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Article

International remittances and poverty : blessing or curse?

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Reference: Can, Zeynep Gizem/Çiftiçi, Hakkı (2022). International remittances and poverty : blessing or curse?. In: Ekonomický časopis 70 (6), S. 544 - 561. https://www.sav.sk/journals/uploads/0103171106%2022%20Can%20+%20SR.pdf. doi:10.31577/ekoncas.2022.06.04.

This Version is available at:
http://hdl.handle.net/11159/13120

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International Remittances and Poverty: Blessing or Curse?

Zeynep Gizem CAN – Hakkı ÇIFTÇI***

Abstract

This paper aims to examine the effectiveness of international remittances on poverty. The equation explaining the determinants of poverty is analyzed using the fixed-effects regression model, and the equation examining the existence of a two-way relationship between poverty and international remittances is analyzed using the three-stage least squares model. The empirical findings reveal that there is a bi-directional relationship between poverty and international remittances. An increase in poverty levels triggers migration abroad, and remittances sent by immigrants to their country of origin reduce poverty. An increase in government spending and household income reduces poverty, while an increase in income inequality and inflation exacerbates poverty. Moreover, trade openness has a positive effect on international remittances, and official remittances become easier in financially developed economies as transaction costs decrease. By channeling international remittances, which are considered a stable source of finance, into the accumulation of physical and human capital, they contribute to economic development and increase their impact on poverty. This study contributes to the literature by using the most recent and comprehensive dataset and econometric methodology, and by differentiating the impact of international remittances on poverty by income group-specific effects as well as by region-specific effects.

Keywords: *international remittances, panel data analysis, poverty*

JEL Classifications: C33, F24, I32

DOI: https://doi.org/10.31577/ekoncas.2022.06.04

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Introduction

International remittances are defined as transfers of funds between countries. Workers' remittances, the most important component of international remittances, are the funds sent by migrants to their country of origin. As a financing instrument for the recipient country, international remittances have multidimensional effects. This study examines one of these effects, which is perhaps the most debated in the literature: the effectiveness of international remittances on poverty.

The channels through which and how international remittances affect poverty are frequently discussed in the literature. The impact of international remittances can vary depending on how the households that receive them in the country of origin use this financing instrument. If these households change their income levels and consumption patterns, i.e., tend to consume more, and become dependent on this financing instrument, the short-term poverty-reducing effect of international remittances will not be sustainable in the long run (Okolo, 2017). On the other hand, these households can contribute to economic development and poverty reduction in the long run by using this source of financing to accumulate human and physical capital (Huay and Bani, 2018; Abduvaliev and Bustillo, 2020). From a macroeconomic perspective, international remittances can have negative effects on the exchange rate of the recipient country. In this case, the real sector suffers a competitive disadvantage and the phenomenon known in the literature as Dutch disease or the reverse J curve effect can occur, leading to a current account deficit and impoverishment (Meyer and Shera, 2017; Hien et al., 2020).

The relationship between international remittances and poverty has long been discussed in the literature; however, the recent increase in studies on this topic is drawing attention. Wagle and Devkota (2018) examine the potential impact of international remittances on the Nepalese economy by applying a random effects panel data analysis to the 1996, 2004, and 2011 Nepal Living Standard Survey. They suggest that international remittances, particularly from countries other than India, have a poverty-reducing and wealth-enhancing effect in Nepal. Musakwa and Odhiambo (2019) examine the impact of remittances on poverty in Botswana using an autoregressive distributed lag (ARDL) approach for the period 1980 to 2017 and conclude that remittance inflows play a critical role in poverty reduction and that Botswana can benefit immensely from the increase in remittances through the implementation of policies and structures that support remittance inflows. Ratha and Moghaddam (2020) examine the relationship between international remittances and the real exchange rate using a bounds test and a random effects regression model. The results suggest that a 10% increase in the remittance-GDP ratio significantly appreciates the real exchange rate

by about 0.009 units, implying that the Dutch disease phenomenon is valid. Taghizadeh-Hesary et al. (2020) examine the impact of international remittances on poverty reduction, the first goal of the Sustainable Development Goals (SDGs), using panel data from 12 Asian developing countries. They show that international remittances have a statistically significant impact on reducing the poverty gap rate and the at-risk-of-poverty rate using the ordinary least squares (OLS) random effects model. An increase in international remittances by 1% of GDP can lead to a decrease in poverty rate by 0.19%, poverty gap rate by 0.3%, and at-risk-of-poverty rate by 0.6% in 12 Asian developing countries between 1981 and 2018. In addition, the results suggest that trade openness can reduce poverty measures and that higher inflation rates can be one of the causes of poverty. Anwar and Mang (2022) investigates the impact of international remittances on the real exchange rate by conducting a meta-study of 426 estimates from 67 studies. International remittances increase the real exchange rate depending on the country, with the increase being highest in East Asia and the Pacific and lowest in Latin America and the Caribbean. A rising real exchange rate prevents the real sector from being competitive and leads to poverty by causing a balance of payments deficit.[1]

Studies that examine the relationship between international remittances and poverty are usually conducted within a country or region, but are very rare for the entire world. This study aims to show this relationship for population, i.e., entire world, and samples classified by region, and income group. The main difference that distinguishes this study from other studies in the literature is that it contains the most comprehensive and up-to-date dataset and econometric method. Moreover, to our knowledge, there is no study in the literature that examines countries by income group in the context of international remittances and poverty.

Methodologically, the unbalanced dataset, which is compiled from World Bank database, analyze the fixed-effects regression model. This model is used to estimate the effect of intrinsic characteristics of individuals in a panel dataset. Considering the heterogeneous structure of the countries in the dataset, it is appropriate to use this model in terms of revealing individual effects. Moreover, it is assumed that in an econometric model there is no endogenous relationship between the explained variable and the explanatory variable, but only the explained variable is endogenous. However, studies in the literature have shown that as the level of poverty in countries increases, the number of people who

[1] Recently, many studies have been published on this topic. For a more detailed literature review, see Yoshino et al. (2017), Inoue (2018), Kumar (2019), Siani (2020), Acheampong et al. (2021), and Bang et al. (2022).

emigrate and international remittances also increase. That is, there may be a bilateral relationship between international remittances and poverty. In this situation, called the endogeneity problem, estimates are biased and inconsistent. To uncover this problem, the three-stage least squares (3SLS) model is used, the which allows two variables that are assumed to have endogenous relationships to be estimated simultaneously as dependent variables.

The remainder of this article is organized as follows. Section 1 describes the data. Section 2 details the estimation strategy. Section 3 presents the empirical findings, followed by concluding remarks.

1. The Data

The dataset used in this study is compiled from various World Bank databases. The poverty and inequality data come from household budget surveys, and the macroeconomic data come from official databases. The data, which covers 116 countries and the period 1990 – 2020, is unbalanced panel data, meaning that the year and number of data vary by country. The time period chosen for analysis is 1990 – 2020 because the pre-1990 data have reliability issues and the post-2020 data are currently unavailable.

Estimating poverty data is quite problematic. This paper uses two different poverty measures per person per day in 2017 purchasing power parity (PPP) terms. First, the headcount ratio, set at USD 2.15, USD 3.65, and USD 6.85, estimates the percentage of the population living below the poverty line. Because this measure neglects the depth of poverty, the poverty gap rate, which indicates how far below the poverty line the average income of the poor is, is set at USD 2.15, USD 3.65, and USD 6.85.

Income can be represented by GDP per capita in 2017 purchasing power parity (PPP) terms, which comes from national accounts data. To calculate PPP, WB estimates the bundled cost of each country's goods with that of the United States.

International remittances consist of personal remittances, widely known as workers' remittances, and workers' compensation. International Monetary Fund (2009) defines personal remittances as all current transfers of money or goods made or received by resident households to or from non-resident households, and workers' compensation as the income of cross-border, seasonal, and other short-term workers employed in an economy in which they are non-residents and of residents employed by non-resident firms. Similar to poverty data, data on international remittances are also vulnerable because they are transmitted through informal channels. International remittances are assumed to be transmitted only

through official channels, such as the banking channel, so the specification of remittance data is quite clear.[2]

The Gini coefficient is an effective way to indicate inequality in income distribution. It is a normalized measure that represents a particular quintile of the population. It takes a value between zero and one, and the closer it is to zero, the lower the income inequality.

As for the control variables, trade openness indicates how large a country's total foreign trade volume is. Higher levels of trade openness may increase the likelihood of remittances because countries with higher trade volumes have better developed financial systems. Unemployment describes the proportion of the population that is not working but is looking for a job. The increase in the unemployment rate is one of the most important determinants of out-migration due to the lack of jobs in the local economy. Health spending reflects a country's level of wealth and negatively impacts poverty. Education is directly linked to employment, migration, and international remittances according to human capital theory. The inflation rate is the rate of increase in general prices in an economy over a period of time and is an important barometer indicating the degree of prosperity and poverty in a country.

To determine the unit-specific effects of the panel data, countries are categorized by both geographic region and income group in Table 6 in the Appendix.[3] Since poverty in high-income countries is ignored, they are not included in this study. It is worth noting that most countries in the Europe and Central Asia regions also belong to the middle-income group. In addition, countries in sub-Saharan regions are predominantly in the low-income group.

2. Estimation Strategy

First, the determinants of poverty are revealed by assuming poverty as the dependent variable. Given the heterogeneity of countries and country groups in the dataset, it is appropriate to use a fixed-effects regression model in this analysis, which allows us to identify unit-specific effects. Following the seminal paper by Adams and Page (2005), the general representation of the fixed effects regression model is:

[2] This assumption seems heroic, as Adams and Page (2005) suggest that unofficial international remittances may account for between one-third and one-half of total international remittances. However, an estimate of unofficial international remittances is beyond the scope of this article.

[3] Countries are categorized according to the World Bank's classification method. For similar work and more detailed information on the data, see Adams and Page (2005).

$$P_{i,t} = \beta_0 + \beta_1 GDP_{i,t} + \beta_2 GINI_{i,t} + \beta_3 REM_{i,t} + \beta_4 X_{i,t} + \eta_i + \mu_{i,t} \quad (1)$$

where

$P_{i,t}$ – the poverty measures,

$GDP_{i,t}$ – gross domestic product per capita,

$GINI_{i,t}$ – the Gini index,

$REM_{i,t}$ – international remittances per capita,

$X_{i,t}$ – the control variables,

β_0 – constant term,

η_i – region- and income group-specific effects,

$\mu_{i,t}$ – the error term for the unit-specific effects $i = 1, 2, \ldots, N$, at time $t = 1, 2, \ldots, T$.

β_1, β_2 and β_3 – the elasticities of poverty with respect to income, income inequality and international remittances, respectively.

The poverty measures consist of the headcount ratio (HR) and the poverty gap (PG). The control variables allow us to robust the empirical results. These variables are government expenditure per capita (GE), inflation rate (INF), school enrolment rate in tertiary education (SE), and health expenditure per capita (HE) as suggested by Peković (2017), Masron and Subramaniam (2018), and Tsaurai (2018). This paper focuses on the coefficient β_3, i.e., the elasticity of poverty with respect to international remittances. As can be seen in the related literature, the signs of β_1 and β_2 are negative and positive, respectively, as expected. That is, as income increases, poverty decreases. On the other hand, as income inequality increases, poverty increases. The sign of β_3, which is the subject of this study, is negative in many studies in the literature.

Equation (1) assumes that poverty is an endogenous variable, which means that there is a one-directional relationship between other variables and poverty measures. However, as shown in many studies in the literature, there may be a bi-directional relationship between poverty and international remittances. Increasing poverty in the country of origin may trigger migration, resulting in more immigrants living abroad and increasing the level of international remittances. In the second step, the three-stage least squares (3SLS) model is used to reveal the bi-directional relationship between international remittances and poverty, i.e., the endogeneity problem. In this model, both international remittances and poverty are estimated simultaneously as dependent variables. The equation in which poverty is estimated as the dependent variable is the same as equation (1), but trade openness and unemployment rate are also used as explanatory variables in the equation in which international remittances are estimated as the dependent

variable. Trade openness is an indicator of financial system development and an important indicator of official transfer of international remittances. Unemployment rate is also one of the important determinants of migration and international remittances. Following the seminal paper by Gupta et al. (2009), the general exposition of the 3SLS model is:

$$P_{i,t} = \gamma_0 + \gamma_1 GDP_{i,t} + \gamma_2 GINI_{i,t} + \gamma_3 REM_{i,t} + \xi_i + \varepsilon_{i,t}$$
$$REM_{i,t} = \delta_0 + \delta_1 P_{i,t} + \delta_2 OPEN_{i,t} + \delta_3 UR_{i,t} + \wp_i + \epsilon_{i,t} \tag{2}$$

where

$P_{i,t}$ – the poverty measures,

$GDP_{i,t}$ – gross domestic product per capita,

$GINI_{i,t}$ – the Gini index,

$REM_{i,t}$ – international remittances per capita,

$OPEN_{i,t}$ – trade openness,

$UR_{i,t}$ – unemployment rate,

γ_0 and δ_0 – constant terms,

ξ_i and $\wp_i$ – region- and income-group specific effects,

$\varepsilon_{i,t}$ and $\epsilon_{i,t}$ – error terms for unit-specific effects $i = 1, 2, \ldots, N$ at time $t = 1, 2, \ldots, T$.

γ_1, γ_2, and γ_3 – the elasticities of poverty with respect to income, income inequality and international remittances; on the other hand,

δ_1, δ_2, and δ_3 – the elasticities of international remittances with respect to poverty, trade openness, and unemployment rate.

As can be seen in the related literature, the signs of δ_2 and δ_3 are expected to positive and positive, as expected. That is, when openness degree and unemployment rate increase, international remittances increase.

This paper focuses on the coefficients γ_3 and δ_1, i.e., the elasticity of poverty with respect to international remittances and vice versa. If γ_3 and δ_1 are statistically significant, it means that there is a bi-directional relationship between the variables. In this case, it would be more accurate to use the 3SLS model estimation. If only *x* is statistically significant, it means that there is a one-way relationship between the variables, and the fixed effects regression model estimates are consistent and unbiased. All variables used in equations (1) and (2) are in logarithmic form to reduce the skewness of the data and to converge data from different units.

3. Empirical Findings

The descriptive statistics of the data, the correlation matrix, and the details of the econometric model are presented in the preliminary analysis section, as they can provide a priori information for the analysis. Then, the results of the analysis using the fixed-effects regression models and three-stage least squares models are included in the empirical findings section.

3.1. Preliminary Analysis

To get a priori information about the data, it is useful to see the change of the data over time. Although data on international remittances are sparse, their volume has increased steadily in recent years, from USD 31.1 billion in 1990 to USD 76.8 billion in 2000, USD 717 billion in 2019 and reverse to 540 billion in 2020 due to Covid-19 pandemic. (Chowdhury and Chakraborty, 2021; World Bank, 2020). According to the data in this paper, compiled by the World Bank for 1990 to 2020, the degree, depth, and severity of poverty in countries tend to decrease over time. In addition, the share of international remittances in GDP tends to increase over time. This could be due to the development of the global financial system, as the development and diversification of money transfer systems and low transaction costs facilitate international remittances (Ahmed et al., 2021). It can be intuitively assumed that there is a negative relationship between international remittances and poverty. The average values of the variables for the selected periods are as follows.

Table 1

Descriptive Statistics

Variables	1990 – 1999	2000 – 2009	2010 – 2020
HR (2.15 USD)	0.20	0.11	0.06
HR (3.65 USD)	0.35	0.23	0.15
HR (6.85 USD)	0.53	0.41	0.31
PG (2.15 USD)	0.09	0.04	0.02
PG (3.65 USD)	0.17	0.09	0.06
PG (6.85 USD)	0.30	0.21	0.14
GDP	13447.29	18322.03	23103.94
REM	152.11	339.29	522.33
REM/GDP	1.13%	1.85%	2.26%
GINI	0.44	0.40	0.38

Source: World Bank.

The correlation coefficient, which indicates the direction and magnitude of the linear relationship between variables, also sheds light on the problem of multicollinearity. Table 2 shows that there is a negative relationship between the poverty

measures and gross domestic product per capita and international remittances, and a positive relationship with income inequality. The signs of the coefficients are consistent with expectations. There is a positive relationship between international remittances, trade openness, and unemployment rate, and the signs of the coefficients are consistent with expectations. It can be inferred that the variable with the most linear relationship with poverty is gross domestic income per capita (–0.41) and that there is no multicollinearity problem because the correlation coefficients are not high.[4]

Table 2

Correlation Matrix

	HR (2.15 USD)	GDP	REM	GINI	OPEN	UR
HR (2.15 USD)	1					
GDP	–0.4136	1				
GINI	0.2825	0.1105	1			
REM	–0.3896	0.2908	–0.1557	1		
OPEN	–0.1748	0.1638	–0.0744	0.3301	1	
UR	–0.1296	0.3154	0.1462	0.083	0.118	1

Source: Authors' own calculations.

To determine the appropriate model in this paper, Hausman (1978) specification test and Breusch and Pagan (1979) LM test are used. While, the χ^2 statistic of Hausman (1978) specification test is 12.86 (0.0049), the χ^2 statistic of Breusch and Pagan (1979) Lagrange multiplier (LM) test is 528.37 (0.00). The null hypotheses can be rejected at the significance level indicated in parentheses. The Hausman test indicates that the unbalanced panel data in this paper must be estimated with a fixed-effects regression model, Breusch and Pagan test shows that there is a significant difference for cross-country data. Given these tests, the fixed-effects regression model may be appropriate to capture unit-specific effects. Therefore, five dummies are assigned for geographic regions, i.e., East Asia and Pacific (EAP), Europe and Central Asia (ECA), Latin America and Caribbean (LAC), Middle East and North Africa (MENA) and South Asia (SA), and two dummies are assigned for income groups, i.e., lower-middle income (LMI) and upper-middle income (UMI).[5] Since the variables are all in logarithmic form, the coefficients can be interpreted as elasticities.

[4] Similar correlation coefficients are obtained with other poverty measures. Since this takes up too much space, only the correlation coefficients for the variables in equation (2) are reported here. The correlation matrix expanded with other poverty measures and control variables will be made available upon request.

[5] While Sub-Saharan Africa is the omitted dummy variable for geographic region, low income is also an omitted dummy variable for income group.

3.2. Empirical Findings

This section presents the results of the fixed-effects regression and three-stage least squares models. First, the estimates of the baseline model, in which seven poverty measures are estimated as dependent variables and the control variables are not yet included, are presented in Table 3.

Table 3 shows that the coefficients of gross domestic product per capita, Gini index and international remittances per capita are statistically significant in almost all models and their signs are in line with expectations. A 10% increase in gross domestic product per capita reduce the different poverty measures by an interval of 5.5% – 13.4%. A 10% rise in Gini index increase the different poverty measures by in the range of 3.6% – 38.5%. A 10% increase in international remittances per capita decrease the different poverty measures by in the range of 0.3% – 1.4%. As the inclusion of the poverty measure increases, i.e., the increase in dollars, the elasticities of poverty with respect to income, income inequality, and international remittances generally decline. It would be a reasonable interpretation to draw a conclusion from looking at income group-specific effects. The dummy variables for lower-middle income group in five of the six estimates and the dummy variable for middle-upper income group in four of them are statistically significant. It can be deduced that the importance of international remittances in poverty alleviation falls as the income level of countries increases. Regarding region-specific effects, the dummy variables for East Asia and Pacific, Latin America and Caribbean, Middle East and North Africa, and South Asia are statistically significant in the majority of all models. These regions are among those with the most international remittances and the lower transaction costs in the world (World Bank, 2020). In addition, the East Asia and Pacific, Latin America and Caribbean regions are sensitive to the U.S. economy, the Middle East and North Asia region is sensitive to the European Union economy, and the South Asia region is sensitive to China, India, and the U.S. economies, making these regions sensitive to changes in global and regional macro variables.

On the other hand, the development of international remittances in Europe and Central Asia regions seems to follow a certain trend. In addition, the results in Table 3 are consistent with those of Adams and Page (2005) and Gupta et al. (2009).

The control variables are added to the baseline model, whose estimation results are shown in Table 3. The control variables are successively included in the estimated equations, and their individual effects are presented in Table 4.

Table 3

Baseline Model

Variables	Dependent variable: HR (2.15 USD)		Dependent variable: HR (3.65 USD)		Dependent variable: HR (6.85 USD)		Dependent variable: PG (2.15 USD)		Dependent variable: PG (3.65 USD)		Dependent variable: PG (6.85 USD)	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
GDP	–1.31*	–1.21*	–1.07*	–0.91*	–0.70*	–0.55*	–1.34*	–1.30*	–1.20*	–1.08*	–0.93*	–0.77*
GINI	2.36*	3.02*	0.71*	1.52*	–0.10	0.43*	3.47*	3.85*	1.59*	2.36*	0.36*	1.03*
REM	–0.11*	–0.95*	–0.58*	–0.03**	–0.01	0.01	–0.13*	–0.14*	–0.09*	–0.07*	–0.04*	–0.01
LMI	0.35**		0.56*		0.50*		0.13		0.43*		0.50*	
UMI	0.25		0.50*		0.52*		0.09		0.35*		0.48*	
EAP		–0.13		0.21*		0.21**		–0.43*		0.03		0.17*
ECA		0.15		0.12		0.09		0.27		0.16		0.10
LAC		–0.37*		–0.33*		–0.17*		–0.23*		–0.36*		–0.28*
MENA		–0.93*		–0.37*		–0.03		–1.22*		–0.65*		–0.23*
SA		0.52*		0.64*		0.35*		0.25		0.57*		0.44*
Constant	0.50	–2.59*	5.14*	1.08**	5.50*	2.48*	–4.38*	–5.86*	2.23*	–1.39**	5.13*	1.56*
R^2_{adj}	0.66	0.69	0.66	0.69	0.62	0.63	0.65	0.69	0.68	0.71	0.68	0.70
F-stats	340.2*	245.8*	348.9*	246.9*	292.5*	186.0*	323.2*	244.5*	379.2*	272.1*	381.2*	260.6*

Notes: (1) * and ** denote that the null hypothesis can be rejected at 1% and 5% significance levels, respectively. (2) HR stands for headcount ratio, PG for poverty gap ratio, GDP for gross domestic product per capita, REM for international remittances per capita, GINI for Gini index, LMI for lower-middle income, UMI for upper-middle income, EAP for East Asia and Pacific, ECA for Europe and Central Asia, LAC for Latin America and Caribbean, MENA for Middle East and North Africa, and SA for South Africa. (3) While the estimates with (1) are the fixed-effects regression model with income group-specific effects, the estimates with (2) are the fixed-effects regression model with region-specific effects.

Source: Authors' own calculations.

In the estimations, only the headcount ratio, which is the most commonly used in the literature, is chosen as the dependent variable. The reason for this is that, as can be seen in Table 3, the values of the coefficients in the estimates vary for all poverty measures but yield similar results in terms of sign and significance.[6]

Table 4 reveals that the coefficients of gross domestic product per capita, the Gini index, international remittances per capita, government expenditure per capita, health expenditure per capita and school enrolment rate in tertiary education are statistically significant in almost all models, and their signs are in line with expectations. A 10% increase in gross domestic product per capita reduces the headcount ratio in an interval from 11.9% to 13.4%. A 10% rise in the Gini index increases the headcount ratio by 23.2% – 30.6%. A 10% increase in international remittances per capita decreases the headcount ratio by 0.9% – 1.1%. An increase in government expenditure per capita, health expenditure per capita, school enrolment rate in tertiary education lower the headcount ratio. This is a very important finding, because with increasing health and well-being and quality education, which are among the 15 sustainable development goals proposed by the World Bank to eradicate poverty, poverty will inevitably decline. However, only the impact of government expenditure on poverty is statistically significant. On the other hand, an increase in the inflation rate leads to a decrease in the headcount ratio. Indeed, the inflation rate is an important barometer for an economy, and it can be assumed that an increase in the inflation rate negatively affects income distribution and triggers poverty. It would be a strong interpretation to draw a conclusion from looking at the income group-specific effects. The dummy variables for the lower-middle income group in all of the four estimates and the dummy variable for middle-upper income group in none of them are statistically significant. As for the region-specific effects, the dummy variables for Latin America and Caribbean, Middle East and North Africa, and South Asia are statistically significant in all models. The significance and explanatory power of the dummy variables for the lower-middle income group and Latin America and Caribbean, Middle East and North Africa regions increase with the control variables.

The estimates conducted so far assume that the poverty measures are the dependent variable and that there is a one-way interaction between the variables. The estimation results of the three-stage least squares model applied to uncover the endogeneity problem are presented in Table 5. Similar to the extended model, only the headcount ratio and poverty gap, set at USD 2.15, is used as poverty measures.[7]

[6] To avoid taking up too much space, the results of models estimated with other poverty measures as dependent variables are not reproduced here; they will be provided by the author upon request. Indeed, the models estimated for all poverty measures seem to yield similar results.

Table 4

Extended Model

Variables	Dependent variable: HR (2.15 USD)							
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
GDP	–1.33*	–1.21*	–1.34*	–1.20*	–1.33*	–1.22*	–1.29*	–1.19*
GINI	2.32*	2.97*	2.38*	3.02*	2.40*	3.06*	2.35*	2.95*
REM	–0.11*	–0.09*	–0.12*	–0.09*	–0.11*	–0.09*	–0.11*	–0.09*
GE	–0.06*	–0.05*						
HE			–0.02	–0.01				
SE					–0.02	–0.02*		
INF							0.09*	0.10*
LMI	0.35*		0.39*		0.36*		0.28*	
UMI	0.26		0.32		0.27		0.20	
EAP		–0.11		–0.13		–0.14		–0.16
ECA		0.11		0.15		0.14		0.10
LAC		–0.39*		–0.38*		–0.37*		–0.39*
MENA		–0.94*		–0.93*		–0.95*		–1.00*
SA		0.47*		0.52*		0.53*		0.43*
Constant	0.52	–2.60*	0.62	–2.60*	0.47	–2.66*	–0.09	–3.04*
R^2_{adj}	0.66	0.69	0.66	0.69	0.66	0.69	0.66	0.70
F-stats	289.7*	221.3*	284.7*	218.3*	284.3*	219.7*	289.0*	224.4*

Notes: (1) * and ** denote that the null hypothesis can be rejected at 1% and 5% significance levels, respectively. (2) HR stands for headcount ratio, GDP for gross domestic product per capita, REM for international remittances per capita, GINI for Gini index, GE for government expenditure per capita, HE for health expenditure per capita, SE for school enrolment rate in tertiary education, INF for inflation rate, LMI for lower-middle income, UMI for upper-middle income, EAP for East Asia and Pacific, ECA for Europe and Central Asia, LAC for Latin America and Caribbean, MENA for Middle East and North Africa, and SA for South Africa. (3) While the estimates with (1) are the fixed-effects regression model with income group-specific effects, the estimates with (2) are the fixed-effects regression model with region-specific effects.

Source: Authors' own calculations.

Table 5 point out that the endogeneity problem arises in case of income group-specific and region-specific effects. The coefficients of the poverty measures are statistically significant in all estimations. It means the results of the three-stage least squares model is consistent and unbiased. Table 5 reveals that the coefficients of gross domestic product per capita, the Gini index, international remittances per capita, poverty measures, and trade openness are statistically significant in almost all models, and their signs are in line with expectations. A 10% increase in gross domestic product per capita reduces the headcount ratio in an interval from 11.8% to 12.5%. A 10% increase in the Gini index increases the headcount ratio by 21.7% – 37.3%. A 10% increase in international remittances per capita decreases the headcount ratio by 1.5% – 2.5%. An increase in trade openness heighten the international remittances per capita. On the other hand, it turns out that only the coefficient of the unemployment rate variable is not statistically significant. It would be a reasonable interpretation to draw a conclusion

[7] To avoid taking up too much space, the results of models estimated with other poverty measures are not reproduced here; they will be provided by the author upon request. Indeed, the models estimated for all poverty measures seem to yield similar results.

from looking at the income group-specific effects. The dummy variables for the lower-middle income group are statistically significant in three of the four estimates, however, the dummy variables for the upper-middle income group are not statistically significant in any of them. As for the region-specific effects, the dummy variables for Europe and Central Asia, Middle East and North Africa, and South Asia are statistically significant in three of the four estimates. The estimations of the three-stage least squares overlap with fixed-effects regression model, as revealed in Table 3.

T a b l e 5

Three-stage Least Squares (3SLS) Model

Variables	Dependent variable: HR (2.15)		Dependent variable: REM		Dependent variable: PG (2.15)		Dependent variable: REM	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
GDP	–1.21*	–1.18*			–1.24*	–1.25*		
GINI	2.17*	2.97*			3.21*	3.73*		
REM	–0.21*	–0.15*			–0.25*	–0.22*		
P			0.64*	0.33*			0.54*	0.37*
OPEN			0.24*	0.26*			0.25*	0.26*
UR			–0.01	–0.07			0.01	–0.07
LMI	0.43*		0.83*		0.24		0.81*	
UMI	0.25		0.05		0.12		0.20	
EAP		–0.10		0.34		–0.40*		0.06
ECA		0.25**		1.51*		0.40*		1.29*
LAC		–0.30*		1.15*		–0.13		1.09*
MENA		0.86*		0.77*		1.13**		0.42
SA		0.58*		1.32*		0.33		1.04*
Constant	0.79	–2.39*	1.54*	2.08*	–3.77*	–5.47*	1.01*	1.69*

Notes: (1) * and ** denote that the null hypothesis can be rejected at 1% and 5% significance levels, respectively. (2) HR stands for headcount ratio, GDP for gross domestic product per capita, REM for international remittances per capita, GINI for Gini index, P for poverty measures, i.e., headcount ratio and poverty gap, OPEN for openness degree, UR for unemployment rate, LMI for lower-middle income, UMI for upper-middle income, EAP for East Asia and Pacific, ECA for Europe and Central Asia, LAC for Latin America and Caribbean, MENA for Middle East and North Africa, and SA for South Africa. (3) While the estimates with (1) are the fixed-effects regression model with income group-specific effects, the estimates with (2) are the fixed-effects regression model with region-specific effects.

Source: Authors' own calculations.

Combining all the finding from Tables 3, 4, and 5, it can be concluded that there is a bi-directional relationship between the poverty measures and international remittances. The rise in poverty triggers migration abroad. Immigrants send international remittances to their country of origin, and thanks to these remittances poverty decreases. The effects of gross domestic product per capita, the Gini index, international remittances per capita, government expenditure per capita, and the inflation rate on poverty are statistically significant. A 10% increase in gross domestic product per capita reduces the headcount ratio in an interval from 11.8% to 12.5%. A 10% increase in the Gini index increases the

headcount ratio by 21.7% – 37.3%. A 10% increase in international remittances per capita decreases the headcount ratio by 1.5% – 2.5%. On the other hand, the impacts of poverty and trade openness on international remittances per capita are statistically significant. A 10% rise in poverty measures surges the international remittances per capita in an interval from 3.3% to 6.4%. A 10% surge in trade openness degree increases the international remittances by 2.4% – 2.6%. As for the unit specific effects, it can be inferred that the income group-specific effects and region-specific effects are meaningful. Generally, the importance of international remittances in poverty alleviation falls as the income level of countries increases. It is statistically significant that international remittances are an instrument for poverty reduction in the regions of Europe and Central Asia, Middle East and North Africa, and South Asia. The existence of an endogeneity problem between poverty and international remittances per capita and the empirical results are consistent with the findings of Adams and Page (2005) and Peković (2017).

Concluding Remarks

This paper highlights the effectiveness of international remittances on poverty using data from 116 countries for the period 1990 – 2020, with headcount ratio and poverty gap, set at USD 2.15, USD 3.65, USD 6.85 as poverty measures. The poverty explanatory models, in which these variables are dependent variables, are estimated using a fixed-effects regression model. Then, the bi-directional relationship between international remittances and poverty is estimated using a three-stage least squares model.

The empirical findings show that there is a bi-directional relationship between poverty and international remittances, that rising poverty levels cause migration abroad, and that international remittances sent by immigrants to their countries of origin have a poverty-reducing effect. In this framework, international remittances are one of the instruments for poverty alleviation, especially for low-middle income countries, and are considered a blessing by countries. Moreover, increasing the level of wealth, e.g., by increasing government expenditure or household income, plays an important role in reducing poverty, while increasing income inequality and inflation exacerbate poverty. On the other hand, the trade openness has a positive effect on international remittances, since it entails financial deepening and a reduction in transaction costs. In this case, it becomes easier to make international remittances through official channels.

The poverty-reducing effect of international remittances is higher in the regions of Europe and Central Asia, Middle East and North Africa, and South Asia. These regions are characterised by high financial development and low

financial transaction fees (WB, 2020). Therefore, the decrease in transaction costs will have a positive impact on official remittances. In this framework, financial development can be achieved by introducing regulations to reduce transaction costs and strengthening competition in the financial sector. In addition, to increase the impact of international remittances, which have a stable flow of money, on poverty, it is important that countries use this resource to accumulate physical and human capital and contribute to economic development in the long term.

It is important to remember that there can always be a bias in household budget surveys from which data on poverty and income inequality are derived, and that international remittances derived from unofficial transfers are estimated downward. Moreover, the dataset used in this study is unbalanced panel data, especially since the data compiled from the questionnaires are not collected at a specific frequency, which allows for a static analysis that does not lend itself to dynamic analysis.

One step beyond this study, the use of balanced panel data and dynamic models will increase the reliability of estimates by creating data for years without data through techniques such as interpolation. In addition, producing unregistered international remittance data for all countries and including them in the analysis will improve the projections. Finally, a sharp decline in international remittances and a structural break in the data due to the Covid-19 epidemic is predicted. In the coming period, along with data released for 2020 and beyond, a review of poverty and international remittances related to Covid-19 will contribute to the literature.

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Appendix

Table 6

Specification of the Countries

Income Group	Country[8]
Upper Middle Income[a] (479 observations)	Albania[I], Algeria[IV], Argentina[III], Armenia[I], Azerbaijan[I], Belarus[I], Bosnia and Herzegovina[I], Botswana[VI], Brazil[III], Bulgaria[I], China[II], Colombia[III], Costa Rica[III], Dominican Republic[III], Ecuador[III], Fiji[II], Gabon[VI], Georgia[I], Guatemala[III], Guyana[III], Iraq[IV], Jamaica[III], Jordan[IV], Kazakhstan[I], Kosovo[I], Malaysia[II], Maldives[V], Mexico[III], Moldova[I], Montenegro[I], Namibia[VI], Nauru[II], North Macedonia[I], Marshall Island[II], Paraguay[III], Peru[III], Romania[I], Russian Federation[I], Serbia[I], South Africa[VI], Sri Lanka[V], St. Lucia[III], Suriname[III], Thailand[II], Tonga[II], Turkey[I], Tuvalu[II]
Lower Middle Income[b] (308 observations)	Angola[VI], Bangladesh[V], Belize[III], Bhutan[V], Bolivia[III], Cabo Verde[VI], Cameroon[VI], Comoros[VI], Côte d'Ivoire[VI], Djibouti[IV], Egypt[IV], El Salvador[III], Estawini[VI], Ghana[VI], Haiti[III], Honduras[III], Indonesia[II], Iran[IV], Kenya[VI], Kiribati[II], Kyrgyz Republic[I], Lao[II], Lesotho[VI], Mauritania[VI], Mongolia[II], Morocco[IV], Myanmar[II], Nicaragua[III], Nigeria[VI], Pakistan[V], Papua New Guinea[II], Philippines[II], Republic of the Congo[VI], São Tomé and Principe[VI], Samoa[II], Senegal[VI], Solomon Islands[II], Sudan[VI], Tajikistan[I], Timor-Leste[II], Tunisia[IV], Ukraine[I], Vanuatu[II], Vietnam[II], West Bank and Gaza[IV], Zambia[VI], Zimbabwe[VI]
Low Income[c] (94 observations)	Benin[VI], Burkina Faso[VI], Burundi[VI], Central African Republic[VI], Democratic Republic of the Congo[VI], Ethiopia[VI], Gambia[VI], Guinea[VI], Guinea-Bissau[VI], Liberia[VI], Madagascar[VI], Malawi[VI], Mali[VI], Micronesia[II], Mozambique[VI], Nepal[V], Niger[VI], Rwanda[VI], Sierra Leone[VI], Tanzania[VI], Togo[VI], Uganda[VI]

Notes: [a] 4,096 USD ≤ GDP per capita of Upper Middle Income ≤ 12,695 USD.
[b] 1,046 USD ≤ GDP per capita of Lower Middle Income ≤ 4,095 USD.
[c] GDP per capita of Low Income ≤ 1,045 USD or less.
[I] Europe and Central Asia (200 observations).
[II] East Asia and Pacific (114 observations).
[III] Latin America and Caribbean (319 observations).
[IV] Middle East and North Africa (41 observations).
[V] South Asia (42 observations).
[VI] Sub-Saharan Africa (165 observations).

Source: World Bank.

[8] The World Bank database does not include poverty data for some countries, such as Afghanistan. In addition, the national distribution for some countries, such as India, is based on an aggregate Lorenz curve from the original rural and urban distribution, making these data less reliable. The lack of data and their reliability limit the countries that are analyzed.