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Workers' Remittances and Socio-Economic Well-Being in Top Ten Remittances Receiving Developing Countries: The Role of Financial Development

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Abstract

The present study contributes empirical evidence to the impact of remittances on the socio-economic well-being of recipient nations, particularly through the enhancement of their Human Development Index (HDI) rankings. Utilizing a panel dataset comprising the top ten remittance-receiving countries over the period from 1990 to 2020, the research endeavors to offer a comprehensive analysis of the relationship between remittance inflows and HDI metrics. This investigation delves into the nuanced dimensions of HDI, namely health, education, and income per capita, to discern the specific effects of remittances on each component. The study employs the generalized method of moments (GMM) technique to mitigate potential endogeneity concerns inherent in the relationship between remittances and financial development. The findings of this empirical inquiry suggest that remittances wield a discernible influence on augmenting human well-being, particularly by fostering improvements in health and education outcomes. Additionally, the study identifies a constructive role for financial development in bolstering HDI indicators. In light of these findings, it is recommended that policymakers formulate tailored strategies aimed at facilitating remittance flows, thereby affording migrants enhanced access to robust financial systems.

Keywords: Remittances, Human Development Index (HDI), Financial Development

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1 Introduction

Workers' remittances comprise funds sent by migrants working abroad to individuals and households in their countries of origin. Both international migration and the value of transfers to origin countries have expanded substantially over recent decades. Since 2000, the number of international migrants has increased markedly, with an estimated 272 million people living outside their countries of origin in 2019. Global remittances were reported at $714 billion in that year, representing slightly less than 1% of global output. In many developing economies, remittance receipts have also become an important source of external finance alongside foreign direct investment (Ratha & Moghaddam, 2020). Therefore, understanding their contribution to economic and social development remains a relevant policy and research concern.

Remittance flows to developing economies amounted to approximately $553 billion in 2020, compared with substantially smaller official development assistance flows reported for that period. In some recipient economies, these transfers account for a considerable share of national income. For example, India received approximately $83.1 billion in remittances in 2020, according to the World Development Indicators data used in this study. International remittances can support foreign exchange availability, household consumption, savings, investment, and access to basic services. However, their contribution to poverty reduction and economic development is likely to depend on the circumstances of recipient households and the institutional environment in which transfers are received and used (Acosta et al., 2007; Ratha & Moghaddam, 2020).

The Human Development Index (HDI) is a widely used composite indicator of national human development. Since 1990, the United Nations Development Programme (UNDP) has published human development assessments that draw attention to the importance of health, education, and material living standards. Accordingly, the HDI offers a broader perspective than income-based measures alone. In the context of workers' remittances, examining individual dimensions alongside the aggregate index is particularly useful because improvements in household resources may be reflected differently in education, health, and income-related outcomes. Previous research has likewise examined financial and socioeconomic determinants of human development in developing economies (Asongu, 2011; Khan et al., 2019).

Historically, remittances in many developing countries were often treated primarily as household consumption resources rather than as an input into wider development processes (Hugo, 2003). However, the sustained expansion of remittance inflows has increased their importance for countries such as India, Pakistan, Bangladesh, the Philippines, Vietnam, and Nepal. These inflows may supplement domestic resources and, in certain circumstances, exceed other forms of external capital inflow. Their developmental significance should therefore be assessed not only by the amount received but also by the ways in which recipient households and domestic financial institutions use these resources (Giuliano & Ruiz-Arranz, 2009; Kumar et al., 2018).

Existing evidence associates remittance receipts with reductions in household poverty and improvements in human capital outcomes (Acosta et al., 2007). Similarly, international migration and transfers may affect household expenditure decisions, including the resources allocated to health and education (Durand et al., 1996; Khan & Khan, 2016). Nevertheless, the effects are not necessarily uniform across countries or households: labour-supply responses and the allocation of remittances may differ with economic conditions and access to services (Rodriguez & Tiongson, 2001). These distinctions provide an important rationale for examining development outcomes separately rather than assuming that a rise in remittances produces equivalent improvements across all HDI dimensions.

Remittances may contribute to human well-being by relaxing household budget constraints and enabling expenditure on food, education, housing, and healthcare. In addition, greater income stability may help recipient families manage unexpected expenses and sustain investment in children's education and health. Such resources may also be directed towards housing improvements, debt repayment, and small-scale business activities. However, the magnitude of these benefits depends on household priorities and access to affordable essential services. Evidence

from remittance-receiving families indicates that transfers support a range of consumption and welfare-related purposes, including housing, education, and healthcare (Abdullah et al., 2021).

For migrant-sending households, remittances can represent a significant and relatively dependable income source. However, their contribution to long-term development depends partly on whether transfers are consumed, saved, or invested (Kumar et al., 2018). Moreover, access to formal financial services, transfer costs, and the regulatory environment may shape the channels through which remittances are received (Kock & Sun, 2011). Earlier research also documents potentially adverse macroeconomic or labour-supply effects, suggesting that transfers should not automatically be equated with higher growth (Chami et al., 2005). In contrast, financial institutions may facilitate the productive use of remittances through saving and credit services. The literature has consequently considered whether remittances and financial development act as substitutes or complements in supporting development (Bettin & Zazzaro, 2012; Giuliano & Ruiz-Arranz, 2009). These competing explanations motivate the present study's consideration of financial development alongside remittance inflows.

Table 1: Top Ten Remittance-Receiving Developing Countries (WDI, 2020)

Sr No	Country	Remittances Inflow	HDI Ranking	Sr No	Country	Remittances Inflow	HDI Ranking
1	India	83.1	131	6	Pakistan	26.1	161
2	China	59.5	82	7	Bangladesh	21.7	128
3	Mexico	42.8	88	8	Nigeria	17.2	163
4	Philippines	34.9	113	9	Vietnam	17.0	113
5	Egypt	29.6	97	10	Nepal	8.2	144

Source: Remittances are measured in billions of US$.

Table 1 identifies the ten developing economies selected according to the volume of workers' remittances received in 2020 and presents their corresponding HDI rankings. Although these countries receive substantial remittance inflows, several occupy relatively low positions in the HDI distribution. India, for example, is the largest recipient in the table, with reported inflows of $83.1 billion, while its listed HDI ranking is 131. However, the coexistence of high remittance receipts and relatively modest human development rankings does not, by itself, demonstrate the absence or presence of a relationship between the two variables. Therefore, this study uses panel data to examine whether remittance inflows are associated with changes in aggregate human development and its constituent dimensions.

The principal objective of this study is to examine the relationship between workers' remittances and the socioeconomic well-being of developing economies that receive substantial remittance inflows, and to derive relevant policy implications. In addition, the analysis considers financial development, measured using banking-sector credit and broad money, as an explanatory factor associated with development outcomes. The specific objectives are as follows:

- To examine the effect of workers' remittances on the Human Development Index in the ten selected developing remittance-receiving countries.
- To examine the effect of workers' remittances on health outcomes in the ten selected developing remittance-receiving countries.
- To examine the effect of workers' remittances on educational outcomes in the ten selected developing remittance-receiving countries.
- To examine the influence of workers' remittances and the role of financial development in economic well-being.

The study assesses the relationship between workers' remittances and aggregate HDI, as well as the three dimensions of health, education, and per capita income. It uses panel data for the ten selected remittance-receiving developing countries over 1990–2020. Four outcome models are specified to reflect the stated objectives, with alternative financial development measures included in each group of specifications. The data are obtained from the United Nations Development Programme and the World Development Indicators. Accordingly, the study maintains a comparative macroeconomic

focus while distinguishing the different channels through which remittances may relate to human well-being.

2 Literature Review

2.1 Remittances, Household Welfare, and Human Development

The literature on remittances and human development addresses several interrelated questions: whether transfers improve household welfare, how financial institutions shape the use of migrant income, and which macroeconomic circumstances influence development outcomes. Some studies emphasise gains in health, education, and income, whereas others identify uneven effects arising from inflation, labour-market incentives, or institutional constraints. Consequently, the present review considers evidence on household welfare, financial development, human capital, and the wider macroeconomic environment. It also identifies the empirical justification for examining aggregate HDI together with its health, education, and income dimensions (Acosta et al., 2007; Asongu, 2011; Bettin & Zazzaro, 2012).

Bracking and Sachikonye (2010) examined the effects of migrant remittances on household welfare in urban Zimbabwe. Their analysis suggests that recipient households may experience welfare gains, although inflation and other local conditions can limit the purchasing-power benefits of additional income. By comparing remittance-receiving and non-receiving households, the study emphasised the importance of distributional and contextual differences. Similarly, Chowdhury (2011) investigated remittance inflows and financial development in Bangladesh using annual data from 1971 to 2008. The study linked remittances to the development and expansion of the financial system. Therefore, these contributions point to two connected mechanisms: remittances may directly support household consumption and welfare, while financial intermediation may influence how such resources are mobilised within the wider economy.

Asongu (2011) investigated financial and macroeconomic determinants of human development across 38 developing countries using data from 1996 to 2008. The analysis considered human development alongside variables such as inflation, governance-related indicators, trade, and income per capita, and employed ordinary least squares and two-stage least squares specifications. The findings emphasised the relevance of financial activity and distributional conditions for human development. However, effects differed across the included explanatory variables. This contribution is important for the present analysis because it supports the inclusion of financial development and macroeconomic controls when examining the relationship between remittances and aggregate HDI.

2.2 Financial Development and Macroeconomic Conditions

Bettin and Zazzaro (2012) investigated whether remittances and financial development are substitutes or complements in explaining economic growth. Using a measure of financial development that emphasised banking-sector effectiveness, they highlighted the importance of the institutional environment for the growth consequences of migrant transfers. Their analysis suggests that the benefits associated with remittances may depend on financial-sector conditions. Accordingly, examining financial development alongside remittance receipts provides a basis for assessing whether the reported development associations remain evident when banking-sector indicators are considered.

Kumar (2012) examined the effects of remittance inflows, information and communication technology, and financial growth on Sub-Saharan African nations. The results showed that ICT had a negative impact on remittances while financial development had a favorable impact; however, there was no correlation between remittances and FDI. In Bangladesh and Vietnam, Barai (2012) looked at how remittances improved socioeconomic metrics like housing, healthcare, and education. The findings indicated that remittances were essential for both nations and had a favorable impact on their BOP, GDP, foreign debt, and FDI.

Using panel data from 1980 to 2009, Nyamongo, Misati, Kipyegon, and Ndirangu (2012) investigated the impact of remittances and banking sector expansion on the economic growth of 36 African nations. They found that, for several African countries, remittances were a major source of revenue and a key driver of growth. Remittance volatility, on the other hand, had a negative impact on

economic growth, and the development of the financial sector appeared to have less impact on boosting the economies of several African nations.

Connolly et al. (2014) conducted a study to identify the factors affecting highly developed human development in various countries. The study included information from HDI, the World Bank, and the Population Reference Bureau for 174 countries. Human Development Index was employed as the dependent variable, whereas life expectancy, literacy rate, GDP per capita, projected years of schooling, and inflation rate were used as the explanatory variables. Probit regression was employed in the data analysis. According to the regression analysis, life expectancy, GDP per capita, and predicted years of schooling had a positive and significant impact on HDI.

Using time-series data from 1981 to 2013, Masuduzzaman (2014) examined the impact of remittances on economic growth and the development of the banking sector in Bangladesh. The findings indicated that remittances contributed to the GDP and benefited the financial development.

Sede and Ohemeng (2015) conducted research on the variables affecting life expectancy in Nigeria. Using information from 1980 to 2011, the study used life expectancy at birth (LEAB) as the dependent variable, and the independent factors were unemployment, secondary school enrollment, health expenditures, GDP per capita, and exchange rate. Utilizing a unit root test to analyze the data, the study found that LEAB was not significantly impacted by health spending, per capita GDP, or school enrollment. However, unemployment and the exchange rate had important effects on LEAB, showing that effective policies aiming at increasing employment rates and redistribution of wealth could improve social well-being in Nigeria.

Sangaji (2016) concentrated on factors influencing the human development index in eight Buddhist-majority nations. He demonstrated that the human development index was significantly influenced by four explanatory variables. All eight countries' HDIs were favorably impacted by GDP per capita, birth length, and life expectancy, while negatively impacted by inflation and fertility rates. Another study by Khan and Khan (2016) looked at how Pakistani children between the ages of 4 and 15 were educated and enrolled in school. They discovered that households receiving remittances were more likely to enroll their children in school, particularly females in rural areas, and that the impact was stronger in rural areas than in urban areas using data from nationally representative surveys conducted in 2010 and 2011. The gender gap shrank, and the literacy rate increased as a result of remittances.

Hassan et al. (2017) used time-series data from 2006 to 2010 to examine the associations between life expectancy and 108 developing nations' GDP, sanitation facilities, water coverage, health spending, and education. However, no immediate cause-and-effect relationship between life expectancy and these characteristics was found. In the long run, there was a bidirectional causal relationship between income and life expectancy. According to Caglayan et al. (2017), there was a negative correlation between HDI, life expectancy at birth, and rural population, while there were positive and significant short-term relationships between health expenditure, life expectancy at birth, GDP per capita, internet users, expected years of schooling, and HDI. GDP per capita and Internet usage were statistically significant.

In three locations in Pakistan, Ariadi et al. (2019) investigated how the foreign remittances of male migrants affected their parents' social lives. The study indicated that remittances had a favorable and significant impact on the healthcare status of parents left behind, allowing them to maintain their expenditure on basic needs and access to high-quality healthcare facilities, using snowball sampling procedures in urban and rural locations.

According to Arisman (2018), human development in ASEAN countries was favorably impacted by income per capita and negatively impacted by population. While employment and inflation rates have little bearing on HDI, inflation reduced people's purchasing power. Another argument built by Shafiq and Gillani (2018) showed that an increase in remittances from developed economies to developing economies has a gradual positive impact on investment and spending, which enables households to access better healthcare. Girum et al. (2018) used data from 83 nations to analyze the factors that affect life expectancy in low- and middle-income countries. According to the study, there was a significant and favorable correlation between independent variables linked to healthcare,

socioeconomics, and morbidity. The research recommended strengthening socioeconomic conditions and the health system.

Kausar et al. (2019) demonstrated that corruption had a significant and negative influence on both human development and remittances, while political openness, migration, population growth, and commerce had positive effects on the HDI. Khan, Ju, and Hassan (2019) studied the relationship between information and communication technology (ICT), economic development, and human development in Pakistan. Using time-series data from 1990 to 2014. Human development was the dependent variable, and the independent factors included GDP per capita, ICT, trade, urbanization, and foreign direct investment. The study found that economic growth and ICT had positive effects on human development.

Jafrin et al. (2021) examined the determinants of life expectancy for a few SAARC economies, including Bangladesh, India, Pakistan, Nepal, and Sri Lanka. They used pooled OLS and random-effects models to analyze secondary data from 2000 to 2016 and found that sanitation services and mean years of schooling have a significant positive impact on life expectancy at birth. Spending on healthcare and birth weight had a substantial unfavorable relationship. On the other hand, GDP, Internet use, mobile phone use, and gross capital creation only somewhat predicted life expectancy.

Abdullah, Habib, and Gillani (2021) investigated how remittances affected the quality of life for families that received money from migrant workers. The study used a cross-sectional research methodology in the Bagh area of AJK, and interviews were used to gather information from 200 families. The dependent variable was remittances, while the independent variables were family means of subsistence, health care, and other aspects. Remittances showed a positive socioeconomic impact on families and were used for a variety of purposes, including debt repayment, construction of new buildings, education, and health care facilities.

The evidence also indicates that the welfare consequences of remittances can vary with local economic conditions and how funds are used. For example, Bracking and Sachikonye (2010) observed differences in household welfare outcomes, while Acosta et al. (2007) considered the implications of transfers for poverty and human capital. Similarly, Bettin and Zazzaro (2012) emphasised the relevance of financial-sector conditions for remittance-related economic outcomes. These studies indicate that short-term household benefits and longer-term development processes should be distinguished. Therefore, an examination of different human development dimensions may help identify whether the associations are consistent across health, education, and income outcomes.

The study's contribution lies in comparing the relationships between workers' remittances and four development outcomes within the same country sample and observation period. This design matters because transfers' ability to support health and schooling need not mirror their relationship with the income dimension of human development. Moreover, including financial development indicators allows the analysis to consider whether remittance coefficients remain positive after accounting for selected features of the domestic financial system (Acosta et al., 2007; Bettin & Zazzaro, 2012; Khan & Khan, 2016).

2.3 Research Gap and Contribution

Previous studies have examined various aspects of human development, remittances, financial development, and economic growth. However, the evidence reviewed here does not consistently consider aggregate HDI and each of its principal dimensions within the same comparative framework for the largest developing-country remittance recipients. This study addresses this gap by using panel data for India, China, Pakistan, the Philippines, Egypt, Mexico, Bangladesh, Nepal, Nigeria, and Vietnam. It examines remittance inflows in relation to aggregate HDI and separately considers health, education, and income per capita. In addition, the study incorporates two indicators of financial development into alternative model specifications. This approach allows comparisons across outcomes while retaining the study's original macroeconomic objectives.

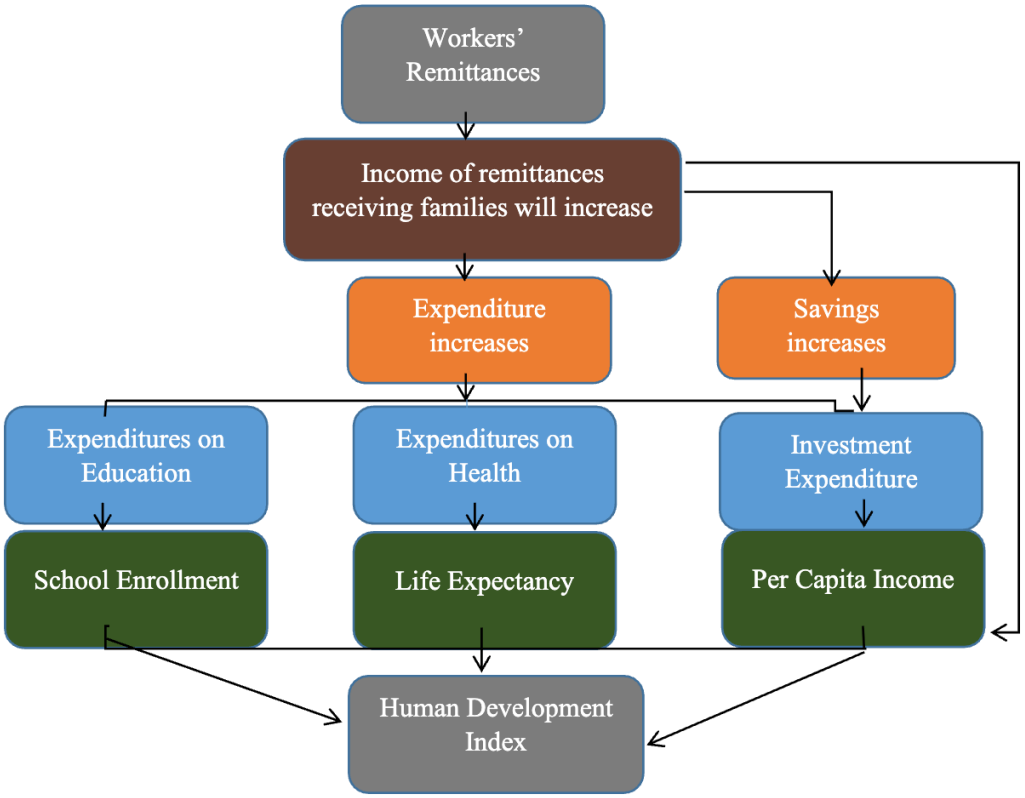


Figure 1: Conceptual framework. Source: Author's own construction

Figure 1 presents the study's conceptual framework, developed from the theoretical and empirical relationships discussed in the literature. The figure illustrates potential channels linking remittance receipts to household expenditure, savings, educational participation, health outcomes, and income-related development (Acosta et al., 2007; Abdullah et al., 2021; Kumar et al., 2018).

3 Data and Methodology

Drawing on the literature review and the conceptual framework, the following four groups of empirical models are specified. Each group examines a distinct dimension of socioeconomic well-being and considers alternative measures of financial development.

3.1 Model for Human Development (HDI)

The functional form of the first model is given as.

HDI= (Remittances, Financial Development (Credit to private sector) (Money Supply), Inflation, Unemployment, Gross Capital Formation, and Primary School Enrollment) (1)

For the HDI outcome, three econometric specifications are estimated: a baseline model and two specifications incorporating alternative indicators of financial development.

$$HDI_{it} = \alpha_1 + \alpha_2 REM_{it} + \alpha_3 INF_{it} + \alpha_4 GCF_{it} + \alpha_5 UNEMP_{it} + \alpha_6 SCHENR_{it} + \varepsilon t_{it} \quad (2)$$

$$HDI_{it} = \alpha_1 + \alpha_2 REM_{it} + \alpha_3 CRTPS_{it} + \alpha_4 INF_{it} + \alpha_5 GCF_{it} + \alpha_6 UNEMP_{it} + \alpha_7 SCHENR_{it} + \varepsilon t_{it} \quad (3)$$

$$HDI_{it} = \alpha_1 + \alpha_2 REM_{it} + \alpha_3 M2_{it} + \alpha_4 INF_{it} + \alpha_5 GCF_{it} + \alpha_6 UNEMP_{it} + \alpha_7 SCHENR_{it} + \varepsilon t_{it} \quad (4)$$

3.2 Model for Health (Life Expectancy at Birth)

Life expectancy at birth = (Remittances, Financial Development (Credit to private sector) (Money Supply), Improved Water Coverage, Unemployment, Urban Population, and Gross Domestic Product per capita) (5)

The corresponding health equations are specified as follows:

$$LEAB_{it} = \alpha_1 + \alpha_2 REM_{it} + \alpha_3 IWC_{it} + \alpha_4 UNEMP_{it} + \alpha_5 URPOP_{it} + \alpha_6 GDPC_{it} + \varepsilon t_{it} \quad (6)$$

$$LEAB_{it} = \alpha_1 + \alpha_2 REM_{it} + \alpha_3 CRTPS_{it} + \alpha_4 IWC_{it} + \alpha_5 UNEMP_{it} + \alpha_6 URPOP_{it} + \alpha_7 GDPC_{it} + \varepsilon t_{it} \quad (7)$$

$$LEAB_{it} = \alpha_1 + \alpha_2 REM_{it} + \alpha_3 M2_{it} + \alpha_4 IWC_{it} + \alpha_5 UNEMP_{it} + \alpha_6 URPOP_{it} + \alpha_7 GDPC_{it} + \varepsilon t_{it} \quad (8)$$

3.3 Model for Education (Tertiary School Enrollment)

Tertiary School Enrollment= (Remittances, Financial Development (Credit To Private Sector) (Money Supply), Urban Population, Foreign Direct Investment, Unemployment, Gross Domestic Product per capita)
(9)

The corresponding education equations are specified as follows:

$$TSE_{it} = \alpha_1 + \alpha_2 REM_{it} + \alpha_3 URPOP_{it} + \alpha_4 UNEMP_{it} + \alpha_5 FDI_{it} + \alpha_6 GDPC_{it} + \varepsilon t_{it} \quad (10)$$

$$TSE_{it} = \alpha_1 + \alpha_2 REM_{it} + \alpha_3 CRTPS_{it} + \alpha_4 URPOP_{it} + \alpha_5 UNEMP_{it} + \alpha_6 FDI_{it} + \alpha_7 GDPC_{it} + \varepsilon t_{it} \quad (11)$$

$$TSE_{it} = \alpha_1 + \alpha_2 REM_{it} + \alpha_3 M2_{it} + \alpha_4 URPOP_{it} + \alpha_5 UNEMP_{it} + \alpha_6 FDI_{it} + \alpha_7 GDPC_{it} + \varepsilon t_{it} \quad (12)$$

(d) Model for Gross National Income Per Capita

Income = (Remittances, Financial Development (Credit to Private Sector) (Money Supply), Inflation, Urban Population, Exports, Gross Capita Formation)

The corresponding income equations are specified as follows:

$$GNI_{it} = \alpha_1 + \alpha_2 REM_{it} + \alpha_3 INF_{it} + \alpha_4 URPOP_{it} + \alpha_5 EXP_{it} + \alpha_6 GCF_{it} + \varepsilon t_{it} \quad (13)$$

$$GNI_{it} = \alpha_1 + \alpha_2 REM_{it} + \alpha_3 CRTPS_{it} + \alpha_4 INF_{it} + \alpha_5 URPOP_{it} + \alpha_6 EXP_{it} + \alpha_7 GCF_{it} + \varepsilon t_{it} \quad (14)$$

$$GNI_{it} = \alpha_1 + \alpha_2 REM_{it} + \alpha_3 M2_{it} + \alpha_4 INF_{it} + \alpha_5 URPOP_{it} + \alpha_6 EXP_{it} + \alpha_7 GCF_{it} + \varepsilon t_{it} \quad (15)$$

Table 2: Description of Variables

Abbreviation	Variables Name	Unit of Measures
	Dependent Variables	
HDI	Human Development Index	Human development indicators
LEAB	Life Expectancy at Birth	Life expectancy at birth, total in years)
EDU	Tertiary School Enrollment use proxy of Education	School enrollment, tertiary (% gross based on annual school surveys)
GNI	Gross National Income per capita	GNI per capita growth (annual %)
Principal Variables		
REM	Remittances	Personal remittances received (current US$)
M2	Money Supply	Broad money (Percentage of GDP)
CRTPS	Domestic Credit to Private Sector	Domestic credit to the private sector provided by banks (Percentage of GDP)
Control Variables		
INF	Inflation	Inflation, GDP deflator (annual percentage)
UNEMP	Unemployment	Unemployment, total (Percentage of the total labor force) (modeled by ILO estimation)
GCF	Gross Capital Formation	Gross capital formation (annual Percentage growth)
SCHENR	School Enrollment	School enrollment, primary (Percentage gross, based on annual school surveys)

IWC	Improved Water Coverage	People have basic facilities of drinking water services (Percentage of the total population)
URPOP	Urban Population	Urban population growth rate (annual percentage)
GDP	Gross Domestic Product per capita	GDP per capita (growth annual percentage)
FDI	Foreign Direct Investment	Foreign direct investment, (net inflows Percentage of GDP)
EXP)	Exports of Goods and Services	Exports of goods and services (percentage of GDP)

Source: By the author

3.5 Data

The analysis uses a panel dataset compiled from the World Development Indicators (WDI) and the United Nations Development Programme (UNDP). The observations cover the ten selected developing countries over 1990–2020 and are used to examine the association between workers' remittances and socioeconomic well-being. Aggregate HDI, life expectancy at birth, tertiary school enrolment, and the reported GNI-per-capita indicator are analysed as separate dependent variables. In addition, credit to the private sector and broad money are used as alternative indicators of financial development, while the relevant macroeconomic and demographic control variables vary across the model groups, as listed in Table 2.

3.6 Estimation Technique (Generalized Method of Moments)

The generalized method of moments (GMM) is an econometric approach that estimates model parameters using moment conditions and can accommodate certain forms of heteroscedasticity and endogeneity. In this study, the System GMM approach is employed because workers' remittances and financial development may be jointly determined with socioeconomic outcomes. The original analysis also reports the use of a Hausman test as part of its preliminary assessment of endogeneity. Nevertheless, the effectiveness of the estimator depends on the validity of the selected instruments and the specification of the dynamic model. Accordingly, the reported Sargan and second-order serial-correlation diagnostics should be interpreted together with the assumptions underlying the instrument set.

The choice of System GMM is motivated primarily by the possibility that remittances, financial development, and development outcomes are interrelated. For instance, better socioeconomic conditions may themselves be associated with changes in remittance flows, while financial institutions may influence the ways transfers enter the domestic economy. Consequently, accounting for potential endogeneity is relevant when interpreting estimated relationships. However, the inclusion of financial development as an explanatory variable does not in itself establish a moderating effect between remittances and development outcomes; such an effect would require an explicitly estimated interaction specification.

In addition, human development outcomes may exhibit persistence over time, making a dynamic panel framework conceptually relevant. The System GMM approach is intended to accommodate this persistence through lagged information and suitable moment conditions. Nevertheless, because the study comprises only ten countries, its estimates require careful interpretation, particularly regarding instrument proliferation, finite-sample properties, and specification diagnostics. The presented estimates are therefore discussed as empirical associations rather than definitive evidence of causality.

4 Results and Discussion

This section discusses the estimated associations between workers' remittances and the four socioeconomic outcomes: aggregate human development, health, education, and income per capita. It also considers how the results change when alternative indicators of financial development are included.

4.1 Remittances and Aggregate Human Development

Table 3 shows positive and statistically significant coefficients for remittance inflows across all three HDI specifications. These findings indicate a positive estimated relationship between remittances and human development in the selected countries, conditional on the included controls. The direction of the relationship is consistent with earlier evidence linking migrant resources to household welfare and socioeconomic outcomes (Abdullah et al., 2021; Acosta et al., 2007; Ariadi et al., 2019). Conversely, the coefficients for inflation and unemployment are negative, indicating that higher inflation and weaker labour-market conditions are associated with lower HDI values in these specifications. These results are broadly consistent with studies examining macroeconomic determinants of human development (Arisman, 2018; Asongu, 2011; Migała-Warchoł & Sobolewski, 2020). However, the numerical coefficients should be interpreted in light of the measurement units listed in Table 2.

Table 3: Impacts of Remittances on Human Development Index

Dependent Variable: Human Development Index			
Variables	**Model 01**	**Model 02**	**Model 03**
Remittances	.0006287**	.0006803**	.0007437***
	(0.045)	(0.031)	(0.014)
Inflation	-.0012826***	-.0007787*	-.0008068*
	(0.003)	(0.086)	(0.078)
Unemployment	-.0010669*	-.0011074**	-.0012395**
	(0.083)	(0.047)	(0.026)
Gross Capital Formation	.0014276***	.0011139***	.0011918***
	(0.000)	(0.004)	(0.003)
School Enrollment	.0100677***	.008658***	.009854***
	(0.000)	(0.000)	(0.000)
Credit To Private Sector(FD)		.0017777***	
		(0.000)	
M2 Broad Money (FD)			.0011879**
			(0.011)
Constant	-.0364903***	-.0326431***	-.0409801***
	(0.001)	(0.003)	(0.000)
Sargan Value	0.435	0.534	0.390
AR2 Value	0.628	0.420	0.453

Source: By the author

Gross capital formation is positively and significantly associated with HDI in the reported specifications, suggesting a relationship between investment-related economic activity and human development. Similarly, the positive estimated coefficient for primary school enrolment is consistent with the importance of educational participation for development outcomes (Kiani, 2010). Both domestic credit to the private sector and broad money also have positive coefficients when included as alternative financial development indicators. These findings are consistent with literature emphasising financial intermediation and development outcomes (Asongu, 2011; Bettin & Zazzaro, 2012; Chowdhury, 2011). Nevertheless, because these indicators enter the specifications separately, the analysis identifies their conditional associations with HDI rather than demonstrating that financial development directly strengthens the remittance effect.

4.2 Remittances and Health Outcomes

Table 4: Impact of Remittances on Health (life expectancy at birth)

Dependent Variable: Life Expectancy at Birth			
Variables	**Model 01**	**Model 02**	**Model 03**
Remittances	.0331358***	.0163602***	.0309184***
	(0.000)	(0.012)	(0.000)
Unemployment	-.0954725***	-.0964409***	-.0720874***

	(0.000)	(0.000)	(0.000)
Improved Water Coverage	.0116004***	.0421585***	.0074423***
	(0.000)	(0.000)	(0.000)
Urban Population	.0012647***	.0047477***	.0005662*
	(0.018)	(0.000)	(0.097)
GDP Per Capita	.0111506***	.022018***	.0099823***
	(0.001)	(0.000)	(0.000)
Credit To Private Sector(FD)		.0041677***	
		(0.000)	
M2 Broad Money (FD)			.0006883***
			(0.013)
Constant	1.854466***	2.371785***	1.841553***
	(0.000)	(0.000)	(0.000)
Sargan Value	0.540	0.458	0.480
AR2 Value	0.490	0.432	0.624

Source: By the author

The first model group examines the aggregate HDI outcome. Subsequently, Tables 4–6 present results for the individual dimensions of human development. Table 4 reports estimates for life expectancy at birth, the study's proxy for health outcomes. The coefficient on remittances is positive and statistically significant in all three health specifications. A possible interpretation is that additional household resources may support spending on medical care, nutrition, and access to basic amenities. However, the country-level results do not directly identify household spending channels, and the coefficients should therefore be interpreted as associations with the health indicator (Kabir, 2008; Shafiq & Gillani, 2018).

The positive association between remittances and life expectancy is consistent with research linking socioeconomic resources to health outcomes (Ariadi et al., 2019; Girum et al., 2018; Hassan et al., 2017). Conversely, the coefficient on unemployment is negative and statistically significant, indicating that weaker employment conditions are associated with lower life expectancy in the estimated models (Sede & Ohemeng, 2015). Improved water coverage is positively associated with life expectancy, consistent with the importance of environmental and social conditions for population health (Hassan et al., 2017). Urban population growth and GDP per capita also have positive coefficients in the reported specifications. In addition, the alternative financial development measures—private-sector credit and broad money—are positively associated with life expectancy. These findings accord with literature considering financial institutions and broader development conditions (Asongu, 2011; Bettin & Zazzaro, 2012; Jafrin et al., 2021), although the estimated associations do not establish the underlying causal mechanisms.

4.3 Remittances and Educational Outcomes

Table 5: Impacts of Remittances on Education

Dependent Variable: Tertiary School Enrollment (Education)			
Variables	**Model 01**	**Model 02**	**Model 03**
Remittances	0.6011222***	0.3918209***	0.3793216***
	(0.001)	(0.002)	(0.003)
Urban Population	0.0723917***	0.0703734***	0.072762***
	(0.000)	(0.000)	(0.000)
Foreign Direct Investment	0.1557171*	0.1381156*	0.1458137*
	0.077	0.075	0.057
Unemployment	-.1578106***	-.0823549*	-.1101997**
	(0.003)	(0.076)	(0.012)
GDP per Capita	.0925125*	.1011538**	.0982394**
	(0.069)	(0.034)	(0.040)
Credit To Private Sector(FD)		0.0095822**	
		(0.036)	

Dependent Variable: Tertiary School Enrollment (Education)			
Variables	**Model 01**	**Model 02**	**Model 03**
M2 Broad Money (FD)			0.0086236** (0.028)
Constant	-15.53202*** (0.000)	-11.30756*** (0.000)	-11.12983*** (0.000)
Sargan	0.530	0.476	0.543
AR2	0.389	0.369	0.435

Source: By the author

Table 5 reports positive and statistically significant coefficients for remittances in all three tertiary school enrolment specifications. This pattern aligns with the argument that migrant income can increase the resources available for educational participation, although enrolment is also shaped by institutional and demographic conditions (Acosta et al., 2007; Khan & Khan, 2016). In addition, urban population growth and foreign direct investment have positive estimated coefficients, while unemployment has a negative estimated coefficient. The alternative financial development indicators are likewise positive in the specifications in which they appear. Therefore, the evidence suggests that remittances and financial-sector conditions are associated with tertiary education outcomes in the selected country panel, without directly measuring household educational expenditure or establishing causality.

4.4 Remittances and Income-Related Outcomes

The fourth model group examines the income dimension, with results reported in Table 6. The coefficients for remittances are positive and statistically significant across the three specifications, indicating a positive association with the study's reported GNI-per-capita outcome. Bettin and Zazzaro (2012), Nyamongo et al. (2012), and Sghaier (2021) have examined comparable relationships between remittances, financial development, and economic activity. Inflation has a negative coefficient, although the reported p-values indicate that it is not statistically significant at conventional levels in two of the three columns and does not reach the 5% threshold in any column. Therefore, this result should not be described as a consistently significant effect. Urban population growth, exports, and gross capital formation exhibit positive estimated coefficients in the reported models. Similarly, credit to the private sector and broad money enter positively in the specifications that include them (Chowdhury, 2011; Sghaier, 2021). Interpretation of the income coefficients should also recognize that Table 2 describes the GNI variable using an annual growth measure rather than a per-capita income level.

Table 6: Impacts of Remittances on GNI Per Capita.

Dependent Variable: GNI Per Capita			
Variables	**Model 01**	**Model 02**	**Model 03**
Remittances	.9059877*** (0.000)	.6499961*** (0.009)	.4697049** (0.040)
Inflation	-.0341679* (0.097)	-.0289968* (0.154)	-.0262977* (0.192)
Urban Population	3.525449*** (0.000)	2.701564*** (0.003)	2.197561*** (0.010)
Exports	.0360147*** (0.000)	.0440398** (0.030)	.0366483** (0.044)
Gross Capital Formation	.1217155*** (0.000)	.1199615*** (0.000)	.1192056*** (0.000)
Credit To Private Sector(FD)		.0143806** (0.042)	
M2 Broad Money (FD)			.0180299*** (0.001)
Constant	-29.15443***	-21.909***	-16.7844**

Dependent Variable: GNI Per Capita			
	(0.000)	(0.006)	(0.023)
Sargan	0.763	0.676	0.568
AR 2	0.582	0.430	0.390

Source: By the author

5 Conclusions and Policy Suggestions

This study examines workers' remittances and socioeconomic well-being in ten major developing-country remittance recipients using panel observations from 1990 to 2020. Four groups of outcome specifications consider aggregate HDI and the individual dimensions of life expectancy, tertiary school enrolment, and reported GNI per capita. Remittance inflows and financial development are central explanatory factors, with the latter represented by domestic credit to the private sector and broad money in alternative specifications. In addition, we include a range of macroeconomic and demographic controls, depending on the characteristics of each outcome. The dataset is compiled from the World Development Indicators and United Nations Development Programme sources, allowing the analysis to consider a comparative set of countries across a substantial historical period.

The reported System GMM estimates indicate positive associations between remittance inflows and aggregate HDI, life expectancy, tertiary school enrolment, and the income-related outcome. Similarly, the two financial development indicators have positive estimated coefficients in the specifications in which they are included. These results suggest that remittance receipts and financial-sector conditions are relevant to the socioeconomic development of the selected economies. However, the findings should be interpreted within the limits of the reported econometric specifications and available indicators; they do not, on their own, establish a causal mechanism or demonstrate a statistical interaction between remittances and financial development. The disaggregated outcomes nevertheless offer useful evidence regarding the distinct dimensions through which human well-being may be assessed.

5.1 Policy Implications

The findings suggest that policymakers should consider measures that improve access to reliable, affordable, and transparent channels for receiving remittances. In particular, accessible banking services and lower transaction costs may help recipient households transfer and manage funds through formal financial institutions. In addition, policies that facilitate savings, appropriate credit access, and informed financial decision-making may strengthen the conditions under which remittance income supports education, health, and productive activity. However, the practical effectiveness of these measures will depend on each country's financial infrastructure, regulatory environment, and development priorities. Accordingly, policy interventions should be tailored to local conditions rather than assuming a uniform effect of remittance inflows across the selected economies (Bettin & Zazzaro, 2012; Chowdhury, 2011; Kumar et al., 2018).

5.2 Limitations of the Study

A key limitation is the incomplete recording of international remittances in official statistical sources, including the World Development Indicators. Some migrants transfer funds through informal arrangements, such as Hawala or Hundi, or carry money through relatives and acquaintances. Consequently, the observed series may not capture the full value of funds received by households. In addition, this macroeconomic panel does not reveal how individual recipients allocate remittances between consumption, education, healthcare, savings, and investment. The findings are therefore conditional on the available aggregate measures and the particular countries included in the analysis. Future research could examine household-level transmission mechanisms and compare alternative financial development measures while retaining the distinction between aggregate HDI and its constituent dimensions.

Ethical Statement: Not Applicable

Conflicts of interest: The authors declare that there are no conflicts of interest.

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