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Article

Impact of Remittance on Household Consumption Patterns in Nepal

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Abstract: The external labour market has a unique role in shaping Nepal's economy, and remittances now account for some 22-28% of the gross domestic product (GDP) in the last decade. Macroeconomically, remittances are being channeled to some specific categories of consumption of the recipient households, and their relationship and the variables smoothing this relationship have been studied at micro scales very little, especially not in a nationally representative, panel data based analytical framework. The study examines the effect of remittance income on disaggregated household consumption expenditure patterns in Nepal, and tries to understand how the moderating factors; financial inclusion and household head gender affect the consumption expenditures. The study uses a quantitative panel research design, based on the Nepal Living Standards Survey (NLSS-III) and the Nepal Household Risk and Vulnerability Survey (NHRV 2016-2018), which has a sample size of 5,988 households. Addressing endogeneity is done with an instrumental variable (IV) two-stage least squares (2SLS) model instrumentalizing remittances in the regression using remittances' migration ratio measures at the village level. The structural hypotheses are tested with PLS-SEM using 5,000 replications. Multi-group analysis is used to explore differences in gender and ecological zone. Remittances exert significant positive effects on food expenditure ($\beta = 0.312$, $p < .001$), education spending ($\beta = 0.274$, $p < .001$), and durable goods acquisition ($\beta = 0.241$, $p < .001$). There is a positive and context dependent relationship with the healthcare expenditure ($\beta = 0.163$, $p = .028$). The interaction term $\beta = 0.189$ ($p < .001$) has a significant increase in financial inclusion. All of the variance in total household consumption is accounted for by the model. No difference is found by gender of head of household which is consistent with the Permanent Income Hypothesis. The findings show the policy interventions are needed that can enhance financial inclusion and re-channel remittance resources to a productive investment in human capital – critical transition from the remittance dependent economy in Nepal towards sustainable economic development.

Keywords: Remittance; household consumption; financial inclusion; Permanent Income Hypothesis; IV-2SLS; PLS-SEM;

1. Introduction

Nepal is in a unique position in the context of remittance market. According to NRB data, Nepal's overall economy is one of the most remittance-dependent in the world. It received nearly USD 9.3 billion in remittances in 2022-23 (22.9% of GDP), only a few countries in the world have remittance dependence similar to that of Nepal. This remarkable reliance on remittances is not just a macro phenomenon, but a livelihood structure of Nepalese household priorities in the context of chronic underemployment of domestic working members, limited domestic labour markets and low productivity of agriculture in an ecologically diversified and largely agricultural country. The twin dynamics between migration and remittance in Nepal started with the Gurkha male workers who have been also recruited in the Gurkha military since more than 200 years passing time and is characterized by short-term contracts in the Gulf Cooperation Council (GCC) countries and Malaysia (Karki, 2020; Aryal, 2022).

The scale of such a phenomenon is very large, as it is revealed that more than 3.5 million Nepalis were employed abroad as per DoFE by the end of 2023, and the households of all the three ecological zones in the country – Terai

plains, mid-hills and mountain regions – have increasingly relied on remittances supplemented by their primary or secondary income source (Pasa et al., 2024). In this context, an important economic question of what households in Nepal invest in remittances in terms of consumption and whether this investment contributes to their long-term well-being as a result of investing in human capital is of interest. The solution has important implications not only for the study of the welfare effects of households, but also for Nepal's overall development trajectory. As long as remittances primarily go to consumption - food and primary products - they play a vital part in poverty alleviation but may not speed-up structural change in the economy. Premised on their systematic feeding into the education, health services, and productive investment sectors, they are a crucial means of intergenerational human capital accumulation. There is an increasing body of empirical literature on this question, with a complex picture and at times conflicting results. In the most methodologically logical Nepal-specific study to date, Mishra et al. (2022), have carried out a study based on the 2010/11 NLSS data that results in significant positive correlations between remittances and food and education expenditure. Thapa-Parajuli et al. (2025) are similarly able to confirm positive welfare impacts for food in their bivariate analysis, on their own and together with non-food welfare spending, but do not find any evidence that remittances are used to finance unproductive consumption in their study of 2016–2018 NHRV data. Building on this, Byanjankar et al (2025) introduce some nuances and determine that while cash remittance increases food, energy, clothing, durable goods, education and agricultural investments, it does not increase healthcare. In confirmation, Karki et al. (2025) relying on propensity score matching report positive impact on financial asset accumulation and food and non-food consumption, with relatively few estimated impacts on education and health expenditure. This is important as a reminder that the results of poverty impact studies are sensitive to the methodological approach adopted. Nevertheless, there are still shortfalls with these Nepal-specific contributions. First, nobody has used a structural equation framework to incorporate the financial inclusion as a mediator in the remittance–consumption nexus in Nepal. Second, its moderating effect on the allocation of consumption categories to the household heads still is controversial. Thirdly, there has been no systematic attempt in Nepal to study ecological zone heterogeneity from an angle that complements the question of consumption pattern.

Thirdly, in Nepal's geographically diverse landscape the role of heterogeneity level of ecological zones has not been studied systematically on the side of the question of consumption pattern. The fourth was the lack of integration of the existing theoretical frameworks, which were largely related to the permanent income hypothesis (Ramcharran, 2019) and the migrations and development theory (Samaratunge et al., 2020) with the financial inclusion literature in a coherent framework analysis in the context of Nepal. The aim of this study is to fill these gaps by exploring the effect of remittances on disaggregated household consumption pattern in Nepal with financial inclusion as a moderator and with proper instrumental variable two stage least squares (IV-2SLS) design and analysis with the help of structural modelling in PLS-SEM. It offers the following methodologically comprehensive four contributions to the existing remittance–consumption literature: (1) the study is the first to use the recently updated household Nepal household survey data to examine the remittance-consumption relationship, and consequently, this study quantitatively employs the most comprehensive method; (2) it integrates the Financial Inclusion Theory in the Nepal-specific remittance–consumption literature as a structural mediator to test it alongside other existing theories and frameworks; (3) systematically testing the ecological zone heterogeneity, this study employs multi-group analysis; and (4) developing an integrated theoretical framework based on the Permanent Income Hypothesis, Migration and Development Theory, and Financial Capability Theory to explain consumption allocation behaviour in remittance-recipient households. The rest of this paper follows as follows: The literature cited in Section 2 is analysed critically. The theoretical framework and the research hypotheses are developed in section 3. The approach used in this study is outlined in Section 4. The results are given in Section 5. Theoretical and policy implications, limitations, future research directions, and conclusions are discussed in sections 6–9.

2. Literature Review

2.1 Global Evidence on Remittances and Household Consumption

Remittances and household consumption are studied in an empirical context from various methodological and geographic perspectives. For the case of Lesotho, Makina (2024) finds that remittance inflows are strongly and positively linked to household consumption levels in the long run, and a negative short-run adjustment period in which households adjust their consumption levels based on the initial capital inflows before remittances re-align consumption. This time dimension, like the adjustment cost literature, has important implications with respect to the trajectory of remittance effects in a country like Nepal, which has recently become a remittance-sending country. By using the Permanent Income Hypothesis (PIH) framework in a cross-country study of 11 Latin American and Caribbean countries, Ramcharran (2019) shows that remittances (as an extraordinary income source) actually boost,

not replace, permanent income and lead to countercyclical consumption-smoothing effects. Remarkably, this transitory income effect falls to a lower level of remittance income, with positive and statistically significant remittance effects on household consumption appearing in lower, lower-middle and upper-middle income country panels in Yun et al. (2022), employing dynamic Semi-Nested Unrelated Regression (SNUR) analysis. Employing time-series analysis and testing Somalia, Abdulle,et al (2026) identifies a positive short-term and long-term relationship between remittance and consumption and Granger causality is found unidirectional remittances to consumption. Colonel et al. (2025) explore the IFB effects at the household level for the Philippines and they conclude that remittance recipients increase their spending on necessities, long-term investment, and discretionary spending; but have no significant change in their spending patterns on savings. Highlighting the migration-development thesis of remittance investments in physical and human capital, Dey et al. (2024), applying propensity score matching for Bangladeshi returnee migrants, find significant positive effects on three studies—namely non-durable goods, education and healthcare. Utilizing quasi-experimental techniques with nationally representative data for Sri Lanka, Samaratunge et al. (2020) report that remittances have positive effects on per capita expenditures and change the allocation of resources to basic needs and human capital investment, especially among rural households, where there are more favourable kinds of behavioural change.

2.2 Nepal-Specific Evidence

A great deal of methodological progress on the Nepal remittance literature has been made in a decade. In the first major study to conform NLSS 2010/11 data with IV estimation, Mishra et al. (2022) find that remittances have positive effects on food and education expenditures and negative effects on consumption of alcohol and tobacco, concluding that migrant income leads to reallocation of the household budgets towards more productive indicators. The cross-gender robustness of these results – that is, qualitatively similar results for male- and female-led households – suggests that the contributions of any gender-specific preferences are relatively small, compared to income effects in the motives behind the reallocation of consumption. Taking the NHRV data for the years 2016–2018, using the IV methodology for elasticity computation, the effect of foreign remittances on the consumption expenditure turns out to be statistically significant at 5 per cent level for total consumption expenditure, food consumption and all other non-food consumption expenditure categories, such as education, healthcare, apart from rent expenditure and alcoholic beverages category (Thapa-Parajuli, 2025). Important, they do not observe a remittance wastage effect on unproductive expenditures like tobacco, alcohol or ritualism – a finding which contradicts the popular 'remittance wastage' narrative in the prevailing policy discourse. In the NHRV 2018 data, with the instrumentation of migration ratios based on the village level, Byanjakars, et al. (2025) also isolate effects by gender and location, finding that cash remittances stimulate spending on food, energy, clothing, durable goods, education and agricultural investment, while the impact on health expenditure depends on location. Karki et al. (2025) use propensity score matching with World Bank household survey data and find significant positive effects on financial asset accumulation, durable goods, food and non-food consumption, which are findings different from Mishra et al. (2022), likely due to methodological variations and the differences in time periods analyzed. Drawing from cross sectional design of Pasa et al. (2024) across three ecological zones, remittances have a positive influence on the welfare of the household through various human development dimensions such as educational, financial and health facilities but did not bring about an increase in agriculture production or entrepreneurship development. In a narrative synthesis (Nikhil Shrestha 2025) the author finds that the remittance effects are stronger in the context of food security, education, health services and housing in rural Nepal; investment through remittances is limited and determined by characteristics of the household, financial access and market conditions.

2.3 Financial Inclusion as a Moderating Factor

Financial inclusion has emerged as an important pathway towards bridging the remittance-development divide as spurred by a body of literature.Many recent studies have begun to recognize financial inclusion as an important pathway between remittances and their development impacts. In countries with high financial inclusion, the favourable effect on economic growth is much stronger in countries with high financial inclusion, argue Khan et al. (2025) in a study that employs GMM panel analysis for 79 developing countries. Micro-implications: Microfinance continuity appears in the way by which remittance income can be smoothed and saved or invested by households using formal financial services as compared to those relying on the informal sector. Geographically, using a model with a nonlinear impact of remittances, Keho (2022) finds that the impact of remittances on the income of the wealthier households is much larger in the two groups of African and Asian countries, with financial deepening acting as a pathway to remittance use for productive investments and credit channels. At the household level, Bare et al. (2022) report the effect of remittances on human capital investment in Sub-Saharan is stronger with financial development, which

allows them to efficiently absorb and utilize remittance capital. Using a dynamic GMM analysis, Saydaliyev et al. (2020) find that the remittance-growth link remains stable, and that financial inclusion and human capital extend the impact of remittances and growth together in developing countries. Overall, such results indicate that the relative underdevelopment of the formal financial sector with large rural unbanked population in Nepal might be limiting development potential of remittance inflows.

2.4 Theoretical Frameworks

There are three basic theoretical frameworks related to the subject of resemblances between remittance and consumption. The Permanent Income Hypothesis is an attempt by the rational household to smooth consumption, essentially by adopting the notion of remittance as a temporary injection of income and adapting consumption accordingly to the permanent income, which was first articulated by Friedman (1957), and extended and applied to the remittance context by Ramcharran (2019) and Yun et al. (2023). Migration and Development Theory (Stark & Bloom, 1985) build on these to place remittance behaviour in a broader perspective of family-level collective decisions on migration and risk diversification. Further, Financial Capability Theory (2010, Sherraden) emphasizes the institutional side, stating financial credentials (financial capability) and access to formal financial institutions is a significant constraint on financial deployments of remittances. The three frameworks—so far not integrated in the Nepal specific literature—have been given as theoretical foundation for this study.

2.5 Research Gaps

That review shows five important areas of research which are answered in the current study. First, to the best of our knowledge, there has been no study using PLS-SEM framework exploring the financial inclusion as a structural moderator in the relationship between remittance and consumption in Nepal. Second, the multi-group system analysis of ecological dimension of consumption heterogeneity has not been done in a systematic manner in previous studies in Nepal. Third, the temporal characteristics of remittance effects – if they get stronger or weaker over time – have not been investigated within a panel setting spanning the period after 2015, when remittance recovery is ongoing. Fourth, the theoretical integration of PITH, MDT and FCT over a period of time has been apparently not operationalized in Nepal. Fifth, there is still no research that apply IV-2SLS analysis method in line with PLS-SEM in the same complementary analysis for the consumption analysis of Nepal household.

Table 1

Literature Review Matrix: Key Empirical Studies on Remittances and Household Consumption

Author(s) & Year	Context	Theory	Method	Sample	Key Findings	Limitations	Gap Addressed
Mishra et al. (2022)	Nepal	Dual economy	IV-OLS	5,987 HH (NLSS-III)	+ food, +education, - alcohol/tobacco	2010/11 data; no FI moderator	FI moderation gap
Thapa-Parajuli et al. (2025)	Rural Nepal	PIH	IV regression	NHRV 2016-18	+ food, +education, +healthcare; 0 on tobacco/alcohol	Rural sample only; no PLS-SEM	Structural modelling
Byanjankar et al. (2025)	Nepal	Agency theory	IV (village migration ratio)	NHRV 2018	+ food, energy, clothes, durables, education	No FI mediation; no zone analysis	Ecological heterogeneity
Karki et al. (2025)	Nepal	Development theory	PSM	WB survey data	+ assets, food, non-food; 0 on education/health	PSM selection sensitivity	Methodological triangulation
Pasa et al. (2024)	Nepal (3 zones)	Welfare approach	Cross-sectional survey	777 respondents	+ welfare access; 0 on agriculture	No panel data; convenience sample	Panel + zone analysis

Author(s) & Year	Context	Theory	Method	Sample	Key Findings	Limitations	Gap Addressed
Makina (2024)	Lesotho	Cointegration	VECM, Johansen	1991-2019 TS	LR positive; SR negative adjustment	Single country Africa	LR dynamics in Nepal
Coronel et al. (2025)	Philippines	Behavioural econ.	OLS (FIES 2023)	National survey	+ necessities, durable goods, investment	No structural modelling	PLS-SEM pathway
Keho (2022)	19 Africa/Asia	FD-remittance nexus	PMG nonlinear panel	1987-2013	FD amplifies remittance-consumption link	No micro-household data	FI moderation in Nepal
Ramcharran (2019)	11 LAC countries	PIH	Panel data GLS	2003-2013	Transitory income +consumption; countercyclical	Not disaggregated by category	Category disaggregation
Yun et al. (2022)	Low-mid income	Uncertainty theory	Dynamic SUR	1996-2020	Remittances + consumption; robust to COVID	No household level data	Micro-level extension
Khan et al. (2025)	79 developing	FI-growth nexus	RE, FE, GMM	2011-2021	FI amplifies remittance-growth link	No consumption category detail	FI moderation pathway
Dey et al. (2024)	Bangladesh	Development theory	PSM (IV-2SLS)	Returnee migrants	+ education, health, non-durables	Single country; returnees only	Panel generalisability
Samaratunge et al. (2020)	Sri Lanka	Migration-dev.	Quasi-experimental	National micro	+ per capita expenditure, education, basic needs	Endogeneity concerns	IV robustness check
Abdulle et al. (2026)	Somalia	Macro consumption	Time-series, VECM	1980-2022	LR + SR positive remittance effects	Fragile state; limited data	Stable LDC extension
Bare et al. (2022)	Sub-Saharan Africa	FD-human capital	Panel GMM	1996-2016	FD mediates remittance-human capital link	Macro level only	Micro-level FI analysis

Note. HH = Households; IV = Instrumental Variable; PSM = Propensity Score Matching; PIH = Permanent Income Hypothesis; FI = Financial Inclusion; FD = Financial Development; PMG = Pooled Mean Group; VECM = Vector Error Correction Model; LR = Long-run; SR = Short-run; LAC = Latin America and Caribbean; WB = World Bank; TS = Time-Series.

3. Theoretical Framework

3.1 Permanent Income Hypothesis (PIH)

The theoretical underpinning of this study is Friedman (1957) Permanent Income Hypothesis which holds that the rational household's consumption policy depends on his permanent income rather than on his current income. Theoretically it is expected that transitory income deviations, like the irregular remittances, will have a lower marginal consumption coefficient than the permanent income, the excess being saved or added to assets. This theoretical prediction has been confirmed in part by Ramcharran (2019), who shows that consumption is more sensitive to permanent income, but some remittances – considered transitory income – have statistically significant effects on consumption, as well. This partial failure to meet strict predictions on remittances as permanent income indicates that Nepali households that receive remittances, many of which are credit constrained, and are not benefiting from formal insurance mechanisms treat remittances somewhat as permanent income, especially when the migration process has been carried out over several years, remittances have become regular, and the process of migration itself has been made predictable.

3.2 Migration and Development Theory

Migration and Development Theory (Stark & Bloom, 1985), an extension of this theory at the household-level, places remittance behaviour in the context of collective household decision making processes. Migration is seen as a household strategy to manage risks – a family member is sent to work on a labour market with a variety of income generating conditions in order to achieve income diversification in the household, and, thus, help the migrant family member remit income to support a consumption program in the home country to buffer against agriculture shocks, price fluctuations or health crises. This theoretical framework suggests that remittances have to go into basic needs stabilisation in a systematic way before it can be in human capital investment; findings with Nepal data support this because the impact of remittances on basic needs stabilisation is best documented by an empirical study. The NELM framework also suggests that the richer and more highly educated household that sends money is more likely to use remittances as a means to invest in productive activities, which is where household characteristics come into play in this study via multi-group analysis.

3.3 Financial Capability Theory

Financial Capability Theory (Sherraden, 2010) proposes that the developmental effects of income transfers – in this instance, remittances – are entirely related to the institutional context and access to institutions in which households perform financial activities. Theoretically, there are three dimensions of financial capability: financial inclusion, financial knowledge and financial literacy, and psychological and social orientations towards money management. The Nepal environment is conducive to some households having formal bank accounts and access to mobile banking services so that they are able to save in interest-bearing financial products, borrow against remittances, and invest in specific financial products. Households that are not able to make formal savings are left with informal savings with higher risk of losing and lower return on investment. This theory forecasts that the remittance–consumption nexus will be lessened by financial inclusion, with a bigger impact for financially included households on expenditure related to education or human capital and less for financially excluded households on the expenses of immediate consumption smoothing.

3.4 Integrated Framework and Novelty Statement

This novelty of the theoretical contribution of this study in one-way integration of these three different frameworks into Remittance-Consumption Capability Framework (RCCF) for Nepal. The RCCF makes three assumptions: (a) remittances are transitory income and therefore lead to a diversification of consumption that can be moderated by expectations of permanence; (b) household risk diversification motives dictate that the category allocation of remittance expenditure occurs on the margins of welfare-enhancing necessities first; and (c) financial inclusion capabilities dictate how far households are able to move beyond consumption smoothing to productive human capital investment. This integrated framework makes predictions that can be tested and differentiates this study from previous Nepal-specific studies and offers a replicable theoretical architecture that can be applied to other low-income countries in South Asia and the rest of the world that rely on remittances as a significant source of income.

4. Hypothesis Development

4.1 Remittance and Food Expenditure

The food group is the first among the consumption smoothing functions that is expected to show the highest consumption smoothing functions, according to the framework of NELM develop by Build Vivid World. The use of Nepal as a case study, Mishra et al. (2022) and Thapa-Parajuli et al. (2025) both reports very positive links between remittances and food expenditure in the country. However, under the restaurant conditions of the binding nature for food, the PIH has predicted that even temporary remittance income will be directed towards food to spend partially. The hypothesis is supported as remittance income is positively related to food expenditure in Nepal at 5% significance level. The hypothesis is accepted because remittance income is significantly positively associated with food expenditure in Nepal at 5% level of significance.

4.2 Remittance and Education Expenditure

Education spending is one of the dimensions of investment in consumption that is forward-looking. Migration and Development Theory suggests that remittance-receiving households will make investments in their children's learning as they view it as an avenue to upgrade their human capital, especially when migration opens up remittance-receiving household members to markets for higher-return education in other countries. The results of Mishra et al. 2022 and Byanjankar et al. 2025 support this prediction and currently show the NHRV data. There is positive and significant association between remittances income and household education expenditure in Nepal as hypothesized by H2.

4.3 Remittance and Healthcare Expenditure

Healthcare expenditure is used for both current consumption and for generations of human capital. There is greater contention about the relationships between remittance and health care among Nepalese people than with food and education issues. The findings of Thapa-Parajuli et al., (2025) are positive effect, Byanjankar et al., (2025) showing the non-significant effect and Karki et al., (2025) showing null effect. In this study, the net effect is tested and ecological zone heterogeneity is considered as a possible explanation for the different results of previous studies. H3: These results offer support for the positive and significant relationship between remittance and household's health spending in Nepal.

4.4 Remittance and Housing/Durable Goods Expenditure

One important category of consumption is housing improvements and durable goods purchases and is related to both status signalling and long duration motives found in the remittance literature. Building on findings by Karki et al. (2025) on the positive remittance effects of durable transfers in Nepal, Arapi-Gjini et al. (2024) carefully document that earmarking for housing is a specific remittance allocation channel that may also have positive remittance effects when standard survey estimates reveal weak or insignificant effects. H4: In Nepal, there is a positive and significant relation between the remittance income and housing improvement and durable goods expenditure.

4.5 Financial Inclusion as Moderator

Financial inclusion is hypothesized to bring financial empowerment to the individual and that this will strengthen the positive effect of remittance receipt on the productive categories of consumption, such as education and health care (Financial Capability Theory – Sherraden, 2010) and the empirical evidence of Khan et al. (2025) and Keho (2022). H5: Financial inclusion strengthens the relationship between remittance income and households' consumption, namely the positive impact of remittance on education and health-care spending, financially included households are positively moderated; and H5*1: Financially included households' education spends more in response to remittance income than their non-included counterparts.

4.6 Gender of Household Head as Moderator

Remittance consumption allocation has presented mixed results worldwide in regards to the gender dimension. Qualitatively, similar findings are observed for both male- and female-headed households in the context of Nepal (Mishra et al. 2022). Concerning productive consumption, Prasertsoong (2025) concludes that the effect of remittances is stronger for female-headed households in Thailand. Analysis of the moderating effect found a significant moderating role between remittance income and allocation of consumption category in the household level in Nepal for the following question: • H6: Gender of the household head significantly moderates the relationship between remittance income and the allocation of consumption category at the household level in the context of Nepal.

5. Research Methodology

5.1 Research Philosophy and Paradigm

The study is applied post-positivist to understand that a household's consumption behaviour is a reality of social life, can be measured socially in empirical ways and that any measurement, although empirical, is at the same time theory-oriented and has methodological restrictions. The research approach used is quantitative-deductive type research in which there are hypotheses that have been formed based on theories or previous studies, then tested by obtaining homogeneous and representative data from a survey of households by applying a systematic sampling procedure. Such is the approach of the major methodological community working on international development economics as well as the standards expected by the leading Q1 international development economics and economics journals.

5.2 Research Design

A quasi-experimental research design with a panel approach was used making a mixed use of the longitudinal data of NHRV Survey (2016 and 2018 waves) and cross-sectional richness of NLSS-III. The quasi-experimental dimension comes from the fact that the IV-2SLS approach used is based on exogenous variation in the intensity of migration within the population of villages, allowing for the identification of causal remittance effects on consumption, as one might expect in a natural experiment where the likelihood of remittance receipt was determined by the pre-existing community migration network rather than by the household's own migration self-selection.

5.3 Data Sources

Major data sources include (1) the Nepal Living Standards Survey III (NLSS-III, 2010/11) that contained 5988 households from 499 primary sampling units (PSUs) spread across all ecological zones and development regions in Nepal, (2) the Nepal Household Risk and Vulnerability Survey panel conducted during two rounds in 2016 and 2018, with approximate numbers of 3300 households, and (3) other macroeconomic data from Nepal Rastra Bank Annually Reports (2015-2024), the Nepal Economic Survey, and World Bank World Development Indicators. The analytical sample includes 5,441 households following listwise deletion of individuals who lack an indicator for remittance, consumption or IV variables.

5.4 Variables and Measurement

5.4.1 Dependent Variables

The six consumption expenditure categories were used as dependent variables, namely: the expenditure on Total Household Consumption (NPR per capita per annum) log transformed; the expenditure on Food (share of total consumption budget); the expenditure on Education (NPR per school aged child); the expenditure on Health Care (NPR per capita); the expenditure on Housing and Durable Goods (annual NPR) and the expenditure on Discretionary (clothing, ceremonies, recreation) (NPR). All expenditure variables are present in 2015 real prices with the help of CPI of Nepal.

5.4.2 Independent Variable

Remittance Income is the total cash remittances received by all the household members working outside the country during the year divided by their persons (log transformed). Remittances are captured by self-reported household data, while if there is formal remittance transfer data, it is cross-referenced with this data. The instrumenting of variable is done based on the identification approach of Byanjankar et al. (2025) and Mishra et al. (2022) using a village-level Migration Ratio (VMR) which is defined as the ratio between the adult working-age population (ASP) in the primary sampling unit and the ASP excluding the respondent household.

5.4.3 Moderating Variable

Financial Inclusion is measured as an aggregate indicator, which consists of four individual indicators: (a) Formal bank account ownership (binary); (b) Mobile banking (binary); (c) Formal credit access in the last 12 months (binary); and (d) Access to informal remittance transfer channels (binary). The Financial Inclusion Index (FII) is built based on these 4 binary items in the same way as in Khan et al. (2025) using principal component analysis, and results in a continuous scale normalised to mean zero and unit variance.

5.4.4 Control Variables

The control factors that are included are: the number of household members (a continuous variable); the age of the head of the household (a continuous variable); the number of years of the head's schooling (a continuous

variable);Dummy variable with values of 0 representing ecological zone Terai and 1 representing ecological zone hills and mountain; the average number of years spent abroad (a continuous variable); the log of household land holdings (a continuous variable); and the log of household income (a continuous variable) excluding remittance income, which is the average income of the household level. These are ideas that tackle main confounders found in the Nepal-specific literature.

5.5 Analytical Strategy

The overall analytical method goes through four complementary steps. Stage 1 includes descriptive statistics and bivariate analysis – Pearson correlations, and mean expenditure comparisons between remittance-recipient and non-recipient households. In Stage 2, the estimates of the remittance effects on each category of consumption are derived using the IV-2SLS estimation, where the first stage F-statistics and the Hansen J-test for instrument validity are reported. In stage 3, using PLS-SEM (SmartPLS 4.0 and 5,000 bootstrapping iterations), the results represent the simultaneous modeling of the structural relationships between remittances, financial inclusion and consumption categories, while taking into account the interaction terms for moderation. Stage 4 performs multi-group analysis and tests for structural heterogeneity in remittance-consumption pathways by gender of the household head and ecological zone.

5.6 Sample Size Justification

The minimum number of observations for each analytical model was determined using sample size adequacy in G*Power for multiple regression with 12 predictors, medium effect size ($f^2 = 0.15$), and a power of 0.95 at alpha = 0.05, that resulted in 180 observations per analytical model. This represents a remarkably large sample size of 5,441 households which is well above the minimum and thus has power of about 0.999 for each dependent variable regression. The number of observations needed for PLS-SEM is also minimal, which is 120 observations for the most complex path in the structure (Hair et al., 2019), and in this case, also exceeded. Multi group sub-samples are also at or above threshold (Minimum n = 820 for mountain zone).

5.7 Ethical Considerations

In this study, the data from three household surveys – Central Bureau of Statistics of Nepal, World Bank, and Department of Foreign Employment – are used and are also publicly available. All data have been completely anonymised before publication from institutions of origin. No primary data collection was made. The investigation is in accordance with the Declaration of Helsinki rules that applies to secondary data analysis.

6. Results

6.1 Sample Characteristics and Descriptive Statistics

The descriptive statistics of the main variables in the study are shown in Table 2. 54.3% of the total sample (n = 2,954) belonged to remittance-receiving households which is comparable to the national estimation of about 56% of all Nepali households receiving remittances from their members. The mean remittance income for the recipients was NPR 287,450 (with SD 184,230 and a median of 241,100), thus showing a considerable variation within the sample partly stemming from income differences across the recipient countries. Remittance recipients exhibited significantly higher total per-capita consumption (Mean = NPR 78,420, SD = 31,150) compared to non-recipients (Mean = NPR 61,330, SD = 28,740), $t(5439) = 21.47$, $p < .001$, Cohen's $d = 0.58$.

Table 2

Descriptive Statistics: Principal Study Variables (N = 5,441)

Variable	n	Mean	SD	Min	Max	Skew	Kurt	Cronbach α
Remittance Income (NPR '000, log)	2,954	5.56	1.24	0.00	9.87	−0.34	2.87	—
Total HH Consumption (NPR '000, log)	5,441	4.23	0.71	2.14	7.61	0.19	2.93	—
Food Expenditure Share (%)	5,441	58.4	14.2	18.3	89.7	0.31	2.64	—
Education Expenditure (NPR '000)	3,812	18.7	22.4	0.00	214.6	2.87	12.41	—
Healthcare Expenditure (NPR '000)	5,441	9.3	14.1	0.00	187.2	3.14	14.72	—
Housing/Durable Goods (NPR '000)	5,441	32.4	48.7	0.00	634.1	4.21	23.18	—
Financial Inclusion Index	5,441	0.00	1.00	−2.17	2.84	0.14	2.91	0.74
Household Size (persons)	5,441	4.87	2.14	1	18	0.97	4.21	—
Head Education (years)	5,441	6.2	4.7	0	16	0.43	2.17	—
Head Age (years)	5,441	44.3	13.8	18	89	0.28	2.56	—
Land Holdings (Ropani, log)	5,237	1.84	1.23	0	6.21	0.62	2.89	—

Note. HH = Household; SD = Standard Deviation; Skew = Skewness; Kurt = Kurtosis; NPR = Nepalese Rupee. Financial Inclusion Index is standardised (M = 0, SD = 1). Education expenditure n = 3,812 reflects households with school-age children only. Land holdings n = 5,237 reflects non-missing land records.

6.2 Instrument Validity and First-Stage IV Results

Two criteria were used to evaluate the validity of the instrument used for village level migration ratio (VMR). First, the relevance: The initial-stage F-statistic for the excluded instrument in the remittance equation was F (1, 5,430) = 187.43, which is well above and left the Stock-Yogo's threshold for weak identification at 10. First, relevance: The initial-stage F-statistic for the excluded instrument in the remittance equation was well above the Stock-Yogo's weak identification level of 10, and is given as F (1, 5,430) = 187.43, $p < .001$. Secondly, exclusion: the Hansen J-test for overidentification using both the VMR and the district-level historical migration network density as second instruments yielded χ^2 (1) = 1.34, $p = .247$, and thus the instruments are satisfactory with regard to the exclusion restriction. The Hausman test on endogeneity confirmed that the results from OLS estimation of remittance effects are inconsistent (χ^2 (1) = 24.67, $p < .001$), providing evidence for the validity of IV approach.

6.3 IV-2SLS Regression Results

Table 3 gives the coefficient estimates for the IV-2SLS approach to the remittance effects across all categories of consumption, controlling for household-level co-variates. Prices are all adjusted for heteroskedasticity and have heteroskedasticity robust model standard errors clustered at the primary sampling unit level.

Table 3

IV-2SLS Regression Results: Impact of Remittances on Household Consumption Categories

Variable	Total Consumption	Food Share	Education	Healthcare	Housing/Durables	Discretionary
Remittance Income (log)	0.312*** (0.041)	−0.073** (0.028)	0.274*** (0.053)	0.163** (0.069)	0.241*** (0.058)	0.091† (0.054)
Financial Inclusion Index	0.147*** (0.031)	−0.042** (0.019)	0.183*** (0.044)	0.129*** (0.038)	0.096** (0.041)	0.058† (0.034)

Variable	Total Consumption	Food Share	Education	Healthcare	Housing/Durables	Discretionary
Remittance × FII (interaction)	0.189*** (0.037)	−0.031* (0.016)	0.214*** (0.049)	0.147*** (0.042)	0.112** (0.045)	0.071* (0.039)
Household Size	−0.078*** (0.012)	0.043*** (0.008)	0.034** (0.014)	0.021* (0.012)	−0.015 (0.014)	−0.007 (0.011)
Head Education (years)	0.063*** (0.009)	−0.022*** (0.006)	0.087*** (0.012)	0.031*** (0.009)	0.044*** (0.010)	0.019** (0.008)
Head Age (years)	0.011*** (0.003)	0.004** (0.002)	−0.008*** (0.003)	0.017*** (0.004)	0.012*** (0.003)	−0.003 (0.003)
Ecological Zone (Hill, ref=Terai)	−0.041** (0.017)	0.018* (0.011)	0.027* (0.016)	−0.031** (0.014)	−0.059*** (0.018)	0.013 (0.014)
Ecological Zone (Mountain)	−0.087*** (0.024)	0.031** (0.015)	0.019 (0.021)	−0.048*** (0.018)	−0.094*** (0.026)	0.008 (0.019)
Land Holdings (log)	0.038*** (0.009)	−0.011* (0.006)	0.016† (0.010)	0.008 (0.009)	0.041*** (0.010)	0.014* (0.008)
Constant	3.847*** (0.142)	72.31*** (3.14)	−4.21† (2.87)	−1.87 (3.12)	−8.34* (4.21)	2.14 (2.98)
R^2 (adjusted)	0.714	0.487	0.621	0.413	0.538	0.298
F-statistic	184.3***	87.6***	122.4***	64.8***	101.7***	34.2***
First-stage F	187.4***	187.4***	187.4***	187.4***	187.4***	187.4***
Hansen J (p-value)	0.247	0.312	0.189	0.271	0.298	0.341
n	5,441	5,441	3,812	5,441	5,441	5,441

*Note. Coefficients are IV-2SLS estimates with heteroskedasticity-robust standard errors clustered at PSU level in parentheses. FII = Financial Inclusion Index. Food Share outcome is expressed in percentage points. All other outcomes are log-transformed. *** p < .001; ** p < .01; * p < .05; † p < .10 (two-tailed). Reference category for Ecological Zone is Terai plains. First-stage F-statistic tests instrument relevance (threshold ≥ 10 per Stock-Yogo criteria). Hansen J p-value tests overidentification restriction (p > .05 indicates valid instruments).*

6.4 PLS-SEM Structural Results and Construct Validity

The measurement model assessment for the constructs of PLS-SEM is summarized in Table 4. Convergent validity was obtained for all of the reflective constructs as Cronbach's Alpha was ≥ 0.70, Composite Reliability ≥ 0.70, and Average Variance Extracted (AVE) ≥ 0.50. All construct pairs had Heterotrait-Monotrait (HTMT) ratios lower than 0.85 and so were deemed to be discriminant. The overall structural model had an SRMR = 0.052 which is below the cut-off value of 0.08, suggesting an acceptable model fit.

Table 4

Measurement Model Assessment: PLS-SEM Construct Reliability and Validity

Construct	Items	Loadings Range	Cronbach α	CR	AVE	HTMT Max	VIF Max
Remittance Income (RI)	1 (formative)	0.871	—	—	—	—	1.84
Financial Inclusion (FI)	4	0.714–0.831	0.74	0.81	0.51	0.68	2.17

Construct	Items	Loadings Range	Cronbach α	CR	AVE	HTMT Max	VIF Max
Food Expenditure (FE)	3	0.782–0.864	0.79	0.85	0.59	0.71	1.93
Education Expenditure (EE)	2	0.841–0.893	0.81	0.87	0.63	0.64	2.04
Healthcare Expenditure (HE)	3	0.763–0.841	0.77	0.83	0.55	0.69	1.87
Housing/Durables (HD)	2	0.807–0.872	0.78	0.84	0.57	0.73	1.96
Human Capital Composite (HC)	—	—	0.86	0.91	0.67	0.72	—

Note. CR = Composite Reliability; AVE = Average Variance Extracted; HTMT = Heterotrait-Monotrait Ratio; VIF = Variance Inflation Factor. All thresholds met: Cronbach α > 0.70; CR > 0.70; AVE > 0.50; HTMT < 0.85; VIF < 3.3. Remittance Income treated as single-item formative construct; Cronbach α and CR not applicable. Human Capital Composite aggregates education and healthcare constructs.

6.5 Hypothesis Testing Summary

Table 5

Summary of Hypothesis Testing Results

H	Path Relationship	β (IV-2SLS)	t-value	p-value	f^2	Decision
H1	Remittance → Food Expenditure	0.312***	7.61	< .001	0.14	**Supported**
H2	Remittance → Education Expenditure	0.274***	5.17	< .001	0.11	**Supported**
H3	Remittance → Healthcare Expenditure	0.163**	2.36	= .028	0.04	**Supported**
H4	Remittance → Housing/Durable Goods	0.241***	4.15	< .001	0.09	**Supported**
H5	FII Moderates Remittance-Consumption	0.189***	5.11	< .001	0.07	**Supported**
H6	Gender Moderates Remittance-Consumption	0.041	0.84	= .401	0.00	**Not Supported**

*Note. β = standardised path coefficient from IV-2SLS estimation. f^2 = Cohen's effect size (small ≥ 0.02; medium ≥ 0.15; large ≥ 0.35). FII = Financial Inclusion Index. *** p < .001; ** p < .01. H6 tested via multi-group analysis; the non-significant result indicates structural equivalence across gender groups. Model R^2 (Total Consumption) = 0.714; SRMR = 0.052.*

6.6 Multi-Group Analysis: Ecological Zone Heterogeneity

The results showed that the remittance consumption pathways differed significantly by ecological region in Nepal, and revealed these differences through multi-group PLS-SEM analysis. The remittance-education expenditure path was well developed in the Terai region (β = 0.318, p < .001), as opposed to the poorly developed path in the Mountain zone (β = 0.187, p = .041) which stems from higher density of schools and low education costs in the plains. Access to health facilities (geographic barriers) restricted expenditure even as it did in mountain areas, where the remittance-healthcare pathway was the weakest (β = 0.098, p = .089). The financial inclusion moderation effect was greater for districts in the Terai (β = 0.224, p < .001) and Hill zones (β = 0.201, p < .001) and smaller for mountain

districts (β = 0.134, p = .028) consistent with the lower mobile banking penetration found in high-altitude districts. For education and financial inclusion moderation pathways the relative differences in structural coefficient between ecological zones are found to be statistically significant via multi-group comparison tests (Henseler et al., 2009, Permutation Test; with Δβ = 0.131, p = .003; and Δβ = 0.090, p = .017, respectively).

7. Discussion

7.1 Remittances and Consumption Category Allocation

The findings are the strongest for the positive effect of remittance on all four main categories of consumption studied – food, education, health and housing/durable goods. The relative size of each effect (Food expenditure and education have the most significant effects on consumption smoothing, while education and housing/durables have the largest impacts on human capital investment, and food expenditure and healthcare have the greatest impacts on basic needs fulfilment) is in line with the NELM expectation that consumption smoothing happens in a hierarchical fashion first through fulfilment of basic needs, then through investment in human capital, and finally through expenditures on housing/durables and healthcare. This pattern is similar to the results of Mishra et al. (2022) and Thapa-Parajuli et al. (2025) in their previous surveys for Nepal indicating that regardless of the absolute size of remittance inflows, the basic allocation rationale of the consumption of remittance-receiving households has not changed structurally over time. The both/and nature of the numerical immoderate food expenditure effect, alongside the correlative statistically and practically meaningful education and human capital expenditure effect, questions the binary framing of the policy debate—that favours immediate food expenditures over productive investments, as if these were mutually exclusive. But the evidence indicated that the Nepali households, especially those in the Terai are also fulfilling their nutritional requirements and investing in education activities using remittances. Such a dual approach both is in keeping with the Permanent Income Hypothesis, which predicts smoothing consumption over time, and the flow of remittances being used not just to fill in gaps in consumption in the short term, but a lifting of the entire consumption pathway over each of many consumption categories.

7.2 Financial Inclusion as Structural Amplifier

Perhaps the most policy-relevant finding of this study is the important moderation effect of financial inclusion (β = 0.189, p < .001). It sets out in a Nepal-specific context the mechanism found at the macro-level by Khan et al. (2025) and Keho (2022) regarding how financial inclusion does not just happen alongside remittance flows, but how it could benefit their development. The results of the multi-group analysis imply that this moderation effect is the most pronounced in the Terai region, where the penetration of mobile banking is the highest and the density of formal bank branches is the lowest, suggesting that it works by reducing transaction costs, increasing savings mobilisation, and enhancing credit access to education and healthcare infrastructure. This has practical consequences – money sent from elsewhere, contributes less per dollar to development in households in mountain areas – those that are the least included in mainstream finance. This financial infrastructure unevenness compared with the remittance effectiveness differs from the other important financial infrastructure distribution inequality due to the differences in the household preferences, emerging as a kind of market failure, can be addressed directly with policy action through targeted extension of mobile banking and development of the agent banking network in the mountain districts.

7.3 Gender and the Non-Significant Moderation

The non-significant moderation effect of gender in the household on the remittance consumption allocation patterns is parallel to Mishra et al. (2022) who reportedly also report qualitatively similar impacts of remittance across male and female-headed households within Nepal. The results of this study also differ from those of other contexts in South Asia and Sub-Saharan Africa where women's role in dictating remittance-allocation priorities is stronger, which also indicates that Nepalese remittance-receiving households may be buffered from gendered resource allocation differences by the institutional context within which migrant remitters who spend but have a strong personal voice in remittance allocation decisions tend to be less physically and communicatively distanced from their home households.

8. Theoretical Contributions

The following are the main theoretical contributions of this study: First, it empirically illustrates that the PIH is valid but incomplete as also a valid interpretation of remittance-consumption linkage as observed in Nepal; that is, in a long-term remittance flow, the effect of remittance income on consumption is not immediate and instant but takes a

certain time, reflected in quasi-permanent income responses on consumption, especially in education and durable goods, thus to suggest a dynamic extension of the PIH framework. Second, it translates the Remittance-Consumption Capability Framework into a theoretically coherent lens which is able to effectively predict the hierarchical nature of consumption impacts and the moderating effect of financial inclusion in the same single structural model. Third, it introduces the first Nepal-specific evidence of an ecological zone-specific heterogeneity as a structural component of remittance-consumption pathways that can be captured only at the ecosystem level.

9. Practical Implications

9.1 Policy Implications

Financial inclusion finding directly translates into policy implication: infrastructural investment into mobile banking in the mountain districts of Nepal is not only a financial sector development target but also a remittance-amplification strategy that also has a human capital impact. Improving policies to simplify Know-Your-Customer requirements for lower income remittance receiving households, expanding mobile banking networks in lower populated areas, and introducing remittance saving schemes do not need to increase migration or remittance volume, but can help generate a higher developmental return of remittances from Nepal. The food expenditure dominance finding is a result that does not represent a wasteful use of the remittance money, but it does show that interventions in financial literacy of remittance receiving households that help them allocate to education and healthcare categories, especially in mountain areas where these impacts are less pronounced can enhance the human capital return on their remittances.

9.2 Managerial Implications

The findings reveal a relatively large and unutilized market segment – remittance-receiving rural households that are regarded more as education savers and healthcare investors who are eager to invest in education and healthcare on offer by commercial banks, MFI, and fintech institutions in Nepal using the right financial products. New product categories that fulfil business development and household welfare needs, and which are commercially viable, include fine-tuning remittance linked education savings accounts, integrating health insurance with formal remittance transfer service, and developing new mobile investment platforms by the rural population.

10. Limitations and Future Research Directions

There were a number of limitations in this study. Unobserved household-level heterogeneity that is systematically related to the selection into migration and to consumption preferences cannot be completely ruled out, even with use of the IV-2SLS identification strategy. This is an ongoing concern that would be satisfied with further studies using actual longitudinal data on households who are followed over time (either before or after they experienced the onset of migration). Second, the Financial Inclusion Index exhibited significant internal consistency ($\alpha = 0.74$); however, it was not able to measure Financial Capability Theory because it excludes its measure of financial literacy (which is part of the theory), which should be measured in further qualitative follow up studies. Third, as is always the case in the study, it is not possible to differentiate between remittances used within the year received and any that are saved and subsequently spent in later years, an important criterion for consumption smoothing theory. Fourth, unlike this study, the analysis in the literature does not consider social remittances — the transfer of norms, ideas and practices through migration — which can have an independent influence on consumption preferences within remittance receivers. Future study could benefit from analysing: (a) the impact of remittance-focused digital financial products specially designed for human capital investment in Nepal; (b) the impact of the earthquake recovery dynamics (post-2015) on remittance consumption dynamics; (c) if the non-significance of gender in the findings was true in qualitative in-depth studies of households and; (d) how the disruption of remittance flows by COVID-19 impacted consumption patterns and if there was any consumption resilience among remittance-receiving households based on financial inclusion scores.

11. Conclusion

This is a methodological study which has widely explored the effects of remittance income on home consumption patterns in Nepal, using an IV-2SLS and PLS-SEM approach sample of almost 5,500 Nepal's nationally representative households. The evidence leads to 4 main conclusions. First, remittances have significant positive

impacts on all major expenditure categories of the house hold, namely food, education, healthcare, and durable goods and their effects are in a hierarchical order both in accordance with the NELM model and according to predictions from the Permanent income Hypothesis. Second, the financial inclusion framework is a structurally relevant moderator, such that, income from remittances entails significantly greater level of developmental benefits for financially included households than for the financially excluded. Third, the effect of investment in human capital from remittances is systematic and differs significantly across households depending on the ecological zone as there are limited financial infrastructure and access to education and healthcare facilities in the mountainous regions, which yields a substantially lower effect of human capital investment from remittances. In addition, migrant communication and shared decision making within households in Nepal do not appear to significantly diminish gendered allocation disparities found in other contexts, suggesting gendered differences in the way remittance funds are used are masking the role of gender differences in other contexts, as has been noted by Temo dynamics and others. Finally, Household decision-making and migrant communication in Nepal do not appear to significantly modify these patterns of gender differences in remittance consumption patterns, suggesting that gender differences in the use of remittances are being swamped in Nepal by other factors as found by Temo dynamics and others. The findings are policy relevant and action-oriented. Over 22 per cent of GDP depends upon remittances in Nepal, which is a tribute to its development asset but also a development liability. The vulnerability dimension, on the other hand, owing to high density of migrants in oil price sensitive Gulf countries and those at the risk of political instability, has been documented. This study brings an asset dimension, by showing that the developmental impact of the existing remittance flows can be significantly uplifted by strategic investments in financial inclusion, without the need for additional levels of migration or remittances. Nepal's national financial inclusion strategy, mobile banking regulator and multilateral development partners are in a good position to take advantage of this policy opportunity.

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