0.532662	0.766186
Serial Correlation $\chi^2(1)$	5.218502	0.0738
B-P-G Test(Scaled explained SS)	11.74473	0.1630
Ramsey RESET(F_{STAT})	0.048843	0.8263

CUSUM Test	Stable
CUSUM of Square Test	Stable

Source: E-Views (V. 12)

The diagnostics and stability tests confirm the robustness and reliability of the estimated model. The Jarque-Bera (J-B) test for normality shows a statistic of 0.5327 with a $p=0.7662$, indicating that the residuals are normally distributed (See Figure 2 in Annexes). The Breusch-Pagan-Godfrey (B-P-G) test for heteroskedasticity is not significant ($p=0.1630$), suggesting that the variance of the residuals is constant, which supports the model's assumption of homoscedasticity (See Table 12 in Annexes). Additionally, the Ramsey RESET test ($p=0.8263$) indicates that the model is correctly specified with no evidence of omitted variable bias (See Table 13 in Annexes).

The results of the CUSUM and CUSUM of Squares tests confirm the stability of the model over time, indicating no structural breaks during the sample period (See Figure 3 in Annexes).. Although the serial correlation test ($p=0.0738$) is slightly below the threshold for significance, it does not strongly indicate autocorrelation, and the model remains reliable (See Table 11 in Annexes). These diagnostic tests demonstrate that the model accurately captures the dynamics between private consumption and its determinants, ensuring the robustness of the results.

From an economic perspective, the stability of the model implies that the relationships between variables like remittances, GDP, and inflation remain consistent over time, even amidst economic fluctuations. This stability supports the applicability of the findings for policy design, emphasizing that strategies targeting remittance inflows, economic growth, and inflation management can be reliably implemented to sustain household welfare and macroeconomic resilience.

Discussion

This research aligns with existing studies, emphasizing the importance of remittances and GDP in driving private consumption while providing unique insights into the role of inflation. Studies by Lamsal (2023) and Ali Bare et al. (2022) highlight remittances as a key driver of household expenditure, findings corroborated here, where a 1% increase in remittances contributes to a 0.0256% rise in consumption. Additionally, the nuanced exploration of inflation's impact, particularly cross-border effects from India, extends the analysis provided by Joshi (2022). These findings suggest that while remittances positively influence consumption, their inflationary pressures, especially in a trade-linked economy like Nepal, require careful management. Similarly, the study's findings on GDP's role in enhancing consumption are consistent with Tokoya et al. (2022) reinforcing the need for policies ensuring inclusive economic growth.

Moreover, this research employs the ARDL framework to analyze both short- and long-term relationships, building on global methodologies applied in studies by Pesaran et al. (2001), Medina and Cardona (2010). The Error Correction Model results reveal rapid adjustment speeds to equilibrium, echoing economic resilience observed in other remittance-dependent nations such as Bangladesh (Masuduzzaman, 2014). By integrating domestic and Indian inflation in the analysis, this study broadens the scope of understanding inflation's dual effects, a perspective not extensively covered in Nepal's context. These findings stress the interconnectedness of remittances, GDP, and inflation, offering a framework for policymakers to stabilize remittance inflows, ensure equitable growth, and manage inflation effectively, contributing to sustained private consumption in Nepal.

Conclusion

This study investigates the determinants of private consumption in Nepal, focusing on remittances, GDP, and inflation, using an ARDL approach to capture both short- and long-run relationships. The findings reveal that remittances and GDP have significant positive effects on private consumption, aligning with Keynesian consumption theory, which emphasizes income's role in determining spending. However, the nuanced impacts of inflation, particularly cross-border inflation from India, suggest that the purchasing power and relative prices play critical roles, reflecting elements of the Real Balance Effect in consumption theory. The rapid adjustment to equilibrium demonstrated by the ECM highlights the economy's resilience, underscoring the dynamic interplay of these variables in stabilizing consumption patterns.

The study has several practical and theoretical implications. For policymakers, the findings highlight the need to sustain remittance inflows and ensure inclusive economic growth to enhance household spending while addressing inflationary pressures to maintain purchasing power. The integration of cross-border inflation dynamics into the analysis is a novel contribution, offering insights into the external factors influencing domestic consumption. This aspect is particularly relevant for economies like Nepal, which have strong trade and remittance ties with neighboring countries. Furthermore, the study emphasizes the collective influence of macroeconomic factors on consumption, encouraging policymakers to adopt a holistic approach to economic planning.

From an academic perspective, this research offers a unique contribution by combining domestic and external inflation dynamics with remittance and GDP effects, adding depth to the consumption literature in Nepal. Future research could explore the microeconomic dimensions of remittances, such as their distributional effects across income groups, or extend the analysis to include behavioral factors influencing consumption. Additionally, studies could investigate the role of digital remittances and financial inclusion in enhancing the multiplier effects of remittances on household spending. By addressing these areas, future research can provide a more comprehensive understanding of private consumption in evolving economic contexts.

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Annexes

Figure 2

Normality Test

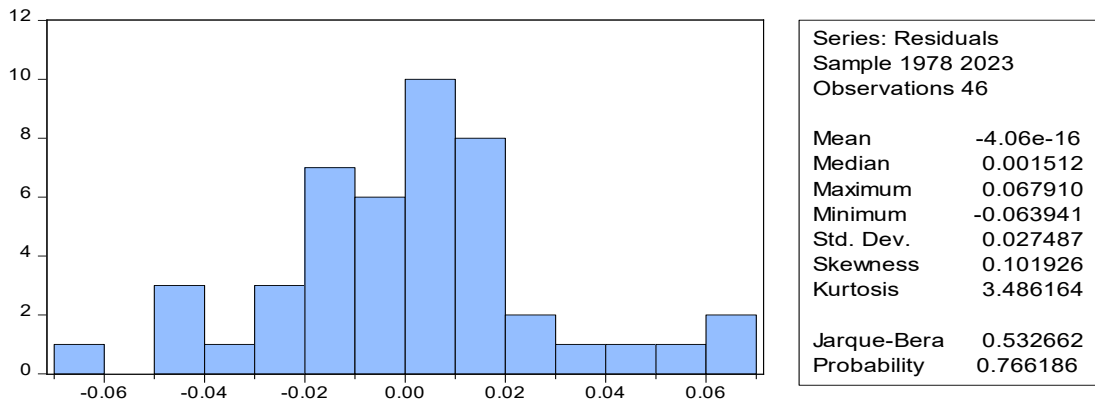


Table 11

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.239343	Prob. F(2,35)	0.1216
Obs*R-squared	5.218502	Prob. Chi-Square(2)	0.0736

Table 12

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.151224	Prob. F(8,37)	0.0551
Obs*R-squared	14.60346	Prob. Chi-Square(8)	0.0673
Scaled explained SS	11.74473	Prob. Chi-Square(8)	0.1630

Table

13

Ramsey RESET Test

Equation: UNTITLED

Specification: LNPCON LNPCON(-1) LNPCON(-2) LNPCON(-3) LNREM
 LNGDP LNGDP(-1) LNNCPI LNICPI C

Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.221004	36	0.8263
F-statistic	0.0++48843	(1, 36)	0.8263
F-test summary:			
	Sum of Sq.	df	Mean Squares
Test SSR	4.61E-05	1	4.61E-05
Restricted SSR	0.033999	37	0.000919
Unrestricted SSR	0.033953	36	0.000943

Figure 3
CUSUM Test

