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Exploring the Macroeconomic Determinants of Remittances in Top Remittances' Receipient Nations.

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ABSTRACT

This study aims to understand the reasons behind remittances sent by emigrants working abroad. It focuses on the top ten recipient nations of remittances, incorporating data from the World Development Indicators (WDI) database covering 1991 to 2022. Various econometric tests were conducted to analyse the data, including descriptive statistics, correlation coefficients, and unit root tests such as (Breitung, 2000) and (Im et al., 2003) tests. Dynamic Ordinary Least Squares (DOLS) by Stock & Watson, (1993) Stock and Watson (1993) and Panel ARDL by Im et al. (2003) models were used to explore long-term effects and relationships between macroeconomic variables and remittances. The findings indicate that remittances are motivated by both altruism and self-interest, showing both pro-cyclical and counter-cyclical patterns. The study recommends that governments in these countries develop policies to encourage remittances through formal banking channels and registered money transfer services. It suggests implementing attractive incentives using modern technology and mobile apps and enforcing strict measures against informal and illegal money transfer operations like hawala and hundi.

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INTRODUCTION

Personal remittances, which are funds sent by migrant workers to families, friends, and charitable organisations in their home countries, represent a crucial financial lifeline for many developing economies. Despite the slower growth in 2023 (3.8%) compared to prior years, remittance flows to low- and middle-income countries (LMICs) are projected to remain significant, fueled by employment markets in developed economies and the Gulf Cooperation Council (GCC) countries (Bank, 2023). This influx is expected to reach USD 669 billion in 2023, with notable increases across various regions: East Asia and the Pacific (3%), South Asia (7.2%), Latin America and the Caribbean (8%), and Sub-Saharan Africa (1.9%). However, remittances to the Middle East and North Africa fell for the second consecutive year, primarily due to declines in flows to Egypt. Similarly, inflows to Europe and Central Asia decreased by 1.4% after a surge in 2022 (Knowmad, 2024).

Remittances have become a vital source of foreign funding for many LMICs, outpacing official development assistance and foreign direct investment in recent years. Given their counter cyclical nature and impact on public finances, leveraging remittances for development financing—such as through diaspora bonds—presents a promising avenue. Nonresident deposits and diaspora bonds can tap into the savings of migrant populations abroad, providing a more stable funding source than volatile short-term deposits. Additionally, collateralising remittance inflows may reduce borrowing costs for developing countries on the global market, enhancing sovereign credit ratings and debt repayment capacities (Unctad, 2024).

Despite these benefits, migrant workers face challenges in sending funds home due to high remittance fees, which averaged 6.2% for a $200 transaction in mid-2023. While mobile and money transfer providers offer more affordable options than traditional banks, regional variations persist. The persistence of these fees, coupled with inflationary pressures and slower global economic growth, make it increasingly difficult for migrants to remit funds, even as they remain committed to supporting their families. For developing nations heavily dependent on these funds, inclusive labour markets and social protection systems in host countries are essential to maintain remittance flows (Imf, 2023; Reuters, 2023).

In the top remittance-receiving countries, several macroeconomic determinants play a significant role in driving remittance inflows. Economic conditions in both the migrant host and origin countries are key factors. For instance, high unemployment or economic instability in the origin country often encourages migrants to remit more funds home, acting as a financial buffer for their families during difficult times. Studies have shown that economic downturns

in the migrant's home country typically lead to increased remittances as migrants support relatives facing financial hardship (Frankel, 2011; Sayan, 2006). Exchange rate fluctuations also impact remittance flows; a favourable exchange rate, which increases the value of remittances in the home country, can encourage migrants to send more funds. This trend has been observed particularly in countries with depreciating currencies, where remittances serve as a critical means of stabilising household income (Lueth & Ruiz-Arranz, 2008).

Financial development in the recipient country also influences remittance flows, as well-developed financial institutions can provide more reliable and affordable channels for sending money. Countries with a higher level of banking penetration and lower transaction costs for money transfers tend to attract more formal remittances, reducing the need for informal transfer channels. Studies by Aggarwal et al. (2011) indicate that a well-developed financial sector can enhance the volume of remittances by offering convenient and safe remittance options, which further contribute to the financial inclusion of recipient households. Additionally, recipient countries' political stability and governance quality are positively associated with remittances, as migrants may feel more confident sending funds to stable economies, ensuring their financial contributions are safe and used effectively (Chami et al., 2009).

The macroeconomic determinants of remittances include factors such as the stock of migrants, economic conditions in both destination and origin countries, interest rate differentials, exchange rates, inflation, financial development, and investment opportunities. On the microeconomic side, remittance flows are influenced by the migrant's income, family needs, personal motivations (such as altruism or self-interest), and household characteristics (Hagen-Zanker & Siegel, 2007). Broadly, motives for remitting range from altruistic support of family members to co-insurance against risks, loan repayment, and investment in home-country assets.

Numerous studies have investigated both microeconomics (Cox & Stark, 1994; Funkhouser, 1995) and macroeconomic (Banerji & Chandrawanshi, 2021; Jijin et al., 2022) determinants of remittances, applying a variety of methodologies across countries and regions with diverse results. Building on this literature, our study aims to analyse the macroeconomic drivers of remittances, specifically in the top remittance-receiving countries, where remittance inflows are integral to economic stability, fiscal balance, and debt management.

Given the substantial inflow of remittances to developing countries, understanding the motivations behind these transfers remains a complex issue. Remittances are influenced by multiple factors, ranging from altruism to self-interest, and they can exhibit both pro-cyclical (increasing with economic improvement in the home country) and counter-cyclical (increasing during economic down-

turns in the home country) patterns. However, the macroeconomic factors driving these motivations are not well-defined in the literature, particularly in the top remittance-receiving nations. Without a clear understanding of these drivers, policymakers struggle to create effective strategies to channel remittances through formal means, enhance financial inclusion, and reduce the prevalence of informal transfer methods like hawala and hundi. This study addresses this gap by examining the macroeconomic determinants of remittances in the top ten remittance-receiving countries, using a data set covering 1991 to 2022 to identify the primary motivations for sending remittances.

While prior research has explored the impact of remittances on economic growth, poverty alleviation, and household welfare, there is limited understanding of the specific macroeconomic factors that drive remittance inflows based on altruistic or self-interest motives. Additionally, most studies do not address the pro-cyclical or counter-cyclical nature of remittances in response to economic conditions in the recipient countries. The motivations behind remittance flows in top remittance-receiving nations, in particular, remain under-explored. Furthermore, existing studies often overlook using advanced econometric techniques, such as Dynamic Ordinary Least Squares (DOLS) and Panel ARDL models, to assess long-term relationships between remittances and macroeconomic indicators. This study aims to comprehensively understand the motivations behind remittance inflows and their responses to economic conditions by addressing these gaps.

This study's contributions are twofold. Theoretically, it expands on existing theories of remittance motivations, examining how altruistic and self-interested motivations and economic cycles shape remittance behaviour in a cross-country context. Practically, it provides evidence-based insights for policymakers and financial institutions to encourage formal remittance flows, reduce reliance on informal channels, enhance financial inclusion, and leverage remittances for economic growth and stability in recipient countries. These contributions make the study valuable for shaping future research and policies aimed at maximising the developmental impact of remittances.

The remaining study is organised so that Section 2 of the paper covers the theoretical and empirical review, while Section 3 covers the methodology, data sources, and econometric models, along with the pertinent robustness and diagnostic checks. Sections 4 and 5, respectively, address the policy implications and recommendations and the discussion's results.

LITERATURE REVIEW

Theoretical Review/ Framework

New Economics of Labour Migration (NELM theory

In their paper "Motivations to remit: Evidence from Botswana," Lucas and Stark (1985) presented groundbreaking concepts that laid the foundation for comprehending emigration and remittance behaviour. They proposed three key predictors of remittances: "tempered altruism or enlightened self-interest," "pure altruism," and "pure self-interest." Their analysis was centred on household-level data. Contractual agreements between migrant workers and their families were placed under the first heading and included things like co-insurance, trade incentives, and loan repayment. Their work still supports current conversations and advancements in this sector (Hagen-Zanker & Siegel, 2007). This means that, in addition to pure altruism, pure self-interest, and tempered altruism, sometimes known as enlightened self-interest, there are three main factors that can, on a micro level, persuade emigrants to send money back to their home households. As seen in Figure 1, these included, but are not limited to, co-insurance, loan repayment, and exchange for services rendered by the household to the migrant couple's wife and children. In addition to macroeconomic factors, macroeconomic factors that impact remittances include economic growth both domestically and abroad, inflation in both the source and destination countries, exchange rates, unemployment rates, interest rates, and oil prices, among other things, as illustrated in Figure 1.

Figure 1: Theoretical Framework

Empirical Review

The research studies conducted by El-Sakka and Mcnabb (1999), L Lueth and Ruiz-Arranz (2008), Sayan (2006), V Vargas-Silva and Huang (2006) and Adams (2009) support the idea that higher GDP per capita in the home country can encourage remittance flows due to self-interest motivations, as migrants are more inclined to send money back when the economic conditions are favourable, viewing remittances as investments or a means to support a stable family environment. This shows the pro-cyclical nature of remittances.

Likewise, literature also shows that financial development proxy by credit to the private sector by banks can also attract more remittances. Mundaca (2009), Orozco and Fedewa (2006) and Kapur (2004) are of the view that Credit to the private sector by banks positively impacts remittance inflows, as migrants may be motivated to support family members' entrepreneurial activities or investments, especially when credit access is available. This behaviour is

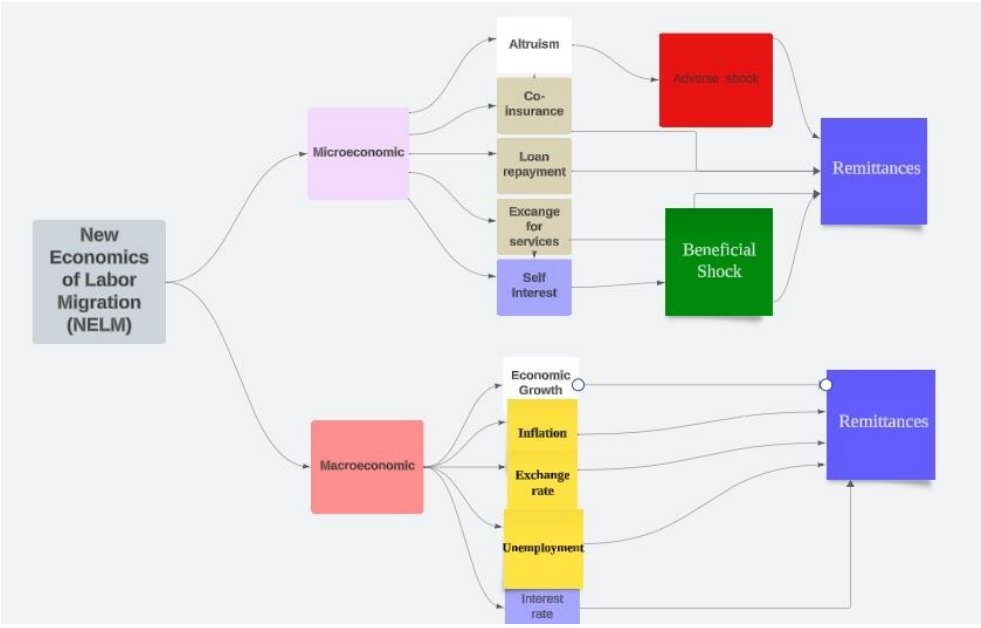

Figure 1: *Theoretical Framework. Source: Drawn by authors*

generally self-interest motivated as migrants aim to take advantage of improved economic opportunities or investment returns, often leading to pro-cyclical remittances as they align with economic growth and favourable conditions in the home country.

However, another notion is that remittances are counter-cyclical, often increasing when the home country experiences economic challenges, which suggests altruistic motives. Migrants remit more during periods of economic downturn to provide financial support to family members, showing a negative relationship between GDP per capita and remittances Amuedo-Dorantes and Pozo (2006), Frankel (2011), Yang (2008), Chami et al. (2009) and Bettin and Zazzaro (2012).

Similarly, there are some other research studies done by Bouhga-Hagbe (2006) and Fajnzylber and López (2008) which show that currency depreciation (an increase in the exchange rate where one unit of foreign currency buys more of the local currency) can lead to higher remittance inflows. When the home country's currency depreciates, the relative value of remittances sent by migrants increases, providing them with an incentive to send more money. This behaviour is generally altruistic (as migrants aim to support family members who may face inflationary pressures or decreased purchasing power in the

home country) and often reflects a counter-cyclical pattern, as remittances help stabilise household consumption during economic stress.

On the other hand, some of the studies conducted by G Giuliano and Ruiz-Arranz (2009), Aggarwal et al. (2011), Meyer and Shera (2017), Chowdhury (2011) and Faini (2007) demonstrate the mixed patterns and natures of remittances both altruistic as well as self-interest motive and counter-cyclical as well as pro-cyclical. These studies focus on remittances' role in financial development, including the effects of high lending rates. The studies conclude that high lending rates can increase remittance flows due to both altruistic motives (to help family members cope with higher borrowing costs) and self-interest motives (to use investment opportunities). It supports a counter-cyclical pattern in the case of financial support and a pro-cyclical for investment.

Jijin et al. (2022) conducted a research in case of India which is the top remittances recipient country. They are of the view that remittances and emigration have long been a compelling area of study for researchers worldwide. Over the past decade, remittance flows have emerged as a significant economic factor. In many developing nations, remittances surpass other forms of capital inflows and the total value of exports. Consequently, they are widely recognised as a possible means of funding for social betterment in developing nations. India has recently seen a substantial increase in remittance inflows, solidifying its top position among receiving nations worldwide. Remittances steadily contribute as a stable part of the Balance of Payments and are essential in reducing the Current Account Deficit. They aimed to investigate the key macroeconomic variables influencing remittance flows to India, particularly exploring the primary motives behind remitting money in India. Applying an ARDL model on quarterly data from Q2 1996 to Q4 2019, they analysed the macroeconomic determinants and identified significant like the value of currency, prices of oil, and home economic conditions that influence remittance flows. Their findings also highlight the vulnerability of migrants to volatile prices of oil in the countries where they work. Key conclusions from their study include: (1) Remittances in India do . not exhibit counter-cyclical behaviour, and (2) Remittances are predominantly motivated by weak investment motives rather than altruistic motives.

Similarly, B Banerji and Chandrawanshi (2021) also researched the factors influencing remittances to India from the United States and the Gulf Cooperation Council (GCC) nations. Their objective is to examine the effects of macroeconomic conditions, both domestically within India and in the host countries of Indian immigrants, on the country's personal transfers or remittances. They discovered that remittances to India seem to be impacted by the macroeconomic conditions in the United States, the Gulf Cooperation Council (GCC), and India.

The association between remittances received in India and macroeconomic indicators from the nations under consideration was analysed by means of a Vector Error Correction Model (VECM) in their study. The analysis uses annual data covering 1980–2016, GDP, US and GCC unemployment rates, and remittances sent home to India. The findings indicate a one-way causality where GDP growth in both the USA and GCC countries influences Indian emigrants' remittances. Additionally, in Indian and GCC countries, unemployment is observed to impact remittances received in India.

However, Simpson and Sparber (2020) estimated the factors affecting remittances originating from the United States of America by using CPS data collected through a literature survey. They were of the view that the United States is the primary source of global remittances. This study provides a ground-breaking attempt to examine the factors influencing remittances coming from the United States among over 3800 households with at least one worker born outside the country. Employing a gravity model, the research investigates the influence of various factors, including economic incentives, pull factors, and geographical distance. Significantly, the study finds that higher household earnings exert a significant push effect on international money transfers, with estimated earnings elasticity ranging between 0.20 and 0.30 on average. Moreover, remittance behaviour shows greater responsiveness to earnings in households where the proportion of adult women relative to men is higher.

Conversely, Tsaurai and Maseko (2020) analysed factors influencing remittances in transitional economies from 1997 to 2014 using fixed effects, random effects, and pooled OLS econometric models. They found that Foreign Direct Investment (FDI) and economic growth consistently reduced remittances across all methods. Financial development and savings positively impacted remittances in fixed and random effects models but negatively in pooled OLS. Inflation consistently had a significant positive effect on remittances in fixed and random effects models. The study highlighted FDI, economic growth, inflation, financial development, and savings as key determinants but found that human capital development and trade openness had no significant impact, contrary to expectations.

However, Khan et al. (2021) examined the determinants of remittances from unskilled Pakistani migrants in Saudi Arabia (KSA) and the United Arab Emirates (UAE), noting that remittances are Pakistan's second-largest source of foreign exchange. They found that rising migration costs and the economic slowdown in the Middle East have strained remittance flows. Using data from KNOMAD and ILO, the study identified experience and income as crucial factors influencing remittance behaviour. However, returns on education and experience are lower in KSA and UAE compared to Pakistan, and it takes 5-9 years for migrants to recover migration costs. The study highlights the high opportunity costs

of migration for skilled workers and suggests reevaluating labour migration policies.

Likewise, Mahmud (2020) delved into the causes of unskilled workers' motivation to remit money from Saudi Arabia and the United Arab Emirates. He opined that migrants send remittances for various reasons, as highlighted in studies influenced by the perspective of NELM theory, that attribute motivations to either self-interest or altruism. He critiques the NELM framework for its utilitarian view of migrants' altruism and its difficulty in distinguishing between altruistic and self-interested motives. The discussion also points out that many quantitative studies analyse how remittances are used in communities of origin, often in the absence of the migrants themselves, leading to indirect deductions about their motivations. This approach can result in such interpretations that lack consistency. In reviewing existing literature, he has identified alternative conceptualisations of migrants' agencies and the structures that shape their remittance behaviours. He also explores the emergent properties of both migrant agencies and these structural factors. Lastly, He proposes a heuristic typology inspired by Durkheim's approach to studying suicide, which aims to study migrants' remittances empirically. This typology is shown to be valuable through examples drawn from literature and reflections on the author's dissertation research.

Similarly, Barua and Rafiq (2020) studied the determinants of remittances from 12 host countries to Bangladesh and their impact on economic growth, using panel data from 2005 to 2017. They found that income differentials between host countries and Bangladesh did not significantly affect remittance flows, indicating that altruistic motives were not the main driver. However, financial sector development in Bangladesh positively influenced remittance inflows by improving access to financial services. Additionally, their data analysis from 1981 to 2017 showed a positive long-term relationship between remittances and GDP, highlighting the crucial role of remittances in Bangladesh's economic growth.

However, Javid and Hasanov (2023) investigated the reasons for remittance outflows from Saudi Arabia and their effects on the country's economic growth. They developed a theoretical model and used co-integration and equilibrium correction methods to analyse data from 1970 to 2021. The study found that Saudi Arabia's GDP and the employment of non-Saudi nationals positively impact remittance outflows in the long term. In contrast, the price level and expatriate levy negatively affect remittance outflows. These findings underscore the significant role of remittances in capital outflow and their potential to influence economic growth and fiscal policy in Saudi Arabia.

Besides, Ali and Murtaza (2023) examined the determinants of remittances from skilled and unskilled Pakistani emigrants, highlighting their critical role

in stabilising the balance of payments and external sectors in developing countries like Pakistan. The study explored macroeconomic factors influencing remittances and compared the contributions of skilled versus unskilled workers. The study uses Johansen's co-integration technique and investigates the long-term relationships among these variables to understand the current status and composition of remittance flows comprehensively. The findings indicate that while unskilled migration negatively affects remittances, skilled migration has a positive impact. The study identifies significant macroeconomic variables like income and wage differentials that determine the flow of remittances to Pakistan.

Thus, this study hypothesises that under

H_1 = GDP per capita has positive and significant impacts on remittances

H_2 = Exchange rate has direct and significant effects on remittances

H_3 = Lending rate has a positive and significant nexus with remittances

H_4 = Financial Development has a positive and significant influence on remittances

H_5 = Real Interest rate has inverse and significant effects on remittances

H_6 = Vulnerable employment has a positive and relationship with remittances

Gap in knowledge and research contribution

The analysis of existing literature on remittance determinants reveals a range of macro and micro-level factors influencing remittance flows. Key determinants include wage, income, interest, exchange rate, inflation, oil price, and unemployment differentials between the host and home nations. These factors significantly contribute to the emigration patterns and the volume of remittances sent to home countries. These research studies have been conducted in various regional and country-specific cases by employing different methodologies and econometric models. Diverse studies have produced varied results, and there is a lack of consensus regarding the determinants of remittances, instigating the need for further exploration. To our knowledge, exploring the main determinants in the top ten remittance recipient countries by applying modern econometric models has been overlooked. However, these countries are role models and good case studies for the rest of the World. Therefore, the research will rectify this gap by establishing the main determinants of remittances in the top ten receiving countries of remittances by applying modern and appropriate techniques of econometrics and their prior and post-estimation robustness and diagnostic tests.

METHODOLOGY

Econometric model, Data Source and variables description

The panel data spanning from 1991 to 2022 for these selected top ten remittance recipient countries and variables have been sourced from the WDI data bank. The top ten remittances recipient countries include India, Mexico, China, Philippines, Pakistan, Egypt, Bangladesh, Nigeria, Vietnam and Ukraine.

For delving the factors that affect remittances, following Equation 1 is estimated.

$Y_{it} = \alpha + \beta' X_{it} + u_{it}$ (1)

The logarithmic transformation of Equation 1 above is shown in Equation 2

$LREM_{it} = \alpha + \beta 1 LPC_{it} + \beta 2 LLR_{it} + \beta 3 LER_{it} + \beta 4 LDCPB_{it} + \beta 5 LVEMP_{it} + \beta 6 RINT_{it} + v_{it}$

(2)

Where LREM is a log of remittances to GDP ratio, LPC is a log of per capita GDP, LLR is a log of lending rate, LER is the exchange rate in log form, which is units of domestic currency to one USD, LDCPB is credit by banks to the private sector as percentage of total credit, LVEMP is log of vulnerable employment as a percentage of total employment, RINT is the interest in log, a is the constant term, B1 to B6 are the respective slopes of independent factors and v_{it} is the residuals. The choice of a sample of the top ten remittances' recipient countries, variables and time periods is based on purely theoretical foundations, availability of data and existing empirical literature.

In Equation 1 or 2, per capita income is expected to have positive and negative relationships with remittances to GDP ratio. If remittances are sent with the motive of altruism, the per capita coefficient will be negative. In this case, the remittances will be counter-cyclical El-Sakka and Mcnabb (1999), L Lueth and Ruiz-Arranz (2008), Sayan (2006), V Vargas-Silva and Huang (2006) and Adams (2009). However, if money is remitted with a self-interest motive, the per capita income will have been positively related to remittances. In this situation, the remittances are pro-cyclical Amuedo-Dorantes and Pozo (2006), Frankel (2011), Yang (2008), Chami et al. (2009) and Bettin and Zazzaro (2012). The lending rate is predicted to have a direct nexus. A greater lending rate would compel the families of overseas workers to ask them to send more money as it indicates the cost of borrowing from domestic banks G Giuliano and Ruiz-Arranz (2009). Similarly, the exchange rate is also expected to have a positive nexus with remittances as the depreciation of the exchange rate will make domestic assets cheaper for the emigrants. Consequently, they are likely to buy more domestic assets in their home country rather than keep money in their destination or host country. Besides, due to depreciation, there may be an increase in inflation

and a decrease in the purchasing power of the leftover family, which may prompt the migrants to send more money to their families Bouhga-Hagbe (2006) and Fajnzylber and López (2008). The credit by banks to the private sector is also expected to have a positive nexus with remittances as it shows the financial development level in the home country. Higher financial development will lead to competition among banks and subsequent reduction in the cost of sending and receiving remittances Mundaca (2009), Orozco and Fedewa (2006) and Kapur (2004). The vulnerable employment in the country of origin is also expected to positively affect remittances as an increase in it will compel more workers to find employment abroad. Subsequently, the remittances will be augmented. In addition, the increase in vulnerable employment will increase altruistic remittances. The real interest rate is expected to be negatively coupled with remittances, as a higher real interest rate is an indication of higher inflationary pressure and bad economic situations in the country of origin. It may decrease the self-interest type of remittances.

Equation 1 or Equation 2 are estimated by applying panel dynamic Ordinary Least Square (PDOLS) by Stock and Watson (1993) model due to unit root properties and potential econometric and statistical issues like heteroscedasticity, and endogeneity in panel data model estimation. However, before regression estimation, the data is checked through descriptive statistics, coefficient of correlation, and unit root properties by using (Breitung, 2000) and (Im et al., 2003) unit root tests

RESULTS

Summary Statistics

ndicates that the average and median of all the factors are near to each other except the real interest rate. It means that most of the series there are free from outliers. Similarly, the standard deviation values are also not too much higher for all series except the real interest rate, suggesting that the actual values of all the series are not too dispersed or deviated from their mean values. The values of skewness statistic show that remittances to GDP ratio, credit by banks to the domestic private sector, vulnerable employment and real interest rate are slightly negatively skewed while per capita income, lending rate and exchange rate are slightly right-skewed. The kurtosis value shows that remittances to GDP ratio, rate of lending, currency rate, loans by banks to home private sector and real interest rate are leptokurtic while the per capita income and vulnerable employment are slightly platykurtic. Three hundred twenty observations of every series demonstrate that the data is a strongly balanced panel.

Coefficient of correlation

The coefficient of correlation between the variables is presented in Table 2. It demonstrates that per capita income, credit by banks to the domestic private sector, vulnerable employment and real interest are negatively and mildly correlated with remittances. However, the lending rate and exchange rate are positively and mildly correlated with remittances.

Table 1: Descriptive Statistics

Table 1.

	LREMG	LPC	LLR	LER	LDCPB	LVEMP	RINT
Mean	0.958397	7.329142	2.510409	3.818799	3.377613	3.814802	2.772054
Median	1.264623	7.269332	2.515114	3.68608	3.322846	4.018959	4.00841
Maximum	2.67988	9.450948	5.522594	10.05497	5.222319	4.437251	37.92865
Minimum	-4.307636	4.946139	1.235229	-3.093897	0.324935	2.123213	-91.72148
Std. Dev.	1.32984	0.991393	0.569137	2.312529	0.841409	0.56865	11.24869
Skewness	-1.61174	0.184972	1.174259	1.334165	-0.356627	-0.987593	-5.054061
Kurtosis	5.162509	2.415127	7.502818	4.851507	4.028702	3.211367	39.47069
Observations	320	320	320	320	320	320	320

Source: authors calculations by using data from WDI, World Bank

Table 2.

2: Coefficient of correlation

	LREMG	LPC	LLR	LER	LDCPB	LVEMP	REALINT
LREMG	1	-0.0481	0.0536	0.3185	-0.1386	-0.0395	-0.0266
LPC	-0.0481	1	-0.3804	-0.2442	0.2108	-0.3975	-0.0362
LLR	0.0536	-0.3804	1	0.0155	-0.4568	-0.2638	-0.2871
LER	0.3185	-0.2442	0.0155	1	0.1316	0.5939	0.1537
LDCPB	-0.1386	0.2108	-0.4568	0.1316	1	0.1855	0.2779
LVEMP	-0.0395	-0.3975	-0.2638	0.5939	0.1855	1	0.2387
REALINT	-0.0266	-0.0362	-0.2871	0.1537	0.2779	0.2387	1

Source: Calculations done by authors using data from the WDI World Bank

Tests for Stationary

The findings of stationary tests by (Breitung, 2000) and (Im et al., 2003) are presented in Table 3. The results exhibit that currency rate and interest rate have no unit root and they are I(0). However, the remittances, per capita GDP, lending rate and vulnerable employment are stationary at first difference I(1).

Results of Panel Dynamic OLS

Since the series have a mixed order of integration, the random effect, fixed effect or pooled OLS, which are static in nature, cannot be applied. Thus, only the panel dynamic model can be applied for data analysis. In dynamic models, researchers have some options like Generalized Method of Moments (GMM), Panel Auto Regressive Distributed Lag Model, Dynamic OLS (DOLS) or Fully modified OLS (FMOLS), etc. This manuscript selected the dynamic OLS model by Watson and Stock and Watson (1993) because the number of cross sections N is less than the time period T, and dynamic OLS is a parametric estimation method that is more suitable for balanced data. It controls econometric and statistical issues like autocorrelation, serial correlation, heteroscedasticity, and endogeneity problems by using lags and leads. The data is also analysed by applying the panel ARDL model to ensure the robustness of the findings of DOLS. The results of the pooled mean group (PMG) are almost similar to those of the results obtained through DOLS. It shows the validity, reliability and robustness of the findings.

The DOLS findings in Table 4 depict that per capita income is positively and significantly related to the remittances to GDP ratio. More specifically, if per capita income increases by one percent, remittances will increase by 0.16 percent, ceteris paribus.

Table 3: Results of Unit root tests

***,** & * indicate 10%, 5% and 1% significance respectively.

Calculations by authors using data from WDI, World Bank.

A positive sign of per capita income shows that remittances in these countries are sent with self-interest motives for investment purposes, and they are pro-cyclical. This finding is aligned with theoretical expectations and matches with the findings of El-Sakka and Mcnabb (1999), L Lueth and Ruiz-Arranz (2008), Sayan (2006), V Vargas-Silva and Huang (2006) and Adams (2009) but is in contrast with the findings of Amuedo-Dorantes and Pozo (2006), Frankel (2011), Yang (2008), Chami et al. (2009) and Bettin and Zazzaro (2012).

Table 3.

Vari-able	Breitung t- state level	1st difference	level	Im, Pesran&Shin w-stat 1st difference	conclu-sion
REMG	0.56315	-9.20239*	-1.26399	-8.7728*	I(1)
LPC	-0.7197	-7.03385*	-0.3244	-5.7852*	I(1)
LLR	-0.9869	-4.3304*	-1.7458	-8.0614*	I(1)
LER	-1.8547*		-2.68155*		I(0)
LDCPB	-0.1445	-4.9088*	1.2654	-5.1206*	I(1)
LVEMP	2.7269	-1.4733*	2.0841	-5.5085*	I(1)
LINT	-3.2437*		-4.3697*		I(0)

Moreover, remittances are also positively and significantly affected by lending rates. The higher lending rate in the country of origin induces the emigrants to send more money to their families as borrowing domestically becomes expensive. If lending rate increase by one percent, the remittances increases by 0.46 percentage, all else same. It's aligned with theoretical expectation and endorse the findings of G Giuliano and Ruiz-Arranz (2009), Aggarwal et al. (2011), Meyer and Shera (2017), Chowdhury (2011) and Faini (2007).

Likewise, the exchange rate also positively and significantly impacts the remittances to GDP ratio. This means that when the domestic currency of emigrants depreciates, the emigrants send more money to buy cheaper assets domestically. If the exchange rate depreciates by one percent, the remittances to GDP ratio increases by 0.77 percent, all else being the same. These findings are aligned with the theoretical expectation of altruism and are similar to the findings of Bouhga-Hagbe (2006) and Fajnzylber and López (2008).

In the same vein, the financial development proxy by credit by banks to the private sector is also positively and significantly related to the remittances to GDP ratio. All else the same, if financial development augments by one percent, the remittances rise by 0.22 percentage. These findings are also in accordance with theoretical expectations and approve the findings of Mundaca (2009), Orozco and Fedewa (2006) and Kapur (2004).

In addition, the vulnerable employment in the country of origin of emigrants has a positive and significant nexus with the remittances to GDP ratio. This means that remittances to the home country are not sent with a self-interest motive but also with the motive of altruism and have a counter-cyclical nature. If vulnerable employment increases at the home country by one percent, the remittances

augment by 1.09 percent ceteris paribus. This finding also aligns with theoretical expectations and shows the altruistic motive behind sending the remittances. Remittances in such a scenario are considered counter-cyclical.

However, the real interest rate negatively and significantly affects the remittances to GDP ratio. This implies that the higher rate of emigrants in the home countries shows bad economic conditions as it is being increased to curb the growing hyperinflation in the home country. More specifically, if the real interest rate increases by one per cent, the remittances fall by 0.04 percent, and other things remain unchanged. The significant value of the F-statistic suggests that all the variables also have a significant joint impact on the remittances.

Table 4: Results of DOLS Regression

Table 4.

Variable	Coefficient	P-value
LPC	0.165081**	0.0483
LLR	0.466679*	0.0042
LER	0.77142	0
LDCPB	0.221545***	0.061
LVEMP	1.094985**	0.0175
RINT	-0.042389*	0
F-statistics	13.522*	0
Chi-Sq	81.132*	0

***,** & * indicate 10%, 5% and 1% significance respectively.

Calculations by authors using data from WDI World Bank

Robustness checks

The data is also analysed by applying Auto Regressive Distributive Lag (ARDL) pooled mean group by Pesaran et al., (1999) to check the robustness of the results of (the DOLS) model; the ARDL results and co-integration results are almost similar to that of (the DOLS) model indicating and confirming the robustness, reliability and validity of the findings of DOLS. The findings of ARDL presented in table Table 5

Table 5: ARDL Long Run and Short Run Results

Table 5.

	Long Run			Short Run	
Variable	Coefficient	Probability	Variable	Coefficient	Probability
LPC	-0.133101**	0.038	D(LPC)	-0.742078**	0.0149
LLR	-0.412254*	0	D(LLR)	0.666667**	0.02
LER	0.797607*	0	D(LER)	-0.577378**	0.0285
LDCPB	0.155269*	0.0129	D(LDCPB)	-0.039184	0.8476
LVEMP	1.49099*	0	D(LVEMP)	-0.475089	0.5443
RINT	-0.012276***	0.0703	D(RINT)	-0.000219	0.9695
ECT	-0.364736*	0.0001	C	-1.999786*	0
F-statistics	67.79658*	0			
Chi-Sq	338.9829*	0			

***,** & * indicate 10%, 5% and 1% significance respectively.

Calculations by authors using data from WDI, World Bank

IMPLICATIONS AND CONCLUSION

The fundamental aim of the manuscript was to uncover the motivations behind the remittances sent by emigrants working abroad. For this purpose, the top ten remittances recipient countries were selected. The data for these cross-sectional units for a time span of the last thirty-two years has been approached from the WDI database. After obtaining the data from WDI, the data has been analysed by applying various econometric tests before and after estimating the model. On the basis of diagnosing the data properties and nature through descriptive statistics, coefficient of correlation and unit root tests by (Breitung, 2000) and (Im et al., 2003) tests, the most suitable model of Dynamic Ordinary least square (DOLS) has been applied to delve into the long run impacts and relationships of different macroeconomic variables on remittances. The results demonstrate that the remittances are sent to the home country with mixed motives, such as self-interest and altruism purpose. Thus, the remittances are both pro-cyclical as well as counter-cyclical.

On the basis of the outcomes of the research, it is strongly recommended that the governments in these countries should architect such policies that attract more money sent by legal means of banking and registered remittance transferring agents. In this regard, policies equipped with attractive incentives that incorporate the use of artificial intelligence, modern technologies, and mobile apps should be designed and applied but implemented in the true spirit. Besides, strict actions should be taken against the culprits involved in the unlawful business of hundi/hawala of transferring money from host to home countries. Besides, the interest rate should be kept under limits by controlling the inflationary pressures and focusing on the enhancement of financial development and finance. Moreover, the governments should establish more branches of their national banks in destination and remittance-sourced countries in order to minimise the cost of sending remittances. Actually, these remittances are interest and hassle-free capital in the form of foreign currency that the governments can utilise in importing modern technologies, minimising their external debt burdens, paying external debt servicing, building foreign reserves, stabilising their domestic currencies, and thereby stimulating their economic growth and development. Coordination among the Department of labour, human resources and external matters is crucial and imperative to find suitable jobs for domestic workers abroad in the conducive work environments. Besides, the new high-return investment projects in real estate, diaspora bonds and nonresident accounts should be initiated to attract more remittances from abroad.

This type of research should be conducted in other regional and national contexts, especially by collecting primary quantitative as well as qualitative data to delve into the main potential factors of remittances.

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