

**NEXUS BETWEEN REMITTANCE AND HOUSEHOLD CONSUMPTION:
FRESH EVIDENCE FROM SYMMETRIC OR
ASYMMETRIC INVESTIGATION**

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There is no conclusive evidence available in empirical literature regarding the pattern of relationship, like symmetry or asymmetry, between remittances and household consumption at the aggregate level. With this study, we empirically investigated the nexus between Remittance and Household consumption under the assumption of both symmetric and asymmetric from 1993 to 2017 of a panel of 105 countries. Symmetry investigation performed with Panel ARDL proposed by Pesaran et al. (1999) and asymmetry test executed with the idea of nonlinear ARDL proposed by Shin et al. (2014). For establishing directional causality, we also performed a Panel Granger-causality test under the error correction term. Study findings unveiled an asymmetric relationship between remittance flows and household consumption both in the long run and in the short run, however, the coefficients elasticity explained greater magnitude in the short-run than the long run. Study findings exposed unidirectional causality from remittance to household consumption in the short-run. The effect of remittance inflows on household consumption at the aggregate level is evident. Therefore, the government should persuade integrated economic policy for the effective deployment of remittance flows in productive investment for increasing aggregate production and economic welfare at large.

Keywords: Remittance, Household Consumption, System-GMM Asymmetry, Symmetry
JEL Classification: F24; D31

1. INTRODUCTION

There are about 250 million migrant workers around the world sent remittance to home countries amount to over US\$500 billion a year. Over the last three-decade, migrants remittance have become a stable source of foreign finance for developing countries (Bettin et al., 2018) and these flows have grown remarkably, representing the second-largest flow of capital across the world (after FDI), and accounting for almost a

third of all international capital flows (Yang, 2011). Remittance becomes one of the prime sources of receiving foreign exchange in many developing and emerging economies. Developing countries keen to accept foreign finance for sustainable development towards ensuring socio-economic development such as the continuous increase of standard of living, availability of capital flow for investment, higher propensity to the consumer with purchasing power, and healthy economic environment. As such, remittance represents the critical component of both household and the national budget, as they freed up scarce economic resources that can be allocated in productive investment.

Remittance treated as export income received by home countries from their migrant's worker of different countries where scarcity of workforce become the acute problem for their economic progress. Continuous inflows of remittance emerge as a key source of foreign reserve towards paying import bills and ensure a stable exchange rate which encourages export to the international market with domestic market development (Siddique et al., 2012). Domestic market expansion enhances production possibilities with many opportunities for income generation and household consumption which eventual effects of increasing standard of living. It is also argued that remittance flow is more stable than foreign direct investment and foreign portfolio investment in developing countries and such availability money flow allows investment in the productive area, which accelerates aggregated production in the economy. In addition, remittance helps households to expand consumption, accumulate physical, human capital, and financial capital for productive investment. In the process developing countries received foreign finance with traditional sources including direct aid, private capital flow, and most prominently foreign direct investment (FDI), however, among all sources the growth of remittance inflows become one of the largest sources of foreign finance over the past two decades (Aggarwal et al., 2011; Bettin et al., 2012; Rao and Hassan, 2011)

The benefits of remittances inflow are multidimensional and in empirical literature we observed a vast number of researchers explained the nexus between remittances inflows and various economic phenomenon such as the remittance impact on poverty reduction (Koechlin and Leon, 2007; Acosta et al., 2008; Bayes et al., 2015; Ratha, 2013; Adams, 2006; Adams et al., 2008), the remittance impact on household spending behavior (Adams Jr and Cuecuecha, 2010; Yang, 2008), macroeconomic effects (Buch and Kukulenz, 2010; Sayan, 2006; Nwaogu and Ryan, 2015; Ahmed, 2010; Siddique et al., 2012), remittance and human capital development (Lopez et al., 2007b; Bansak and Chezum, 2009), the impact of remittance on financial development (Nyamongo et al., 2012), the impact of remittance on political institution (Williams, 2017), and the impact of remittance on labor productivity (Al Mamun et al., 2015). It is clearly apparent that remittance-receiving countries experience the eventual effect in the economy under various aspects.

Remittance inflows from host countries to home countries channelized additional money flow in the economy and the marginal effects can observe in household

consumption level. Remittance inflows, according to Combes and Ebeke (2011), reduce instability in household consumption it is because the excess capacity to expenses allows them to maintain current consumption. Further evidence observed in Akpa (2018) study, where study findings revealed that remittance receives positively influence on household consumption both in the short run and long-run in Ghana.

The flow of remittance remains stable despite the recent global financial crisis in 2009, lower and middle-income countries experience an increase of remittance inflows by 4.1% in 2009. According to the World Bank (2018) report, the remittances to lower and middle-income countries reached \$466 billion in 2017, an increase of 8.5 percent over \$429 billion in 2016. Global remittances, which include flows to high-income countries, grew 7 percent to \$613 billion in 2017, from \$573 billion in 2016. The amount of remittance receives an increase at a greater rate than the increase in household recipients. Therefore, the contribution of remittance suppresses the individual level to the macro level. Given the role and potential power of remittance on the macroeconomic phenomenon, the focus of this present study to answers the question of whether Remittance-Household consumption nexus is symmetric or asymmetric. Examining the symmetric relationship between Remittance receive and household consumption study apply Panel ARDL under Pooled Group Mean (PGM) assumption proposed by Pesaran et al. (1999). Asymmetric relationship investigates through the reconstruction of non-linear ARDL proposed by Shin et al. (2014) with decomposition positive and negative shock in remittance receive with dynamic panel data. We also apply The system GMM estimation is used to address possible biases due to reverse causality and potential endogeneity of remittances in this paper, which is suggested in empirical studies see, Mondal and Khanam (2018).

From the empirical investigation, we observed that the effect of remittance flow in the economy positively linked to household consumption both in the long-run and in the short-run. Furthermore, the magnetite of the coefficients is higher in upper-middle-income countries in comparison with lower-income countries and lower-middle-income countries. The study also observed the asymmetric relationship between remittance flows and household consumption. In long run, the coefficient of positive shock in remittance flows positively linked with household consumption is implying the extra amount of remittance received by country will experience a higher level of consumption having excess capacity to expense. On the other hand, the negative shock in remittance flows adversely affect on overall household consumption. It is implying that limiting flows of remittance may reduce the purchasing power of recipient households and need to adjust their current consumption level.

The remaining sections of this paper are as follows: Section 2 deals with empirical littermate's investigation about the nexus between Remittances-household consumptions. Section 3 discusses the data and econometric methodology used for empirical estimation. Section 4 presents empirical estimations and interpretation, and conclusion and policy recommendation critically explained in Section 5.

2. REMITTANCE-HOUSEHOLD CONSUMPTION NEXUS: WHAT EMPIRICAL STUDIES SAY?

Cross-border migration is a global phenomenon, with migrants accounting for over 3 percent of the world's population. There are more than 250 million migrants globally and workers' remittances, the money migrants send home to their families staying behind, amount to over US\$500 billion a year. Remittances are one of the most important sources of external financing for many developing countries, surpassing both official development assistance and private capital flows, and provide critical income for the households receiving these inflows. In 2015, some 84 countries received migrant remittances equivalent to at least 1 percent of GDP, and 19 countries received 10 percent or more

Since the early 1990s, inflows of remittance became the key discussed phenomenon among researchers, academicians, and policymakers with respect to its impact on the aggregate economy, especially for developing countries. The inflows of remittance in developing countries are the second most desirable source of foreign finance, the effects of remittance inflows observed by recipients countries like social welfare, poverty reduction, promoting financial development, improvement in health and education and greater productivity in the economy (Adams Jr and Page, 2005; Jongwanich, 2007; Giuliano and Ruiz-Arranz, 2009; De and Ratha, 2012; Thapa and Acharya, 2017).

Remittance-household consumption nexus draw the immense attention of discovering insights for formulating economic policy with positive intent. Thereby, a number of empirical studies had already been conducted based on household survey data with the application of various econometric methodology see for an instant, Yang and Choi (2007) in Philippines, De and Ratha (2012) in Srilanka, Raihan et al. (2009) in Bangladesh, Calero et al. (2009) in Ecuador, Randazzo and Piracha (2013) in Senegal, Ahmed et al. (2010) in Pakistan, Olowa and Awoyemi (2011) in Nigeria, Clément (2011) in Tajikistan, Medina and Cardona (2010) in Columbian, Quartey (2006) in Ghana, and Parinduri and Thangavelu (2008) in Indonesia. Empirical studies explored that continual remittance-receiving households can maintain stable consumption level even through society pass through any shocks, these findings implying that remittance can promote stability in household consumption following adverse shock in the macroeconomic environment it is because remittance act as insurance against continuous income flow and households do not compromise their consumption level. with a similar note, Beaton et al. (2018) explained remittance-receiving household has a greater extension of managing their consumption level and also assist in smoothing consumption level. In another study, Edelbloude et al. (2017) bring another side of remittance impact on the economy. They found remittance flows positively absorbed the shocks resulting from political revaluation in the home country.

However, empirical literature focusing on the nexus between remittances receive and household consumption at an aggregate level produces no substantial evidence of testing this relationship. In a study Akpa (2018), scrutinize private remittance impaction on

household consumption by applying the ARDL approach in Ghana. The study revealed a positive effect from private remittance receives to household consumption both in the short-run and in the long run but the magnitude to the household is statistically insignificant. In another study, Combes and Ebeke (2011) investigate remittance receive impact on household consumption instability of developing countries by applying dynamic Panel system-GMM. The final verdicts established in the study that remittance received reduce consumption instability with insurance role in receiving continuous income flow.

In the connection of remittance impact on the macro phenomenon, a group of researches put efforts into investigating the impact on financial development and empirical studies come-up with inclusive evidence. For an instant, Lartey (2013) found remittance positively tempt financial development in sub-Saharan African countries. He explained remittance flow with investment channel accelerate investment by stabilizing the macroeconomic environment. Further evidence also found in another study performed by Gupta et al. (2007). In a study Bjuggren et al. (2010) examine remittance investment nexus. They argued that the effect from remittance to investment could address either directly or indirectly with efficient financial institutions or sustained financial development. Remittance flow towards productive investment requires quality financial institutions, institutional framework, and efficient financial channels for resource mobilization. However, the effect of remittance on the use of financial service is not straightforward. It is customarily argued that the linking between remittance receive and financial service has greater benefits for the household having better risk management tool and capital accumulation through channelizing savings in financial institutions from remittance to credit deficits groups.

Furthermore, remittance influence also appeared in two key ingredients of the economy such as financial investment and human capital development (Calero et al., 2009; Mohanty et al., 2014; Azizi, 2018). In a study, Adams Jr and Cuecuecha (2010) claimed that remittance assists in human capital development through improving health care and educational condition in the society. Further evidence found in De and Ratha (2012) study. They argued, in Srilanka, remittances receiving household accelerate human capital accumulation through ensuring child education. It is observed that remittance-receiving households invest in education than non-remittance receiving households, in general (Kifle, 2007). A similar conclusion found in Salas (2014) study, revealed positive linked with remittance and the increase of child schooling in especially for those households receive foreign remittance.

Nonetheless, a group of researchers shows a skeptical attitude towards continuous remittance inflow and economic growth (see Amuedo-Dorantes and Pozo, 2004; Lopez et al., 2007a). They argued that substantial raising in remittance flow could cause real exchange rate appreciation and reallocation of economic resources to unproductive investment from productive, known as *Dutch disease phenomenon*.

3. ECONOMETRIC MODEL AND DATA

In this section, we critically explained data and econometric methodology used in assessing Remittance - Household consumption nexus. We use annualized data for three panels taking the topology of the World Bank data set; Lower-income countries (LIC-20), Lower Middle-Income countries (LMIC-46), and Upper-Middle-Income Countries (UMIC-39). The idea to investigate whether Remittance household consumption relations are symmetric or asymmetric varies on income level rather than geographical division. We believed that the subgroup of countries based on income criteria relevant to differentiate the final verdict in explaining the empirically tested relationship between Remittance and Household consumption.

In this estimation, we have three balanced panel data set for spanning 1993-2017, including 20 countries from lower-income countries (Panel A), 46 countries from Lower middle-income countries (Panel B) and 39 counties from Upper-middle-income countries (Panel C)¹. The entire dataset prepared by extracting pertinent data from World Development Indicators (World Bank, 2017), International Financial Statistics (IMF, 2018). We use the following empirical specification to examine the nexus between Remittance and Household consumption of a panel data set covering 106 countries for the period of 1993-2017. Our baseline estimation takes in the following form:

$$\Delta HC_{it} = \beta_0 + \beta_{1t}RR_{it} + \beta_{2t}FD_{it} + \beta_{3t}FO_{it} + \beta_{4t}TO_{it} + \mu_i + \varepsilon_{it}, \quad (1)$$

where ΔHC represents the change of Household Consumption, RR denotes Remittance Received, FD for financial development, TO for Trade Openness and FO for Financial Openness, respectively. μ_i represents the unobserved country effects, and ε_{it} is the error term in the equation.

In the above-mentioned equation, as the dependent variable, Household consumption (HC) is proxied by the household final consumption as a percentage of Gross Domestic Product. The important explanatory variable is Remittance receipts (RR) of capturing the relationship with household consumption at the aggregate level. Following Escribà-Folch et al. (2015) and Williams (2017), the study uses real remittance per capita instead of the ratio of remittances to GDP because, as they argue, a change in this ratio could be due to a change in GDP as well as a change in remittances. We follow the common practice suggested in literature, remittance measures by using the sum of personal transfers and compensation of employees (see Feeny et al., 2014; Williams, 2017; Coulibaly, 2015). Personal transfers consist of all current transfers in cash or in-kind made or received by resident households to or from nonresident households. Personal transfers thus include all current transfers between resident and non-resident individuals. Employee compensation refers to the income of border, seasonal, and other short-term workers who are employed in an economy where they are not residents and of residents

¹ See Appendix A for the list of all countries.

employed by non-resident entities.

In order to enhance robustness in the model estimation, we include a three control variable pertinent to explain the relationship between remittance and household consumption. The first control variable is financial development (*FD*), It is observed in empirical literature that a number of researchers come with a positive note while investigating remittance and financial development (see, (Giuliano and Ruiz-Arranz, 2009; Gupta et al., 2007; Aggarwal et al., 2011; Nyamongo et al., 2012; Chowdhury, 2011). Remittance flows in the economy reduce liquidity constraints and facilitate access to credit by households. Inflows of remittance, apart from resolving liquidity crisis and credit availability, allow growth in capital formation and financial diversification in the financial system, which promotes financial development, eventually. Acknowledging the fact established by the prior study, in this study we try to address the possible effect of financial development on Household consumption. To capture the effect of financial development in the model study consider commonly used financial development indicator the ratio of broad money to GDP (see, (Calderón and Liu, 2003; King and Levine, 1993; Nyamongo et al., 2012). Therefore, the coefficient of *FD* is expected to be positive to household consumption.

The second control variable is Trade openness proxy by the ratio of total trade (sum of Export and Import) as a percentage of GDP. The third control variable is financial openness proxy by flows of cross broader foreign capital is known as Foreign Direct investment, are deemed to promote the development of financial markets and the flow of funds across countries. The descriptive statistics and pairwise correlation matrix report in Appendix B.

Table 1. Variable definition with model notation

Variable	Notation	Description	Sources
Household Consumption	HC	Log of Household final consumption expenditure to GDP	WDI and IFS
Real remittances	RR	Log of personal remittances per capita	WDI and IFS
Financial development	FD	Log of the ratio of broad money to GDP	WDI and IFS
Economic Openness	TO	Total exports plus total imports as a percentage of GDP	WDI
Financial Openness	FO	Foreign direct investment as a percentage of GDP	WDI

Cross-section Dependence Test

In a panel empirical study, it is obligatory to assess cross-sectional dependency among equation variables, particularly representative countries contain similar economic attributes like developing countries, emerging economies, and transition countries. Due to trade internationalization, financial integration, and globalization make a similar

economy subject to experience effect with any shock in other countries. Therefore, investigation of the presence of cross-sectional dependence is most likely demand in the empirical investigation with panel data. In the empirical literature, it is apparent that a growing number of studies rely on four cross-section dependency tests. First, the Lagrange multiplier (LM) test was proposed by Breusch and Pagan (1980), which is preferred in a situation when the cross-section (N) is smaller than time (T). The LM test statistics can be extracted by following the equation stated below:

$$y_{it} = \alpha_i + \beta_i x_{it} + u_{it},$$

where y_{it} denotes dependent variable, x_{it} is the independent variable, and the subscript of t and i represent for cross-section and time period, respectively. The coefficients of α_i and β_i respectively represent the country-specific intercept and slope in the equation. In the context of LM cross-section dependency test, the null hypothesis of cross-section independence: $H_0 = Cov(u_{it}u_{jt}) = 0$ for all t , and $t \neq j$, against the alternative hypothesis of cross-sectional dependence $H_1 = Cov(u_{it}u_{jt}) \neq 0$ for at least $t \neq j$. Moreover, the LM test statistics can compute with the following equation:

$$LM = T \sum_{i=1}^{N-1} \sum_{j=i+1}^N \hat{\rho}_{ij} \xrightarrow{d} \chi_{N(N+1)/2}^2,$$

where $\hat{\rho}_{ij}$ represents the pairwise correlation of the residuals.

Second, the key inadequacies of the LM test that is, it might not work properly in a situation with a larger cross-section (N). With this note, overcoming the existing shortcoming, Pesaran (2004) suggest the following the Lagrange multiplier (CD_{lm}) that is the scaled version of the LM test:

$$CD_{lm} = \sqrt{\frac{N}{N(N-1)}} \sum_{l=1}^{N-1} \sum_{j=l+1}^N (T \hat{\rho}_{lj} - 1).$$

Under cross-sectional independence of the null hypothesis with $t \rightarrow \infty$ and then $N \rightarrow \infty$, CD_{lm} test statistics follow an asymptotic normal distribution see, (Nazlioglu et al., 2011; Menyah et al., 2014; Wolde-Rufael, 2014). In the case of larger N relative to T , CD_{lm} estimation subject to size dissipation. Therefore, Pesaran (2006) proposed the following CD test, which is suitable in a situation when N is larger than T :

$$CD_{lm} = \sqrt{\frac{2T}{N(N-1)}} \sum_{l=1}^{N-1} \sum_{j=l+1}^N (\hat{\rho}_{lj}).$$

The CD test followed an asymptotically standard normal distribution of investigation of the null hypothesis of cross-sectional interdependency with $t \rightarrow \infty$ and then $N \rightarrow \infty$, in any order (Nazlioglu et al., 2011). Furthermore, the CD test might produce distorted

information in a situation where the population average pairwise correlation is zero and the individual pairwise correlation is non zero. Limiting the negative effect, Pesaran et al. (2008) proposed the bias-adjusted LM test. LM_{adj} utilize the exact mean and variance of the LM statistics in case of the large panel first $t \rightarrow \infty$, and then $N \rightarrow \infty$. The bias-adjusted LM statistics can compute with the following equation:

$$CD_{lm} = \sqrt{\frac{2}{N(N-1)}} \sum_{l=1}^{N-1} \sum_{j=i+1}^N \left(\frac{(T-K)\hat{\rho}_{ij}^2 - u_{Tij}}{v_{Tij}^2} \right) \xrightarrow{d} (N, 0),$$

where K refers to the number of regressors, u_{Tij} and v_{Tij}^2 specifies the mean and variance of $(T-K)\hat{\rho}_{ij}^2$, respectively.

The symmetric Panel ARDL

The framework used in this study commonly known as Pooled Group Mean (PGM) panel ARDL estimation initially proposed by Pesaran and Smith (1995) and further development performed by Pesaran et al. (1999) and proposed well defined model to investigate long-run association of dynamic panel data having variables integration in mix order either I(0) or/and I(1).

The symmetric form of Panel ARDL is as follows:

$$\begin{aligned} \Delta HC_{it} &= \beta_{0i} + \beta_{1t} HC_{it-1} + \beta_{2t} RR_{it-1} + \beta_{3t} FO_{it-1} + \beta_{4t} TO_{it-1} + \beta_{5t} FD_{it-1} \\ &+ \sum_{j=1}^{M-1} \gamma_{1j} \Delta HC_{it-j} + \sum_{j=0}^{N-1} \gamma_{2j} \Delta RR_{it-j} + \sum_{j=0}^{O-1} \gamma_{3j} \Delta FO_{it-j} \\ &+ \sum_{j=0}^{P-1} \gamma_{4j} \Delta TO_{it-j} + \sum_{j=0}^{Q-1} \gamma_{5j} \Delta FD_{it-j} + \varepsilon_{it}, \end{aligned} \quad (2)$$

where the subscript t is the number of periods and i is the sample unit. The long-run coefficient can find from β_1, \dots, β_6 and the short-run coefficient from $\gamma_{11}, \dots, \gamma_{5J}$. The Equation (7) can be specified under the error correction term in the following ways:

$$\begin{aligned} \Delta HC_{it} &= \zeta_i \rho_{it-1} + \sum_{j=1}^{M-1} \gamma_{ij} \Delta HC_{it-j} + \sum_{j=0}^{N-1} \gamma_{ij} \Delta RR_{it-j} + \sum_{j=0}^{O-1} \gamma_{ij} \Delta FO_{it-j} \\ &+ \sum_{j=0}^{P-1} \gamma_{ij} \Delta TO_{it-j} + \sum_{j=0}^{Q-1} \gamma_{ij} \Delta FD_{it-j} + \varepsilon_{it}, \end{aligned} \quad (3)$$

where $\rho_{it-1} = \beta_{1t} - \varphi_{0i} - \varphi_{1i} HC_{i-1}$ are the linear error correction term of each unit and the coefficient of ζ_i is the speed of adjustment towards long-run equilibrium. The parameters of φ_{0i} and φ_{1i} is computed as $\varphi_{0i} = -\frac{\beta_{0i}}{\beta_{1i}}$ and $\varphi_{1i} = -\frac{\beta_{2i}}{\beta_{1i}}$, respectively. It is noticeable from both Equation (2) and (3) that there is on remittance receive decomposition effect, i.e., positive and negative change, on household consumption under the symmetric assumption.

The Asymmetric Panel ARDL

In order to test symmetric or asymmetric effects of remittance receive on household consumption, we follow the non-linear ARDL proposed by Shin et al. (2014) and transform into panel mode with the underlying assumption that is a positive and negative shock in the independent variable. Following empirical studies (see, Bahmani-Oskooee and Mohammadian, 2016) we decompose remittance receive into positive and negative changes denoted by RR^+ and RR^- . The argument behind decomposition is that the flows of remittance do not remain stable since remittance inflows affected by both host and home country economic phenomena like exchange rate fluctuations, mode of remittance payment, and recipient expenditure pattern. Using new notation, we create two sets of new time series variables, where RR^+ denoted by growth in remittance flows and RR^- denoted by negative growth in remittance flows. Series can drive using the following equations:

$$\begin{cases} POS(RR)_t = \sum_{k=1}^t \ln RR_k^+ = \sum_{k=1}^T MAX(\Delta RR_k, 0) \\ NEG(RR)_t = \sum_{k=1}^t \ln RR_k^- = \sum_{k=1}^T MIN(\Delta RR_k, 0) \end{cases} \quad (4)$$

The next step to rewrite Equation (2) by incorporating positive and negative changes in the equation and transform into Panel Non-linear ARDL:

$$\begin{aligned} \Delta HC_{it} = & \alpha_{0i} + \sum_{x=1}^n \mu_{i1} \Delta HC_{it-1} + \sum_{x=0}^n \mu_{i2}^+ \Delta POS(RR)_{t-x} \\ & + \sum_{x=0}^n \mu_{i2}^- \Delta NEG(RR)_{it-x} + \sum_{x=0}^n \mu_{i3} \Delta FD_{it} + \sum_{x=0}^n \mu_{i4} \Delta FO_t \\ & + \sum_{x=0}^n \mu_{i5} \Delta TO_t + \gamma_{i0} HC_{it-1} + \gamma_{i1}^+ POS(RR)_{it-1} + \gamma_{i1}^- NEG(RR)_{it-1} \\ & + \gamma_{i2} FD_{it-1} + \gamma_{i3} TO_{it-1} + \gamma_{i4} FO_{it-1} + \omega_{it}, \end{aligned} \quad (5)$$

4. ESTIMATION RESULTS AND DISCUSSIONS

4.1. Preliminary Investigation for Key Determinants

Table 2 exhibits the results of baseline estimation for determining the key macro-fundamentals those are playing a critical role in aggregate remittance received by the economy during the researched period. We present the estimates using the ordinary least square estimator, fixed effects, and random effects estimator. In accordance with Hausman test results, the test statistics and associated probability confirmed the fixed effects model is suitable in explaining the empirical model estimation. The key findings from empirical investigations are reported below.

In earlier, we confirmed fixed effect model is more preferable over the random effects model, therefore in explaining empirical model output for key determinants of

remittance inflow we only concentrated on model output reported with fixed effects.

For lower-income countries, study findings unveiled positive effects running from financial development (a coefficient of 0.244), capital adequacy (a coefficient of 0.193), financial openness (a coefficient of 0.083), and economic growth (a coefficient of 0.022). In addition, study findings also established adverse effects running from trade openness (a coefficient of -0.468), government final consumption (a coefficient of -0.115), and inflation (a coefficient of -0.027), respectively. It is obvious for lower-income countries that are the effective mobilization of economic resources and financial efficiency can augment the flows of remittance. However, selective government investment and controlled inflation also desirable in essence for creating a conducive environment for economic progress.

Second, Model estimation for lower-middle-income countries exhibited in column [4] to [6]. Considering coefficients reported in column [5] with fixed effects estimation. It is apparent that positive motivation appears towards remittance inflows from financial development (a coefficient of 0.286), government final consumption (a coefficient of 0.181), financial openness (a coefficient of 0.061), and economic growth (a coefficient of 0.011). on the other hand, the negative effects also observed which is running from trade openness (a coefficient of -0.525), capital availability (a coefficient of -0.149) and inflation (a coefficient of -0.024). findings suggesting that remittance inflows in the lower-middle-income countries can be accelerated by allowing efficient financial intermediation implying an effective and efficient channel for fund transfer and government efficient reallocation of available economic resources in the economy.

Third, Column [7] to [9] displayed empirical model estimation for Upper-middle income countries. In accordance to fixed effects model output, it is pertinent to assume positive effects induce positive flows of remittance in the economy through financial development (a coefficient of 0.044), capital adequacy in the economy (a coefficient of 0.546), government final consumption (a coefficient of 0.029), and economic progress (a coefficient of 0.074). Furthermore, the undesirable effects also appear which is running from trade openness (a coefficient of -0.035), financial openness (a coefficient of -0.097), and inflation (a coefficient of -0.074), respectively to remittance inflows.

Fourth, the results of full model estimation exhibited in columns [10] to [12]. Study findings established an affirmative influence from financial development (a coefficient of 0.190), capital adequacy in the economy (a coefficient of 0.229), financial openness (a coefficient of 0.126), and economic growth (a coefficient of 0.041), respectively. Study findings suggesting that the role of macro-fundamental is obligatory in essence of accelerating the current of remittance in the economy regardless of the state of economy. In regards to detrimental effects which discourage steady inflows of remittance in the economy also noticed. More specifically, negative effects are running from trade openness (a coefficient of -0.360), government final consumption (a coefficient of -0.302), and inflation (a coefficient of -0.014), respectively.

Table 2. Macro-determinants for Remittance Inflows

Repressors	LIC			LMIC			UMIC			FULL		
	OLS [1]	FE [2]	RE [3]	OLS [4]	FE [5]	RE [6]	OLS [7]	FE [8]	RE [9]	OLS [10]	FE [11]	RE [12]
C	-0.797 **	-2.858 ***	-0.166 **	-2.018 ***	-2.301 ***	-2.89 ***	0.893 ***	-1.301 ***	-3.736 ***	-0.262 ***	-0.027 ***	-0.247 **
Financial development	1.009 ***	0.244 ***	0.470 **	0.811 ***	0.286 ***	0.810 ***	0.031 ***	0.044 ***	0.065 ***	0.202 ***	0.190 ***	0.202 **
Trade Openness	-0.577 ***	-0.468 **	-0.160 ***	-0.015 ***	-0.524 **	-0.015 ***	-0.725 **	-0.035 *	-0.382 **	-0.443 ***	-0.360 **	-0.451 ***
Capital availability	-0.652 ***	0.193 **	0.342 ***	0.229 ***	-0.149 ***	0.229 ***	-0.713 ***	0.546 ***	0.775 ***	-0.195 ***	0.229 ***	-0.220 ***
Government final consumption	-0.470 ***	-0.012 ***	-0.115 **	-0.062 ***	0.181 ***	-0.062 *	-0.691 ***	0.029 **	-0.019 **	-0.383 **	-0.302 ***	-0.377 ***
Financial Openness	-0.023 ***	0.083 ***	0.180 ***	0.061 **	0.061 **	0.061 ***	0.135 ***	-0.097 ***	-0.025 ***	0.138 ***	0.126 ***	0.136 ***
GDP_growth	0.015 ***	0.022 ***	0.074 ***	0.014 ***	0.011 ***	0.081 ***	0.012 ***	0.074 **	0.084 **	0.012 ***	0.041 ***	0.091 ***
Inflation	-0.021 ***	-0.027 **	-0.047 *	-0.074 ***	-0.024 **	-0.041 **	-0.024 **	-0.074 **	-0.014 ***	-0.047 ***	-0.014 **	-0.042 *
Year FE	No	Yes	no	No	Yes	No	No	Yes	No	No	Yes	No
Country FE	No	Yes	Yes	No	Yes	yes	No	Yes	Yes	No	Yes	Yes
Houseman test		16.358 (0.0059)			16.304 (0.000)			3.872 (0.007)			15.264 (0.004)	
R ²	0.234	0.187	0.328	0.269	R ²	0.234	0.187	0.328	0.269	R ²	0.234	0.187
Sample	20	20	20	46	Sample	20	20	20	46	Sample	20	20

In-a-nutshell, observing the overall empirical model estimation it is obvious that financial development and capital adequacy are the two critical macro fundamentals who are playing the positive role in accelerating remittance inflows in the economy which is applicable to all economy. Therefore, efficient financial system and economic resources efficient reallocation should be encouraged by the government. And reducing negative effect from inflation, the policy implementation centering control inflation is imperative.

4.2. Panel Data Unit Root Test, Co-integration, and Cross-section Dependency Test.

In this section, we investigate variables order of integration by applying different panel unit root test like, t-test proposed by Levin et al. (2002) and W-stat proposed by Im et al. (2003) which have null hypothesis that all panel contains a unit root, and Hadri Z-stat proposed by Hadri (2000) which has null hypothesis that panel is stationary, of investigating the presence of unit root in the panel. The results of panel unit root test exhibits in Table 3 with four (04) panel of estimation that is Panel A represents unit root results for lower-income countries, Panel B reports results for lower-middle-income countries, Panel C depicts results for Upper-middle income countries, and finally, Panel D exhibits unit root test results for whole sample, respectively. We observed from test statistics that are variables as integrated either at the level or after the first difference, most importantly neither variables are integrated after 2nd difference. Therefore, the variables either contained in the studied mixture of integration at the level or after the first difference, which allows the application of ARDL to estimate relationships. In the next section, we perform the panel Cointegration test of exploring any existence of long-run association or not between Household consumptions, Remittance received, financial development (FD), Trade Openness (TO), and Financial Openness (FO).

In this section, the study performs the panel Cointegration test proposed by Pedroni (2004); Pedroni (1999) and Kao (1999) which is based on examining residues. Table 4 reports the results of panel cointegration. It is observed from the estimation that seven out of eleven statistics are statistically significant at a 1% level of significance which implying that the null hypothesis “the absence of co-integration” can be rejected. Therefore, one can reasonably conclude long-run cointegration between Household consumption, Remittance receive, Financial Openness, Financial Development, and Trade Openness. Once it is confirmed the presence of co-integration, now we move towards estimating the long-run relationship between variables.

In the following segment, we perform a cross-section dependency test considering the main regression model with possible subgroup estimation. Table 5 exhibits the results of estimation and convincingly rejected the null hypothesis of cross-section independent at 1% significant level. Study findings suggesting the existence of dynamics common to all research variables of the study.

Table 3. Panel Unit Root Estimation

Variable	Levin, Lin and Chu t		Im, Pesaran and Shin W-stat		Hadri Z-stat	
	Al level	1 st difference	Al level	1 st difference	Al level	1 st difference
Panel A: lower-income countries						
HC	-1.952	-8.976***	-4.839**	-	1.983	16.905***
RR	-2.853	-17.864***	-2.885	5.936***	2.812	8.953***
FO	-13.962***	-	-12.965***	-	5.932***	-
FD	2.811	8.053***	1.954	6.889***	13.954***	-
TO	4.945**	-	7.923***	-	10.934***	-
Panel B: Lower-Middle income countries						
HC	-8.649	-9.758***	-2.465	-13.033***	1.835	8.649***
RR	2.165	-6.103***	-2.166	7.695***	6.155	7.165***
FO	1.704	-14.332***	-5.917**	2.707	6.211***	-
FD	-2.382	-7.011***	-2.563	-12.755***	1.219	6.382***
TO	1.858	-5.392***	-2.225	-13.03***	8.241***	-
Panel C: Upper-Middle income countries						
HC	-2.972	-14.05**	-1.551	12.86***	7.075	-
RR	-1.647	-4.738**	-1.77	-21.825***	-	-1.647
FO	-9.562	-	-1.129	-6.554***	1.661	9.562
FD	-1.428	-8.146***	-8.512***	-	1.928	11.428
TO	-0.593	-12.202***	-2.602	-11.431***	8.087***	-
Panel D: Full Sample						
HC	-5.62***	-	-2.45	-10.934***	18.277***	-
RR	-1.834	-7.33***	-1.934	-12.98***	2.068	24.27***
FO	-1.772	-5.66***	-0.734	5.922***	1.834	11.67***
FD	-0.823	-13.68***	-1.092	-2.381	1.952	24.89***
TO	-6.98***	-	-5.43***	-	12.54***	-

Notes: All the variables are converted into natural logarithm for estimation.

Table 4. The Results of the Co-integration Tests

Panel A: Padroni test				
Alternative hypothesis: Common AR coefficients (within-dimension)				
	LIC	LMIC	UMIC	Full sample
v-Statistic _[weighted]	1.306**	-2.195**	-1.313***	-1.567***
rho-Statistic _[weighted]	-6.139***	3.581	3.415***	-1.431**
PP-Statistic _[weighted]	-10.473***	-5.768***	-0.482***	-2.791***
ADF-Statistic _[weighted]	2.856	0.920***	1.509	-0.493***
v-Statistic	4.902***	-1.329	-2.227***	-2.158**
rho-Statistic	-4.858***	3.222***	5.155	-0.576***
PP-Statistic	-8.101***	-8.238***	3.573***	-1.789***
ADF-Statistic	3.470***	-5.251	5.208***	0.608[0.997]
Alternative hypothesis: Individual AR coefficients (between-dimension)				
Group rho-Statistic	-2.438***	5.238	5.382***	-1.837***
Group PP-Statistic	-7.007***	-8.744***	-0.414***	-3.588***
Group ADF-Statistic	7.830	-0.866**	2.308***	-1.490***
Panel B: KAO test				
ADF	-3.564***	-4.098***	-5.223***	-5.1491***

Notes: ***/**/* indicates level of significance at a 1%/5%/10%, respectively. LIC stands for Lower-income countries, LMIC represents Lower-middle-income countries, and UMIC denotes Upper-middle income countries, respectively.

Table 5. The Results Cross-Section Dependence Test

	Lower Income Countries	Lower-Middle Income countries	Upper-Middle Income Countries	Full Sample
<i>Regression model: HC/RR, FO, FD, TO</i>				
LM_{BP} (Breusch and Pagan, 1980)	4463.66***	643.305***	456.23***	1321.48***
LM_{PS} (Pesaran, 2004)	169.98***	23.254***	22.345***	62.21***
CD_{PS} (Pesaran, 2006)	65.141***	4.773***	2.564***	1.25***
LM_{adj} (Pesaran et al., 2008)	12.700***	24.892***	22.901***	31.981***

4.3. Remittance - Household Consumption Nexus: Baseline Estimation

In this section, we perform a baseline investigation by using Equation (1).

Table 6 reports the household consumption-remittance nexus estimation in Ordinary Least Square (OLS), Random effects (RE), and Fixed effects (FE)². It is observed from estimations, the anticipated nexus between Household consumption and remittance received dully confirmed in every scenario, that means the coefficient of RR is positive and statistically significant.

The results in column [1] to [3] represent a baseline estimation of lower-income countries. Estimated results suggest a positive linked between remittance flows and household consumption. The magnitude of remittance inflows lies between 0.042 to 0.66 in three different estimations. The study explained that household consumption in lower-income countries would appreciate by 0.42% to 0.66% in household consumption with an increase of 10% additional remittance flows. The baseline estimation for lower-middle-income countries reports in a column from [4] to [6]. The coefficient remittance flows are positive and statistically significant, which supports positive movement in household consumption due to a 10% acceleration in remittance inflows can increase the level of consumption by 0.34% to 0.78%. The result reports in column [7] to [9] represent baseline estimation for upper-middle-income countries. Study findings are similar to earlier two-baseline estimation. The coefficient magnitude lies from 0.060 to 0.085. It is suggesting that a 10% increase in remittance inflows in the economy will appreciate household consumption by 0.88% in fixed-effect estimation.

In brief, we can assume that a 10% improvement in Remittance flow can results in positive growth in household consumption by 0.66% in Lower-income countries, 0.78% in Lower middle-income countries, and 0.85% in Upper-middle income countries, respectively. Furthermore, the overall effects of remittance received towards household consumption found positively linked, estimation suggesting 0.88% enhancement in household consumption with a 10% increase in remittance inflows in the economy.

² The Hausman test shows that the fixed effect model is valid in every sample estimation.

Table 6. Household consumption-Remittance nexus: OLS, Fixed Effects, and Random Effects Estimates

Repressors	Lower income countries						Lower-middle-income countries						Upper – middle-income countries						Whole sample					
	OLS [1]	FE [2]	RE [3]	OLS [4]	FE [5]	RE [6]	OLS [7]	FE [8]	RE [9]	OLS [10]	FE [11]	RE [12]	OLS [13]	FE [14]	RE [15]	OLS [16]	FE [17]	RE [18]	OLS [19]	FE [20]	RE [21]			
RR	0.062 (0.000)	0.066 (0.000)	0.042 (0.000)	0.047 (0.000)	0.078 (0.000)	0.034 (0.001)	0.068 (0.000)	0.085 (0.004)	0.060 (0.074)	0.068 (0.000)	0.088 (0.000)	0.083 (0.000)	0.062 (0.000)	0.085 (0.004)	0.060 (0.074)	0.068 (0.000)	0.088 (0.000)	0.083 (0.000)	0.062 (0.000)	0.088 (0.000)	0.083 (0.000)	0.060 (0.074)		
FD	0.012 (0.305)	0.023 (0.063)	0.022 (0.411)	0.046 (0.022)	0.066 (0.000)	0.061 (0.012)	0.025 (0.693)	0.025 (0.000)	0.024 (0.000)	0.070 (0.000)	0.044 (0.004)	0.047 (0.002)	0.024 (0.000)	0.025 (0.000)	0.024 (0.000)	0.070 (0.000)	0.044 (0.004)	0.047 (0.002)	0.024 (0.000)	0.044 (0.004)	0.047 (0.002)	0.024 (0.000)		
TO	0.034 (0.040)	0.026 (0.112)	0.0342 (0.016)	0.031 (0.427)	0.037 (0.032)	0.073 (0.885)	0.061 (0.000)	0.183 (0.000)	0.152 (0.000)	0.019 (0.880)	0.09 (0.1274)	0.017 (0.181)	0.152 (0.000)	0.183 (0.000)	0.152 (0.000)	0.019 (0.880)	0.09 (0.1274)	0.017 (0.181)	0.152 (0.000)	0.09 (0.1274)	0.017 (0.181)	0.152 (0.000)		
FO	-0.010 (0.187)	-0.001 (0.894)	-0.013 (0.145)	-0.020 (0.014)	-0.021 (0.004)	-0.022 (0.013)	-0.016 (0.004)	-0.014 (0.000)	-0.015 (0.000)	-0.151 (0.000)	-0.16 (0.000)	-0.161 (0.000)	-0.014 (0.000)	-0.014 (0.000)	-0.015 (0.000)	-0.151 (0.000)	-0.16 (0.000)	-0.161 (0.000)	-0.014 (0.000)	-0.16 (0.000)	-0.161 (0.000)	-0.015 (0.000)		
C	4.230 (0.001)	4.185 (0.000)	4.230 (0.000)	4.675 (0.000)	4.588 (0.000)	4.587 (0.000)	5.240 (0.000)	5.351 (0.000)	5.250 (0.000)	4.725 (0.000)	4.822 (0.000)	4.809 (0.000)	5.250 (0.000)	5.351 (0.000)	5.250 (0.000)	4.725 (0.000)	4.822 (0.000)	4.809 (0.000)	5.250 (0.000)	4.822 (0.000)	4.809 (0.000)	5.250 (0.000)		
R ²	0.234	0.187		0.269	0.322		0.432	0.813		0.245	0.431		0.245	0.813		0.245	0.431		0.245	0.431		0.245		
Sample	20	20	20	46	46	46	39	39	39	105	105	105	39	39	39	105	105	105	105	105	105	105		

Note: REMIT for remittance receive par capital; FD for financial development; TO for trade openness; FO for financial openness; All variables are defined in Table -1, Coefficients probabilities in parenthesis ().

4.4. The Symmetric Panel ARDL Estimation

The PGM³ estimation assumes the existence of co-integration however this study performs a panel cointegration test (see, Table 4) as suggested by Bergheim (2008) for efficient estimation. The PGM estimation not only provides long-run coefficients for the model but also has the capacity to examine the existence of short-run association in the model. The error correction term specifies the existence of long-run relation; in that case, the coefficient of ECT should be negative and statistically significant. The coefficients of ECT explain the speed of adjustment towards long-run equilibrium having a shock in the short-run.

³ Pooled Group Mean.

In the long run: Table 7 (Panel A) exhibits the results of the long-run coefficient estimated under PGM dynamic panel data. It is observed that the coefficient of Remittance Received (RR) is positive and statistically significant at 1% level. study findings suggesting that household consumption of sample countries positively affected by additional money flow in the economy in the form of remittance. The effect of remittance flow, in the end, on household consumption increased 0.29% by Lower-Income Countries, 0.27% by Lower Middle-Income Countries, and 0.23% by upper-middle-income Countries, respectively due to an increase of 1% additional remittance flow in the economy. It is because excess money flows to households increase the level of purchasing power and propensity to consume. The ultimate effects may be observed in the economic development with an increase of domestic savings and spurt in capital formation.

For short-run: Table 7 (Panel B) reports the results of short-run estimation. The coefficients of error correction terms of each estimated model show negative in sign and statistically significant. This finding confirms the existence of long-run convergence from any short-run shock in the equation. The speed of adjustment towards equilibrium is more than 70% in every case of estimation.

Similar to the long run, short-run model estimation findings of remittance inflow impact on household consumption is positive and the magnitude of the coefficient is statistically significant as well. However, the magnitude of coefficients is higher in comparison with the long-run like household consumption of lower-income countries will be increased by 0.56%, Lower middle-income countries by 0.52%, and higher middle-income countries by 0.39% with the positive changes of remittance flow by 1% in future. Study findings explain people prefer current consumption rather than consume in the future by sacrificing the current level of consumption. It is because economic theory state that the utility level of current consumption is higher than the expected consumption level in the future due to the change of consumer preference.

Table 7. Estimation of Panel Error Correction Model with PGM Method

	LIC Coefficient [Prob]	LMIC Coefficient [Prob]	UMIC Coefficient [Prob]	Full sample Coefficient [Prob]
Panel A: Long-run Coefficients				
RR	0.296***	0.273***	0.225***	0.321***
FD	0.122 ***	0.165**	0.602***	0.185***
TO	0.378***	0.311***	0.110***	0.337**
FO	0.980***	0.070***	0.387***	-0.123***
Panel B: Short-run Coefficients				
ECT(-1)	-0.754***	-0.716***	-0.735[0.263]	-0.721***
Constant	7.012**	3.112***	6.344***	9.334***
Δ RR	0.561***	0.522***	0.391***	0.525***
Δ FD	-0.141***	-0.037***	0.002	0.048
Δ TO	0.042***	0.023***	0.052***	-0.086***
Δ FO	0.101***	-0.206***	-0.084	0.126
Hausman	0.342	0.435	0.554	0.627

4.5. The Asymmetric Panel ARDL Estimation

In this section, we investigate the relationship, whether symmetric or asymmetric, between remittance flow and household consumption by considering a nonlinear approach (see, Equation 5).

Table 8 exhibits the results of panel estimation under asymmetry assumption in the equation. It is observed that positive shock in remittance received [RR+] positively linked to household consumption both in the end and in the short-run. These findings suggest that an increase in remittance receive will have positive effects on future consumption however the magnitude of the coefficient is higher in the short-run than the long run. It is implying households prefer current consumption rather than holding consumption for future consumption.

Table 8. Panel Regression Results for Household Consumption-Remittance Receive

	LIC Coefficient [Prob]	LMIC Coefficient [Prob]	UMIC Coefficient [Prob]	Full sample Coefficient [Prob]
Panel A: Long-run Coefficients				
RR^+	0.155 ***	0.237***	0.272[***]	0.248***
RR^-	-0.048***	-0.077**	-0.041**	-0.045***
FD	0.003 ***	0.097***	0.003 ***	0.021**
TO	0.112**	0.056***	0.343***	0.213***
FO	0.041 ***	0.218***	0.008 ***	0.017***
Panel B: Short-run Coefficients				
ECT(-1)	-0.323[0.002]	-0.513[0.004]	-0.453***	-0.534***
ΔRR^+	0.216 [0.003]	0.161***	0.114 **	0.341***
ΔRR^-	0.030[0.121]	-0.124[0.280]	-0.095 ***	-0.012***
ΔFD	0.024 ***	-0.039 ***	-0.010***	-0.006***
ΔTO	0.014***	0.116***	0.031***	0.052***
ΔFO	-0.038 ***	0.036 ***	0.004***	0.004
Constant	0.205 [0.026]	-2.307 ***	0.099***	0.246 ***

4.6. System-GMM Dynamic Panel – Two-step Robust Estimate

In this section, we investigate asymmetry between remittance receive and household consumption applying System-GMM dynamic estimation proposed by Arellano and Bover (1995) and further development made by Blundell and Bond (1998). The estimation was executed considering previously developed asymmetric equation (see, equation -5). Wald statistics of both in the short-run and long-run can discover symmetry relation between remittances receive and household consumption, while the optimal number of lags is selected based on SIC information criterion. Table 9 exhibits the results, countries are classified based on income level and Short-run dynamics estimation reports in Panel A as well as Wald test statistics for the null hypothesis of short-run symmetry. Furthermore, the results illustrate the conventional AR(2) and

Sargan test statistics, which allow us to check out for the validity of the instruments used in the GMM regressions. It is worth noting that both tests are not rejected at the 1% significance level, suggesting that all GMM regressions use valid instruments. Panel B reports long-run coefficients along with Wald test statistics of confirming long-run symmetry. In terms of symmetry test both in the short-run and in the long run, the null hypothesis convincingly rejected at a 1% level of significance.

Table 9. Short- and Long-Run Symmetry Tests

	LIC Coeff.[P-value]	LMIC Coeff.[P-value]	UMIC Coeff.[P-value]	Full sample Coeff.[P-value]
Panel A: Short-run				
HC(-1)	0.724***	0.647***	0.835***	0.308[0.008]
ΔRR^+	0.103[0.015]	0.549[0.025]	0.409[0.009]	0.326***
ΔRR^-	-0.010[0.001]	-0.152[0.071]	-0.138[0.046]	-0.64[0.002]
ΔFD	0.023[0.012]	0.011[0.021]	0.089***	0.098[0.00]
ΔTO	0.097***	0.013 [0.008]	0.011[0.016]	0.098[0.002]
ΔFO	0.012***	0.017***	0.023 [0.008]	0.061[0.116]
ECT(-1)	0.452[0.001]	0.342[0.023]	0.293[0.004]	0.426[0.003]
(Wald) symmetry test	11.981***	23.192***	22.132***	16.189***
Panel B: Long-run				
RR^+	0.393[0.184]	0.105[0.009]	0.371[0.005]	0.668[0.071]
RR^-	-0.724[0.002]	-0.079[0.017]	-0.477[0.007]	0.037[0.002]
ΔFD	0.113***	0.092[0.005]	0.009***	0.231***
ΔTO	0.004[0.982]	0.023***	0.115***	0.093[0.001]
ΔFO	0.073***	0.098[0.007]	0.005***	0.072***
Symmetry test	23.112***	16.154***	12.983***	32.112***
AR(1) Prob > Z	0.000	0.004	0.000	0.000
AR(1) Prob > Z	0.675	0.876	0.667	0.678
Hansen Test Prob > Chi2	0.6456	0.867	0.776	0.456

Notes: AR(2) test is a test for the second-order serial correlation, and is asymptotically distributed as $N(0, 1)$ under the null of no serial correlation. Sargan test is a test for the validity of instruments and is asymptotically distributed as χ^2 under the null of valid instruments. As instruments, lagged values up to 4 lags of the independent variables have been used.

4.7. Granger Causality Test under Error Correction Term

Exploring the directional relationship between variables in this study performed panel Granger casualty test based on error correction term with the subdivision of sample based on the level of Income classified by the World Bank. Table 10 exhibits (Panel A for Lower-Income Countries, Panel B for Lower Middle-Income Countries, Panel C for Higher Middle-Income Counties, and Panel D for the Whole Sample) the results of Granger-causality test.

In the short run, the study unveiled a number of the causal relationships between variables either unidirectional or bi-directional in sub-group estimation based on

countries' income levels. However, it is observed a common unidirectional causality, in the case of every sub-group of the sample, from Remittance Received to Household consumption [RR→HC], the same directional causality also confirmed while using the sample as a whole. This finding suggests that remittance received by countries' populations has effects on their level of consumption. Receipts of foreign remittance act an additional source of income and therefore excess money increase their purchasing power of fulfilling the daily need and encourage saving for future consumptions, it is because past consumption habits induce future consumption level.

In the long run, the error correction term (ECM_{t-1}) is negative and statistically significant, especially when Household consumption treated as a dependent variable.

Table 10. Granger - Causality Test Results under ECM Environment

	Short-run Causality					Long-run Causality
	$\Delta \ln HC$	$\Delta \ln RR$	$\Delta \ln FD$	$\Delta \ln TO$	$\Delta \ln FO$	(ECM_{t-1})
Panel A: Lower-Income Countries						
$\Delta \ln HC$	-	5.839*	5.097*	1.002	3.222**	-0.910[0.002]
$\Delta \ln RR$	2.007	-	0.392	3.701	4.639*	-0.529[0.008]
$\Delta \ln FD$	1.322	5.422*	-	1.515	5.214*	0.905[0.005]
$\Delta \ln FD$	8.495*	2.477	2.658	-	4.510**	0.089[0.002]
$\Delta \ln FO$	1.864*	3.700	0.346	3.867	-	-0.594[0.018]
Panel B: Lower Middle Income Countries						
$\Delta \ln HC$		10.628*	1.667	11.405*	8.977*	-0.352[0.036]
$\Delta \ln RR$	1.853		21.506*	1.369	7.765*	-0.894[0.019]
$\Delta \ln FD$	8.277*	4.337		0.311	4.256*	-0.477[0.136]
$\Delta \ln FD$	6.392*	9.342*	4.735		6.064*	-0.328[0.138]
$\Delta \ln FO$	31.719	2.581**	1.604	3.875	-	-0.659[0.201]
Panel C: Higher Middle-Income Countries						
$\Delta \ln HC$	-	5.089*	1.995	8.280*	3.862**	-0.884[0.002]*
$\Delta \ln RR$	0.555	-	0.105	10.247*	9.816*	-0.635[0.015]*
$\Delta \ln FD$	4.965*	0.665	-	0.377	2.327	0.726[0.018]
$\Delta \ln FD$	0.285	0.971	0.252	-	0.955	0.338[0.003]
$\Delta \ln FO$	3.067	3.479**	2.543	5.331*	4.530	-0.234[0.027]*
Panel D: Full Sample						
	-	6.125*	4.955*	2.472	5.450*	-0.711[0.002]
$\Delta \ln HC$	0.059		0.142	2.431	1.796	0.973[0.017]
$\Delta \ln RR$	6.218*	0.0867		0.607	1.303	-0.129[0.014]
$\Delta \ln FD$	0.245	3.388**	1.694		1.142	-0.129[0.005]
$\Delta \ln FD$	4.475*	0.082	0.788	1.723		0.423[0.005]
$\Delta \ln FO$	1.790	0.828	1.680	2.615	1.227	0.018[0.608]

5. CONCLUSIONS

Remittance impact on either in micro or/and macro level, empirical studies provide evidence of explaining nexus between remittance flows and economic phenomenon, most prominently studies based on household survey data. However, with our best knowledge, no studies had yet been carried out of exploring the pattern of relationship between remittance flows and household consumption at the aggregate level. This study is an attempt to fill the existing research gap by providing empirical evidence by answer the question of “whether the relationship between Remittance and Household Consumption is symmetric or Asymmetric”. The study covers a pane of 104 countries for the spans 1993-2017. Study apply Panel ARDL proposed by Pesaran et al. (1999) to examine long-run relationship under symmetry assumption, study findings revealed that and asymmetry investigation performed by applying non-linear ARDL proposed by Shin et al. (2014) and transform into panel form with three set of panel data apportioning according to their income level class. Study findings suggest a positive association between remittance inflows and household consumption by confirming the asymmetric relationship between remittances receive and household consumption both in the long run and short-run.

However, we observed that the coefficient magnitude is higher in lower-income countries in compare with upper-middle and lower-middle-income countries both in short-run and long runs. Findings implying that income availability in lower-income countries immensely intensify their consumption level since lower-income countries economy has limited source for income generation. The study also observed deviation in remittance flows critically affect household consumption. Nonlinear estimation confirms positive shock in remittance flows positively linked to household consumption, it is implying that additional income assurance encourages the household to go additional expenditure in their life and similarly negative shock produces a negative impact on household consumption by limiting their current consumption level.

While addressing directional causality (see, Table 10) study perform the Panel Granger-causality test under the error correction environment (PECM). The study revealed a number of the long-run causal model in the estimation, in particular when Household consumption treated as a dependent variable in the equation. These findings suggest that the continuous flow of remittance in the economy can cause household consumption levels in the long run. Furthermore, the study also unveiled unidirectional casualties from remittance flow to household consumption in the short-run. The impact of remittance inflow on household consumption is obvious therefore, both macro and microeconomic policies should formulate in such a way for encouraging migrant workers to remit funds to the home country. It is because remittance inflows also assist in maintaining stable foreign currency reserved.

APPENDIX

Appendix A. List of Countries by Income Groups

Lower-Income Countries	Lower-Middle Income Countries		Upper-Middle Income Countries	
Benin	Angola	Kosovo	Albania	Jordan
Burkina Faso	Bangladesh	Kyrgyz Republic	Algeria	Kazakhstan
Comoros	Bhutan	Lao PDR	Armenia	Lebanon
Guinea	Bolivia	Lesotho	Azerbaijan	Libya
Guinea-Bissau	Cabo Verde	Mauritania	Belarus	Macedonia
Haiti	Cambodia	Micronesia	Belize	Malaysia
Madagascar	Cameroon	Moldova	Botswana	Mauritius
Malawi	Congo, Rep.	Mongolia	Brazil	Mexico
Mali	Cote d'Ivoire	Morocco	Bulgaria	Namibia
Mozambique	Djibouti	Myanmar	China	Paraguay
Nepal	Egypt, Arab Rep.	Nicaragua	Colombia	Peru
Niger	El Salvador	Nigeria	Costa Rica	Romania
Rwanda	Eswatini	Pakistan	Dominican Republic	Russian
Senegal	Georgia	Papua New Guinea	Ecuador	South Africa
Sierra Leone	Ghana	Philippines	Fiji	Suriname
Tajikistan	Honduras	Sao Tome and Principe	Gabon	Thailand
Tanzania	India	Solomon Islands	Guatemala	Tonga
Togo	Indonesia	Sri Lanka	Guyana	Turkey
Uganda	Kenya	Sudan	Iran, Islamic Rep.	Venezuela
Yemen, Rep.	Kiribati	Timor-Leste	Jamaica	
	Vanuatu	Tunisia		
	Vietnam	Ukraine		
	Zambia	Uzbekistan		

Appendix B. Descriptive statistics and Pair wise correlation

	Mean	Median	Max	Min	Std. Dev.	HFC	PR	FD	FO	TO
Lower Income Countries										
HC	4.356	4.379	4.921	2.528	0.257	1				
PR	0.872	1.042	3.897	-4.234	1.596	0.224	1			
FD	2.373	2.453	4.396	-0.890	0.722	-0.077	0.400	1		
FO	0.310	0.630	3.733	-8.922	1.539	-0.170	0.015	0.135	1	
TO	4.048	4.039	5.296	3.245	0.327	-0.073	0.207	0.276	0.369	1
Lower-Middle Income Countries										
HC	4.231	4.275	4.685	2.386	0.2586	1				
PR	1.050	1.354	3.556	-8.444	1.506	0.367	1			
FD	3.144	3.267	4.872	0.325	0.806	0.170	0.039	1		
FO	0.822	0.213	3.912	-5.418	1.205	0.105	0.102	0.108	1	
TO	4.261	4.361	5.299	-1.742	0.572	0.087	0.136	0.213	0.018	1
Higher-Middle Income Countries										
HC	4.133	4.169	4.770	3.027	0.255	1				
PR	0.151	0.368	6.901	-5.925	1.969	0.144	1			
FD	3.455	3.485	8.436	-7.102	1.019	-0.233	0.017	1		
FO	0.987	1.182	4.026	-5.883	1.167	0.078	0.111	0.056	1	
TO	4.297	4.330	5.539	2.749	0.462	-0.040	0.166	0.101	0.256	1

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