# The Effect of International Remittances on Income Inequality in Migrant-Sending Countries

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# Abstract

Global remittance flows have replaced foreign direct investment and developmental aid as the premier source of global external finance to low- and middle-income nations. The field of income inequality and remittances lacks unanimity along with a general empirical analysis based on 21st century data. This paper analyzes the effect that international remittances may have on income inequality in migrant-sending nations. Utilizing fixed effects models and two-way fixed effects models, the research finds a negative relationship between international remittances and income inequality in a sample of 84 migrant-sending nations, with data collected in intervals between 2002 and 2021, totaling 1276 observations. The validity of the conclusion is further evaluated through robustness checks that include a change in the method of measurement regarding remittances, a natural log transformation of the remittances variable, and an alternative set of control variables. The research also provides evidence for a possible heterogenous effect of remittances on income inequality based upon a nation's geographic region, as well as a nation's GDP per capita. Additionally, the analysis deduces that the relationship between remittances and income inequality may be non-linear, with remittances exhibiting diminishing marginal returns with respect to income inequality.

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# 1     Introduction

The economic impact of international remittances on migrant-sending countries is difficult to overstate. In 2023, remittance flows, totaling USD 669 billion, exceeded both foreign direct investment (FDI) and international aid as the largest source of external finance in low- and middle-income countries, eclipsing the former by more than USD 250 billion and tripling the latter (Ratha et al., 2023). In its most basic form, remittances are transfers of money from migrants to their home countries, most commonly directed towards family and friends. The inherent nature of these transfers essentially turns remittances into income supplements for recipient families, with the analytical consensus among scholars and economists being that remittances aid in reducing poverty in receiving countries. Strikingly, empirical evidence highlights the superior efficacy of remittances in poverty alleviation compared to foreign aid. Bodomo (2013) discovered this phenomenon in African nations in the 21st century, while Stojanov and Strielkowski (2013) provided compelling findings across a broader array of developing countries over the last half-century that further support this concept.

Conversely, when analyzing the effect of remittances on income inequality there is a clear lack of unanimity among scholars and economists. Income inequality, an incredibly complex socio-economic phenomenon, plays an immense role in shaping the wealth of societies, as well as the opportunities of people within them. While global inequality has declined in our lifetime, its magnitude remains significant, warranting the designation of reducing income inequality as a United Nations Sustainable Development Goal (UN DESA, 2023). The escalating global risks posed by climate change and geopolitical tensions make the mitigation of income inequality especially imperative. The consequences of this issue are rather severe, as outlined by many analytical pieces. Both economic and medical researchers have concluded that societies with higher degrees of income inequality are less healthy, with high correlations between income inequality and drug use, mental illness, teenage motherhood, premature mortality, and obesity (Pickett et al., 2015). Additionally, Kelly (2000) concluded in his research on crime data in urban American counties that "for violent crime the impact of inequality is large" and that "individuals face greater pressure and incentives to commit crime in areas of high inequality" (p. 537).

The relevance of investigating the possible relationship between remittances and income inequality is abundantly clear. Academically, there is still no consensus regarding the effect that remittances have on income inequality.  Remittances are an unstoppable force, dominating traditional sources of external funding over the past decade. Additionally, as financial transactions become more seamless and efficient, remittances become more popular and meaningful. From 2011 to 2020 the median remittance fee dropped from 7.7% to 5.5%, and

this figure is projected to decrease even further in coming years (Beck et al., 2022). Increasing migration coupled with lower fees will ensure that remittances remain a mainstream source of external funding and possible poverty relief. As briefly touched upon above, income inequality is incredibly consequential, and carries with it copious collateral detriments that affect almost all aspects of society. Understanding the economic consequences of this phenomenon is important for policy makers, and if the benefits of remittances outweigh the drawbacks governments should do everything in their power to make the transaction process as seamless as possible. Moreover, additional rigorous research can provide clearer insights into the dynamics of emigration and its effects within a nation and an economy.

There are many aspects surrounding the topic of remittances that create the possibility of a meaningful addition to the existing literature. The discoveries of empirical analysis and literature in the field range from a decrease in inequality, an increase in inequality, and no significant effect. The lack of concurrence among researchers in this realm signifies an opportunity to add to the literature. Additionally, a large portion of the research to date focuses on specific countries, areas within countries, or larger regions, limiting the external validity of any possible conclusions. General empirical analysis is not plentiful in this domain, and of the limited number of general approaches, several analyses are not sufficiently recent to include newer migration trends. For example, the total migrant stock in the Middle East soared from 25 million to 54 million between 2005 and 2015, largely due to major conflicts in Iraq, Syria, and Yemen (Connor, 2016). Migration has steadily increased across the entire world, with a 29% increase in the percentage of the global population living outside their birth country from 1995 to 2020 (McAuliffe & Triandafyllidou, 2021). The emergence of newer migration channels, improved communication technology, as well as the increased ease of global financial transfers has simplified the challenge of immigration for many. The contemporary global migration environment is distinct from those of the past, justifying further investigation with novel data.

Previous general work in the field utilizes samples of nations based on their income levels or their geographic locations, whereas the inclusion of countries based upon their net migration status is presumably more fitting and is yet to be explored. The traditional behavior of remittances may not be properly exhibited in countries that see more immigrants than emigrants, and there are several examples of nations that are relatively poor yet still see more entries than exits. This paper will sample nations based on their net migration statistics, which are expected to more accurately capture the intended effect compared to previous samples of developing nations, as it includes only those countries with a notable culture or trend of emigration.

When examining previous work in the field, more importantly the work that is most parallel to this paper, the possible contributions to the existing literature become clear. The

sample of nations utilized is entirely new, as no other cross-country analysis investigating the relationship between remittances per capita and income inequality has used a sampling technique based on migration data. This allows for a more intuitive representation of nations that have a history or culture of migration to an extent, which in turn creates a more accurate depiction of the true effects of remittances within an economy. Sampling based on migration data and not income level provides a clearer understanding of the economic impact of remittances, as it captures the dynamics and patterns of migration that influence remittance flows and their subsequent effects on the economy. There are systematic differences between migrant-sending nations and poor nations that may influence the effect that remittances have on income inequality. Countries with significant migration flows are more likely to receive substantial remittances, and countries that send large numbers of migrants are inherently more economically-dependent on remittances. This allows for a more pronounced effect, one that is not diluted by nations that lack emigration and thus lack remittances. In addition, the policy implications of the conclusion are much more relevant to nations that explicitly exhibit an exodus of people and a subsequent inflow of remittances as compared to other sampling techniques that may include nations with no trend of emigration. The paper exclusively utilizes 21st century data, whereas other general empirical analyses in the field tend to utilize late 20th century data. The combination of an alternate sample and novel data compared to other general empirical analyses in the field creates a context that is yet to be explored within previous studies, and more importantly allows for a meaningful contribution to the existing literature.

This paper aims to investigate the effect of remittances on income inequality in migrant-sending nations through a combination of panel data analysis techniques. The research will employ both a fixed effects model and a two-way fixed effects model to control for potential endogeneity resulting from time invariant unobserved differences and time-specific confounders. Additionally, supplementary heterogeneity analysis will be conducted in the interest of unearthing further trends in geographic disparities and possible parabolic relationships. The research will aim to provide an answer for the following research question:

*What are the effects of remittances on income inequality in migrant-sending nations?*

The question will be approached through a combination of a fixed effects model and a two-way fixed effects model. The fixed effects methodology inherently controls for time-invariant unit-specific factors, which is immensely valuable in country-based analyses. The two-way fixed effects model adds another degree of control, as it accounts for characteristics that vary over time but are constant across countries. Both regressions will encompass a combination of region-based interaction effects alongside the incorporation of squared

variables and additional interaction effects, thereby facilitating a rigorous examination of the heterogeneity in the dataset. Examining interaction effects between regions and remittances allows for the identification of regional differences in the relationship, which may provide further insights into possible underlying mechanisms driving the effect of remittances on income inequality. It also may unearth the possibility that remittances behave differently in different areas of the world, creating an opportunity for future research. The analysis will also examine interaction effects between remittances and both income and migration, which aims to identify whether the relationship between remittances and income inequality is contingent on the wealth of or amount of emigration from a nation. Additionally, the linearity of the relationship will be challenged through the inclusion of the squared value of the remittance variable. This may capture a potential parabolic relationship, where remittances exhibit diminishing or increasing marginal returns with respect to income inequality. The aforementioned methodological decisions are substantiated by previous research in the field, which is outlined in the literature review section of the paper. Additionally, robustness checks in the form of an alternative measurement of the treatment variable, remittances, a natural log transformation of remittances, and an alternate set of control variables will be utilized in the interest of evaluating the validity and reliability of the findings.

The results of the regression analyses point to a negative relationship between remittances and income inequality, insinuating that as the amount of remittances received increases the income inequality within a nation decreases. This result is, for the most part, further supported by a series of robustness checks, but is not entirely replicable under differing econometric circumstances. Furthermore, the results suggest that a nation's region and income level alter the negative relationship of remittances, with wealthier nations exhibiting weaker relationships in terms of magnitude. Additionally, there is evidence to support the existence of a diminishing marginal effect, suggesting that initially, as remittances per capita increase, income inequality tends to rise. However, as remittances continue to grow, their impact on increasing income inequality diminishes and eventually may reverse, leading to a reduction in income inequality.

The remainder of this paper is organized as follows: Section Two, the literature review, presents the theoretical background and notable empirical literature pertaining to income inequality, remittances, and their relationship. Section Three discusses the details of the data utilized in the analysis. Subsequently, Section Four presents the empirical strategy and its implementation. Section Five outlines and analyzes the empirical findings. Section Six provides a robustness check. The paper concludes with Section Seven, offering a summary of key insights and critiques of the investigation.

# 2        Literature Review

The absence of a consensus in the field of remittances and income inequality has led to several comprehensive pieces of literature exploring this relationship, with a diverse range of analytical techniques, contexts, and most importantly, conclusions. Establishing the current state of knowledge surrounding the factors of interest and their relationships allows for the identification of gaps in the existing research and aids in building the foundation upon which this paper will be based.

## 2.1 Income Inequality

General research in the field of income inequality is incredibly rich and insightful. There are several established theories, empirically proven mechanisms, and promising hypotheses encompassing its primary causes. The substantiation of these causes within the literature allows for the confident use of control variables within the forthcoming empirical analysis, enhancing the internal validity of the research and assisting in isolating the possible effect of the variable of interest, remittances.

Globalization has been deemed by many economists as a major force behind income inequality worldwide. The leading theorem behind this relationship was introduced by Stolper and Samuelson (1941), which posits that changes in the relative price of a good alter the real returns to the factor used intensively in the production of said good. The Stolper-Samuelson theorem states that a relative increase in a good's price increases the intensive factor's return and vice versa. The theorem was utilized as a foundation for the Heckscher-Ohlin trade model, in which the idea of globalization becomes more apparent. With increased globalization comes increased global trade, altering the relative prices of goods and affecting the returns to intensive factors. With labor being a major factor in the production of traded goods, the consequence of easing trade-protection could be a decrease in the return to labor, which is presumed to be wages. Changes in wages correspond to changes in the distribution of income, and with possible wage decreases being concentrated among laborers, income disparity is likely to grow.

The overwhelming majority of analyses studying the theorem conclude that globalization, which has been proxied by a large number of variables, exacerbates income inequality both within and between countries. Revenga (1992), for example, concludes that increased manufacturing import competition within the United States of America in the 1970s and 1980s produced negative effects on both employment and wages. An incredibly similar phenomenon has also taken place in more contemporary times, with Autor et al. (2013) concluding that rising Chinese import competition between 1990 and 2007 was responsible for

25% of American manufacturing unemployment, leading to a sharp uptick in unemployment, disability, retirement, and healthcare expenditures in labor markets across the country. The study also noted that the decrease in employment and wages expanded beyond solely the manufacturing sector, in addition affecting average households employed in other sectors of the economy. This pattern is not specific to only the United States of America, as other Western countries have succumbed in similar manners. Long-run decreases in both wages and employment due to rising import competition from China was also found in Denmark, for example (Utar, 2018). The opening of the global economy has led to the displacement of many low-skilled jobs in Western nations, driving both the employment and earnings of this cohort downwards, further exacerbating the disparity in wealth between the high and lower classes.

The quality of a nation's institutions also plays a major role in governing the level of its wealth disparity. "Institution" itself is a rather broad umbrella term meant to represent formal and informal rules, norms, and organizations that shape economic activity and behavior within a society. The most prominent institution within any nation is the government, which establishes laws, regulations, and policies that ultimately support economic prosperity. While the institution of government is the backbone of most civil societies, institutions also encompass durable financial systems, positive cultural practices, and a strong rule of law. Effective institutions reduce uncertainty within an economy, emboldening entrepreneurial spirit and fostering economic prosperity. It allows for people to elevate their socioeconomic status and overcome the difficult rut of generational poverty.

The idea of institutions and income inequality is not novel, and weak institutions have been held responsible for economic hardship for centuries. The overwhelming majority of empirical analyses studying this relationship confirm this mechanism.

The existence of corruption within a nation's government is a key indicator of a fragile or immoral government. Corruption takes many forms, yet the most mainstream definitions revolve around the use of public office for private benefit. There are several avenues through which corruption could theoretically hinder the wealth accumulation of the poor or cater to and create additional wealth for the upper class. Bribery, the most straightforward form of corruption, is inherently more accessible to the wealthy. This allows for the wealthy to hold outsized influence in the political system, including the design of tax systems. Reducing the progressivity of tax and eliminating wealth transfers through social services further exacerbates the existing income disparity within a nation. Gupta and Alonso-Terme (2002) found in a sample ranging from 1980 to 1997 that an increase of one standard deviation in corruption leads to an approximate 11-point rise in the Gini coefficient of income inequality. The Gini coefficient is the most popular measure of income inequality, and an increase corresponds to greater inequality.

The paper further states that the evidence supports the notion of the "better-connected" capturing the largest portion of the benefits of corruption, and that policy targeting corruption would aid in diminishing wealth disparity.

Chong and Gradstein (2007) utilize a series of institutional measures: government stability, corruption, law and order, democratic accountability, and bureaucracy quality. In a sample of 121 nations from 1960-2000, Chong and Gradstein find that every indicator has a positive and significant effect on income inequality. They further conclude that a mutual reinforcing mechanism exists between income inequality and institutions, indicating that the problem will continue to worsen if not mitigated. However, the supposed reverse causality is dominated by the causality of the effect of institutions on income inequality, indicating that policy still needs to target institutional weakness.

The general consensus in the field of institution strength and income inequality finds a negative relationship, being that stronger institutions, as proxied by a wide range of variables, decrease income inequality.

Simon Kuznets' 1955 paper was one of the most influential pieces of literature relating to income growth and income inequality and laid the foundations for his highly controversial yet insightful "Kuznets curve" (Kuznets, 1955). Essentially, based on empirical testing and controlling for a range of caveats, Kuznets hypothesized that the relationship between the income and income inequality of a nation follows an inverted U shape, where a country is characterized by low inequality when income per capita is low, followed by high levels of inequality when the nation is in a middle-income stage, and succeeded by a return to low inequality at higher levels of income per capita.

While the Kuznets curve has been refuted and criticized with validity, no consensus has since been established regarding how the wealth of a nation impacts income inequality. However, many have come to the conclusion that this very effect is not homogenous across the varying regions of the world. Palma (2011), a famous critic of the hypothesis, states that the "the 'upwards' side of the 'Inverted-U' between inequality and income per capita has evaporated" (p. 1). The paper concludes that Latin American countries and South Africa are distinctly unequal, a further critique of Kuznets' 1955 piece that utilized many Latin American countries in its sample. The most important takeaway from the analysis is the lack of a blanket effect, and Palma emphasizes the fact that income inequality is a complex amalgamation of a range of factors that can never truly be quantified, creating intense region-based differences in the relationship that must be accounted for in any valid investigation.

## 2.2 Remittances and Income Inequality

The relationship between remittances and income inequality has been studied empirically countless times, but as mentioned previously, the field has yet to produce a conclusive answer.

The early stage of empirical analysis in the topic focused largely on micro data. Researchers utilized household surveys and other forms of local data sources and aimed to exploit differences between villages, households, or regions to estimate the effect of remittances on income inequality. Stark et al. (1986) established the groundwork for this line of research, where the paper utilized household data from two Mexican villages only two kilometers apart, 2000 kilometers from the American border. Despite their proximity and similarity in a multitude of variables, one village peculiarly had substantially greater experience with migration to the USA. This distinction was highlighted by the varying percentages of households with at least one migrant to the USA: the more experienced village saw 70% of their households contain at least one of these migrants, while only 25.8% of households in the less experienced village reached this benchmark. The analysis concluded that the effect of remittances on inequality differed per village. The more experienced village saw their remittances have an equalizing effect, whereas the contrary can be stated for the less experienced village.

Adams (1989) follows in the footsteps of Stark et al. (1986) through a similar analysis, this time using household data in rural Egypt. The analysis compares households that received past or current remittances to those with no history of remittance receipts. The paper concludes that remittances worsen income inequality in rural Egypt, as they were primarily received by wealthier village households. Adams attributes this phenomenon to the fact that a disproportionate share of migrants who went abroad originated from these wealthier households, logically resulting in these same households receiving the most money. This is introduced as a major caveat to his findings, as Adams hypothesizes that a more even distribution of households sending migrants would result in a more equitable impact.

Unsatisfied with the continuous lack of unanimity in the field, Adams and Mahmood (1992) again carried out a micro-data-based analysis, utilizing data from rural Pakistan. The household survey was more comprehensive in terms of both migration and remittance data collection, allowing the researchers to use net remittance figures with respect to migration expenses. Contrary to both Adams (1989) and Stark et al. (1986), the paper concludes that there is a neutral effect due to the fact that remittances were rather equal across the quintiles of income, which the authors note as surprising as general migration costs in South Asia are high.

Similar micro-data approaches have also been utilized in more contemporary empirical studies, with higher quality data and more novel analytical techniques enhancing the reliability and depth of the findings. Cuecuecha et al. (2013) examined the impact of remittances on poverty and income inequality using the 2005/2006 Ghanaian national household survey. Households were divided based on their remittance-receiving experience. This improved upon previous literature that instead divided households based on the existence of an emigrant, irrespective of whether said household was receiving remittances. Through a two-stage multinomial logit model with instrumental variables, the paper concluded that international remittances caused the Gini coefficient to increase by an extraordinary 17.4%, crediting this phenomenon to the fact that remittances flowed primarily to wealthy households that could afford to finance emigration.

Margolis et al. (2014) carried out an analysis on the effects of remittances in Algeria through a survey of their own. Their survey allowed for improved precision compared to general household surveys conducted by governments, as these surveys often only capture official remittances. This poses a challenge as the researchers estimated that in Algeria over 90% of remittances are informal. Utilizing data from 1,200 households in two regions, the paper estimated that remittances decreased the Gini coefficient by 8%, decreasing income inequality.

Evidently, conclusions based on household surveys and other forms of micro-data are incredibly convoluted, indicating that the given result of any analysis is uniquely reliant upon the location in which it is conducted. Analyses utilizing larger samples of nations may unearth different results, or perhaps different mechanisms justifying said results.

Koechlin and Leon (2007) were among the first to conduct a general empirical analysis on a large sample of nations, with their data covering 166 different nations from 1970 to 2003. With the assistance of instrumental variables, panel data regressions, and ordinary least squares regressions (OLS), the paper concluded that the relationship between remittances and income inequality follows an inverted-U shape. The intuition behind this shape is that the initial stage of international migration is characterized by high costs, both financially and socially. Only those who are relatively wealthier in this stage can afford to leave to another nation, causing remittances to be sent to households that are generally affluent. As channels of migration become more established and network effects become stronger over time, the financial requirements of emigration diminish, creating greater accessibility across the income spectrum. The paper deduces that the effect remittances have on income inequality is dependent upon the amount of remittances received and does not provide a conclusion regarding a general effect.

Azizi (2021), contrarily, makes a firm conclusion based upon an empirical analysis conducted upon developing countries. The study utilized data from 103 different nations, with

data for each country being collected at various intervals between 1990 and 2014. Utilizing a range of instrumental variables, panel data regressions and fixed effects models Azizi came to the conclusion that a 10% increase in per capita remittances led to a 0.3% decline in the Gini coefficients of developing nations, corresponding to a decrease in income inequality. Additionally, remittances increased the wealth share of the poorest decile and quantile of the population and exhibited the opposite for the wealthiest decile and quantile in these nations.

## 2.3 Hypotheses

The clearest conclusion provided by the existing literature is the lack of a unanimous conclusion. Both micro- and macro-data analyses have yielded varying results, demonstrating that the choice of methodology is not fully determinant of the outcome. However, the literature has provided strong theories that may manifest themselves within the results of this research.

Relying on the well-substantiated theory of an inverted U-shape relationship proposed by Koechlin and Leon (2007), in tandem with the conclusions related to migration history and the income inequality effect of remittances propagated by Stark et al. (1986), one can form a logical hypothesis related to how remittances impact income inequality in migrant-sending nations. Because the analysis will be performed solely on migrant-sending nations, it is likely that the nations within the sample reflect a relatively deep history or culture of migration, indicating that remittances are not completely novel to the receiving nation. This corresponds with a generally higher level of remittances and reflects the stage of the relationship where remittances begin to exert an equalizing effect according to Koechlin and Leon (2007). Considering the aforementioned points, the following hypothesis is formed:

*Remittances have a negative effect on income inequality in migrant-sending nations.*

A second, related hypotheses can be posited to address the impact of remittances on income inequality on a regional basis. The emphasis of Palma (2011) on regional differences in the contributors to income inequality provides a strong methodological justification for analyzing results controlling for a given nation's region. In tandem with the general findings of Adams and Mahmood (1992) of high migration costs in South Asia, a phenomenon that persists today (Abella & Martin, 2014), the following hypothesis is formed:

*Remittances have the largest positive effect on income inequality in Southern Asian countries.*

# 3    Data

In order to investigate the research question, the analysis utilizes a large panel data set constructed from a wide variety of variables. The data section will provide details regarding the variables, their sources, their creation, the justification for their inclusion, and the sample upon which the analysis will be based.

## 3.1 Sample

The characterization of nations into migrant-sending versus migrant-receiving is deduced based on basic net migration data. A nation is deemed as a migrant-sending nation if it exhibits a net outflow of people in five successive years, and only the years in which a nation experiences a net outflow enters the sample. This ensures that the sample contains only nations with a trend of outwards migration. The detailed sample of nations, including their regional designation, and their respective time intervals, is presented in Entry 1 of the appendix. The sample comprises 84 nations, with data collected in various intervals between 2002 and 2021. Among these, 31 nations have uninterrupted data spanning the entire period from 2002 to 2021. The remaining countries have data collected in intervals either due to their migration status or gaps in data availability. In total, the sample contains 1276 entries. The designation of nations into regions is in accordance with the United Nations geoscheme, in which the geographical subregion division will be utilized (United Nations Statistics Division, n.d).

The regions included within the sample are the Caribbean, Central America, Central Asia, Eastern Africa, Eastern Asia, Eastern Europe, Middle Africa, Northern Africa, Northern Europe, South America, South Eastern Asia, Southern Africa, Southern Asia, Southern Europe, Western Africa, and Western Asia.

Figure 3.1 displays the number of countries belonging to each region in the sample. It is important to note that there are no nations from the North America, Western Europe, or Australia and New Zealand regions, a general testament to their wealth and status as migration destinations. Middle Africa is represented only by one nation largely due to data problems. The distribution of nations generally matches wealth patterns between the global north and south and there are no notable surprises. The included European regions, while wealthy relative to global standards, still see significant amounts of emigration due to less-challenging restrictions regarding intercontinental movement.

Figure 3.1: Number of Countries by Region in the Sample
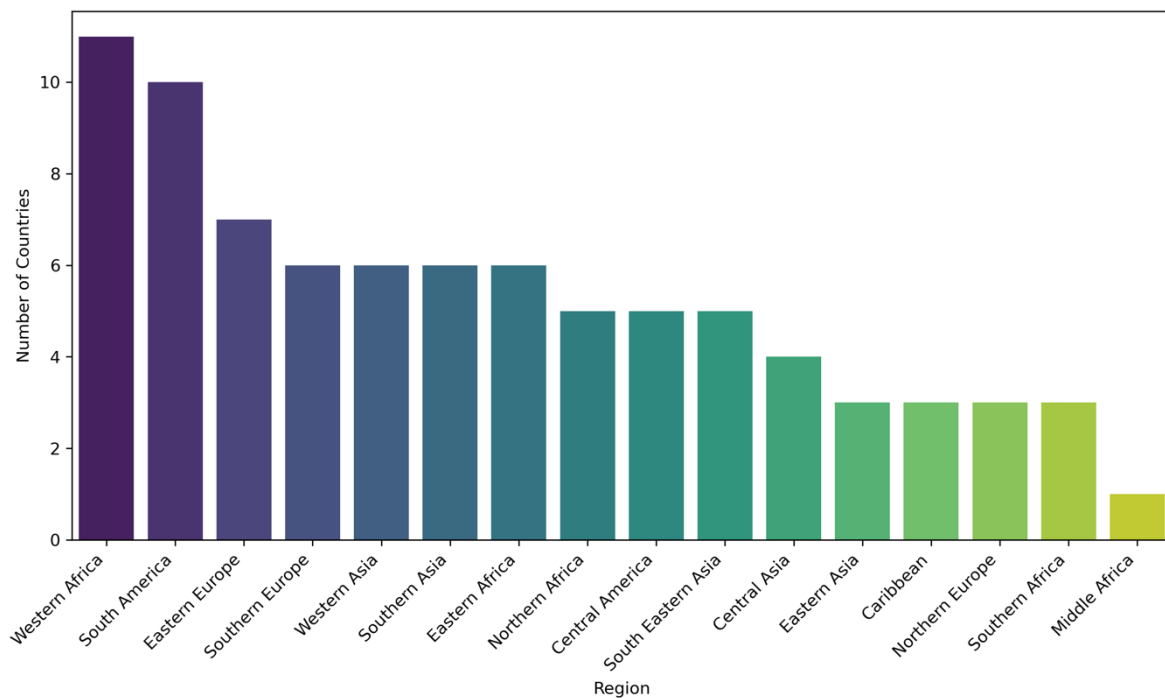


## 3.2 Income Inequality Measure and Remittance Measure

There exist several measures to quantify income inequality, each with its own strengths and deficiencies. The most popular indicator among the analyses reviewed in the literature review section and in the general realm of income inequality research is the Gini index. Unfortunately, reliable Gini index figures are difficult to come by, especially in less affluent nations. The simple income inequality measure of nation $i$ in year $t$ that will represent the dependent variable in this analysis is composed as follows.

$$Income\ Inequality\ Measure_{it} = Top\ 10\%\ Income\ Share_{it} - Bottom\ 50\%\ Income\ Share_{it}$$

The measure can be interpreted as the difference in income share between the top 10% and bottom 50% of a nation. The decile shares of income are sourced from the World Inequality Database (WID), an extensive and comprehensive database encompassing detailed income inequality data for nearly every nation worldwide covering the last 60 years. The measure itself captures the extremes of income concentration due to its focus on the income share of the wealthy minority, the top 10%, and the overall majority, the bottom 50%. The distribution of the income inequality measure is approximately normal, allowing for it to be utilized in its standard,

linear form. Additionally, the measure is simple and intuitive, aiding in the overall interpretability of results.

Similarly, there are a large number of indicators representing remittances. Remittance figures are estimated by the International Monetary Fund (IMF) through examining the national balance of payments statements published by a nation's central bank (International Monetary Fund, 2008). The IMF sums "Compensation of Employees" and "Personal Transfers" to deduce its figure. The former encompasses income received by employees of embassies, foreign companies, and international organizations, in addition to the income earned by temporary migrant workers. The latter relates to transfers between residents of differing nations, akin to the traditional portrayal of a remittance. The IMF justifies the inclusion of the less-traditional compensation of employees component within the measure of personal remittances because it pertains to the earnings of geographically mobile workers and benefits households in a territory different from where the work is carried out. For purposes of this research, remittances will be measured by personal transfers received per capita in terms of current (2024) US dollars. The measure controls for population while simultaneously capturing solely the personal transfers component of the IMF's remittance figure. This component reflects the traditional remittance process more accurately as it simply measures monetary transfers between residents of two different nations. The figure can essentially be interpreted as a per-person representation of the total remittances received in US dollars.

## 3.3 Control Variables

As substantiated in the literature review section, several control variables are required in order to effectively isolate the possible effect of remittances and reduce potential biases or risks of endogeneity. The impacts of institutions, income, globalization, and geographic location are well-established in the literature and as such will be employed in the analysis. All control variables included have plausible effects on both income inequality and remittances, with the inclusion of these variable aiding in the mitigation of endogeneity through moderating the impact of possible confounding factors.

The World Bank provides six varying "Worldwide Governance Indicators" reflecting the "household, business, and citizen perceptions of the quality of governance" of a given nation (Kaufmann & Kraay, 2023). The general effect of institutions on income inequality is comprehensive, as outlined in the literature review, and plausible mechanisms exist through which these institutions may affect remittance figures. Poorer institutions are generally representative of poorer life outcomes, prompting emigration and subsequently remittance

transfers. The confounding nature of these indicators make their inclusion as control variables beneficial to the mitigation efforts regarding endogeneity. These figures are based upon an aggregation of data from private firms, nongovernmental organizations, think tanks, and international organizations. All of these indicators are in units of a standard distribution with lower and upper bounds of -2.5 and 2.5 respectively. A higher score corresponds to better governance. It is important to note that none of the indicators utilized data regarding income inequality within their calculations.

The Voice and Accountability indicator aims to capture perceptions on general freedoms and the strength of democracy within a nation. These freedoms include the freedom of media, association, and expression.

Regulatory quality refers to the perceived capacity of the government to develop and enforce effective policies and regulations conducive to fostering private sector growth and advancement.

Political Stability and Absence of Violence/Terrorism assesses perceptions regarding the probability of encountering political unrest or violence, including acts of terrorism.

The Rule of Law indicator encompasses perceptions regarding the degree to which individuals trust and adhere to societal norms and regulations. This includes the effectiveness of contract enforcement, protection of property rights, law enforcement agencies, judicial systems, as well as the prevalence of criminal activities and violence.

Government Effectiveness relates to the caliber of public services, civil services, and the extent to which the quality of said services are independent from political pressures. Additionally, it encompasses the effectiveness of policy development and execution, as well as the government's reliability in upholding these policies.

Finally, the Control of Corruption indicator reflects perceptions of the degree to which public authority is exploited for private benefit. This includes both grand and petty forms of corruption, in addition to the sway that private interests and elites hold over the state.

The Human Development Index (HDI) was extracted from the United Nations Development Programme. HDI is a general index that aims to measure quality-of-life beyond just economic outcomes and encompasses values such as health and contentment, among many others. The indicator takes the form of a score between 1 and 100. The Human Development Index influences income inequality through many mechanisms as it includes composite indicators relating to health and education, both of which are major determinants of income inequality. The influence of HDI scores on remittance figures is also rather rudimentary, as quality-of-life concerns are a major emigration incentive. Nations with a lower quality-of-life may experience larger flows of emigration, increasing the number of remittances received.

The following variables are all sourced from the World Bank's DataBank and aim to further control for confounding influences. Net migration as a percentage of the population likely influences remittance flows as the number of migrants inherently alters the potential amount of remittances sent. However, it is important to note that this variable does not fully capture the mechanism of increased emigration leading to larger remittance flows. This shortcoming is attributable to the fact that the figure includes both inflows and outflows of migrants, without solely isolating emigration. This indicates that confounding variables that influence remittance figures through changes in emigration still need to be controlled for. There are many mechanisms through which this variable may also plausibly influence income inequality, such as labor supply dynamics, human capital flight, and the creation of dependencies due to changes in family structure, among others. The confounding nature of this variable is clear, leading to its deployment as a control variable in the analysis.

Net inflows of foreign direct investment expressed in percentage of GDP and trade as a percentage of GDP both serve as proxies for globalization. The former aims to represent the global financial integration of a nation, whereas the latter aims to quantify the global economic integration of a nation. The effect of globalization on income inequality is well-established as outlined in the literature review. These variables are essential as controls as globalization may also plausibly influence remittance figures. Economically and financially globalized nations are more likely to experience social and cultural globalization, facilitating easier movement of people across borders through enhanced transportation, communication, and reduced regulatory barriers. This increase in migration inherently boosts remittance figures. Moreover, financial integration may also streamline the remittance process itself through the reduction of transaction fees and general increases in efficiency, presenting an additional mechanism through which globalization may influence remittances.

GDP per capita expressed in current US dollars, annual GDP per capita growth percentage, general government final consumption expenditure as a percentage of GDP, and the percentage of the total labor force that is unemployed all serve as general economic indicators that are vital in providing a comprehensive understanding of a country's economic health and development. The works of Kuznets (1955) and Palma (2011), as reviewed earlier, underscore the inherent complexity in definitively quantifying the impact of economic growth and other related indicators on income inequality. Nevertheless, these studies suggest that a relationship does exist between an economy's strength and income inequality, albeit a convoluted one. The general economic health of a nation additionally holds a plausible effect on remittance figures, as economic incentives are traditionally the largest driver of outward migration, which

subsequently alters remittance figures. The confounding nature of general economic indicators necessitates their inclusion as control variables within the analysis.

The final control variable utilized is total natural resources rents as a percentage of GDP. While this aspect was not explicitly explored within the literature review, there exist previous analyses that justify its inclusion as a control variable. Auty (1993) was the first to put a name to the "Resource curse," a general phenomenon in which resource-rich nations tend to have warped economic outcomes in terms of size, concentration, and growth. Further empirical analyses have extended upon Auty's work, with varying conclusions (Gemicioglu et al., 2024; Hartwell et al., 2022). However, even given the ambiguity of the results of previous analyses, it is fair to state that the resource abundance of a nation may play a role in its level of income inequality. Previous research in the realm of natural-resource dependance and conflict has suggested that higher levels of resource extraction and rents may both cause and prolong armed conflicts and civil unrest, which of course subsequently drives emigration and remittance changes (Berman et al., 2017; Struver & Wegenast, 2018). With plausible impacts on both income inequality and remittances, it is clear the natural-resource rents of a nation is a confounding factor that should be controlled for.

Table 3.1: Descriptive Statistics of Sample

| Variable | Obs. | Mean | Std. Dev. | Minimum | Maximum |
|---|---|---|---|---|---|
| Control of corruption | 1276 | -0.477 | 0.593 | -1.695 | 1.397 |
| FDI net inflows (% of GDP) | 1276 | 3.461 | 3.635 | -11.191 | 43.912 |
| GDP per capita | 1276 | 4337.087 | 4889.916 | 186.663 | 32127.983 |
| GDP per capita growth | 1276 | 2.941 | 4.208 | -29.921 | 19.938 |
| Government expenditure (% of GDP) | 1276 | 14.246 | 5.202 | 2.360 | 43.482 |
| Government effectiveness | 1276 | -0.385 | 0.615 | -2.273 | 1.201 |
| HDI | 1276 | 65.045 | 12.909 | 33.500 | 89.000 |
| Political stability and absence of violence/terrorism | 1276 | -0.416 | 0.781 | -2.996 | 1.201 |
| Regulatory quality | 1276 | -0.279 | 0.648 | -2.080 | 1.670 |
| Rule of law | 1276 | -0.460 | 0.610 | -1.909 | 1.369 |
| Total natural resources rents (% of GDP) | 1276 | 5.383 | 7.217 | 0.001 | 49.205 |
| Trade (% of GDP) | 1276 | 74.990 | 31.489 | 21.856 | 186.428 |
| Unemployment | 1276 | 8.626 | 6.408 | 0.116 | 37.320 |
| Voice and accountability | 1276 | -0.296 | 0.750 | -2.124 | 1.191 |
| Income inequality measure | 1276 | 33.092 | 12.097 | 5.140 | 66.020 |
| Net migration (% of population) | 1276 | -0.003 | 0.004 | -0.041 | -0.000 |
| Remittances per capita | 1276 | 190.802 | 221.617 | 0.013 | 1297.936 |

Table 3.1 displays the descriptive statistics pertaining to the primary variables used in the analysis. The mean of all six governance indicators being below zero signifies that, on average, this sample performs below the global average in these areas.  The sample captures nations confined within the shackles of extreme poverty, as provided by the minimum GDP per capita value of 186.663, yet also includes relatively wealthy nations. All in all, the sample is rather diverse but for the most part consists of less developed nations, as naturally those nations experience the largest waves of emigration.

Additionally, several variables were created in the interest of investigating heterogeneity. Firstly, the remittances per capita variable was squared in order to capture any possible parabolic relationship, which would be vaguely in line with the findings presented by Koechlin and Leon (2007). Furthermore, an interaction effect was added between remittances per capita and each individual region. Western Africa will act as the omitted region in the interest of avoiding collinearity. The region was selected as the reference category due to it holding the largest number of observations, making it more likely to provide a stable and reliable baseline. The final two interaction effects will be constructed using the GDP per capita variable and the net migration variable, each of which will be multiplied by remittances per capita. The former interaction aims to capture how the wealth of a nation alters the effect of remittances on income inequality, whereas the latter attempts to quantify how the relative size of a nation's outward-migration flow modifies the aforementioned effect.

# 4      Methodology

The most common analytical techniques utilized with panel data are the fixed and random effects models. The decision regarding which model suits the given context more appropriately relies on several factors largely relating to the assumptions that both models make. The following section justifies the choice of a two-way fixed effects model as opposed to a random effects model, as well as outlines the specific regression structure that will be utilized in order to unearth the potential effect of remittances on income inequality.

## 4.1 Fixed Effects versus Random Effects

The primary difference between the two models is rooted within the assumptions concerning the nature of unobserved heterogeneity. The random effects model assumes that unobserved unit-specific effects are uncorrelated with the independent variables (Wooldridge, 2010). In the given context, this is akin to assuming that unobserved country-specific traits, such as cultural factors and historical context, are not correlated with any of the independent variables within the analysis. Intuitively, this seems farfetched. For example, it is well established that colonial ties between nations facilitate migration, violating this assumption (Mukherjee, 2010). Fortunately, there are statistical measures that can be applied to test this assumption, adding a supplementary level of confidence in the decision.

The Durbin-Wu-Hausman test compares the estimates of the two models, checking for significant differences between coefficients. The null hypothesis favors the random effects model, deducing that the unit-specific effects are uncorrelated with the independent variables, whereas the alternative hypothesis alludes to a violation of the assumption, favoring the fixed effects model (Hausman, 1978). The results of the test can be found in Entry 2 of the Appendix. The results indicate that the fixed effects model is more appropriate in the given context.

## 4.2 Fixed Effects Model

The fixed effects model is advantageous for panel data as it controls for unobserved heterogeneity through allowing each country to have its own intercept. When examining nations this is incredibly valuable, as it essentially captures inherent aspects of a nation that do not change over time. The general fixed effects regression equation is defined as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \sum_{j=2}^{m} \beta_j Z_{jit} + \alpha_i + \epsilon_{it}$$

The $Y_{it}$ and $X_{it}$ terms represent the dependent and independent variable of interest for country $i$ at time $t$. The $Z_{jit}$ term represents the value of the given control variable, of which there are multiple as outlined previously, with the $m$ term corresponding to the total number. The $\alpha_i$ term represents the individual fixed effect of country $i$, and $\epsilon_{it}$ reflects the error term. The $\beta_0$ coefficient represents the intercept, which will be absorbed by the individual fixed effect $\alpha_i$. It is included in the equation for clarity and completeness but will not be estimated. The $\beta_1$ coefficient quantifies the potential effect of the variable of interest, remittances per capita.

It is imperative to discuss the assumptions of the model that permit the establishment of causality. The fixed effects model shares key assumptions with most regression models, such as zero conditional mean, no perfect multicollinearity, and homoskedasticity. The zero conditional mean assumption is daunting to establish in non-experimental contexts. This assumption states that the unobserved factors, represented by the error term, are uncorrelated with the independent variables. There is no statistical test to uphold or refute the assumption, but very rarely can a non-experimental setting validate the assumption. It is naïve to state that there are zero omitted variables bias within the models. Although causation cannot be directly assumed, the analysis still provides valuable insights into possible relationships and heterogeneities.

The most crucial assumption that is inherently unique to the fixed effects model family is that the country-specific effects are constant over time for each nation. There is a lack of a direct statistical test to address this assumption, but the results of the Hausman test indirectly support the validity of the assumption. In terms of real-world plausibility, it is difficult to confidently establish whether country-specific effects change over the 20-year sample. While larger factors, such as culture, history, and geography are likely to stay constant, policy, geopolitical contexts and economic shocks are plausibly subject to change. The risk of this assumption's violation also restricts the establishment of causality.

## 4.3 Two-Way Fixed Effects Model

The two-way fixed effects model acts as an extension of the fixed effects model that additionally controls for unobserved heterogeneity within each time period of the data. In the given context, this corresponds to year-specific fixed effects. With the Great Recession in the late 2000s and the COVID-19 pandemic in the early 2020s, there are undoubtedly time-specific shocks that influence income inequality and alter the nature of migration, justifying the use of a time-based model (Meyer & Sullivan, 2013; McCann et al., 2020). The general equation of the model is as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \sum_{j=2}^{m} \beta_j Z_{jit} + \alpha_i + \gamma_t + \epsilon_{it}$$

The composition of the model is identical to that of the fixed effects model, barring the admission of $\gamma_t$, which represents the fixed effect of year $t$. While causality is very difficult to establish given the context of the data, the use of both fixed effects and two-way fixed effects improves the causal probability of the analysis. As mentioned previously, the inclusion of fixed effects controls for time-invariant characteristics of each nation. Additionally, the presence of year fixed effects in the two-way fixed effects model allows for the model to control for temporal trends that may influence income inequality, isolating the impact of the remittance variable more effectively. The method brings the research closer to causality by alleviating a large portion of the existing omitted variable bias when compared to a traditional OLS regression.

## 4.4 Method

In determining the effect of remittances per capita on income inequality, two regression models will be estimated for both the fixed effects model (Models 1 and 2) and the two-way fixed effects model (Models 3 and 4). The first regression model will simply include the control variables, whereas the second model will append variables relating to the investigation of heterogeneity, comprising regional interaction effects, interaction effects with control variables, and a simple squaring of the variable of interest. The full equation of the regression model for the fixed effects model takes the following form:

$$IncomeInequalityMeasure_{it} = \beta_0 + \alpha_i + \beta_1 RemittancesPerCapita_{it}$$
$$+ \beta_2 Corruption_{it} + \beta_3 FDI_{it} + \beta_4 GDPperCapita_{it} + \beta_5 GDPperCapitaGrowth_{it} + \beta_6 GovernmentExpenditure_{it}$$
$$+ \beta_7 GovernmentEffectiveness_{it} + \beta_8 HDI_{it} + \beta_9 PoliticalStability_{it}$$
$$+ \beta_{10} RegulatoryQuality_{it} + \beta_{11} RuleofLaw_{it} + \beta_{12} NaturalResourcesRent_{it} + \beta_{13} Trade_{it}$$
$$+ \beta_{14} Unemployment_{it} + \beta_{15} VoiceandAccountability_{it} + \beta_{16} NetMigration_{it} + \beta_{17} RemittancesPerCapita_{it}^2$$
$$+ \beta_{18}(RemittancesPerCapita_{it} * GDPperCapita_{it}) + \beta_{19}(RemittancesPerCapita_{it} * NetMigration_{it})$$
$$+ \sum_{r=20}^{15} \beta_{20+r}(Region_r * RemittancesPerCapita_{it}) + \epsilon_{it}$$

The first estimated regression, Model 1, includes all variables up until and including "NetMigration," whereas the second regression, Model 2, encompasses the full model, including the added interaction effects and the squared variable. As mentioned within the data section, the model includes all 15 regions of the sample excluding Western Africa, which will be used as the reference category. The regression equations for Models 1 and 2 in full can be found in Entries 3 and 4 of the appendix, respectively.

The two-way fixed effects regression models closely resemble Models 1 and 2, with the only difference lying in the inclusion of the year-fixed effect estimator $\gamma_t$. Model 3 includes solely the control variables, whereas Model 4 sees the addition of the added interaction effects and squared variable. Dummy variables corresponding to each year of the sample will be utilized and will represent the year-fixed effects, with the first year of the sample, 2002, being used as the reference category. The full regression equations for Models 3 and 4 can be found in Entries 5 and 6 of the appendix, respectively.

## 4.5 Robustness Check Method

The main methodology will be followed by a robustness check, aiming to examine whether the results found in the main method are independent from specific assumptions, models, or peculiarities in data. The further validation of results through alternative methods suggests that the findings are reliable and can be replicated under varying econometric conditions. This research will utilize an alternative representation of the remittances variable, a natural log transformation of the remittances variable, and a different set of control variables in order to assess the consistency and reliability of the findings. All robustness checks will utilize the full two-way fixed effects model, Model 4, as their bases.

Remittances will be represented by the personal remittances received as a percentage of GDP indicator, with the data being sourced from the World Bank. Whereas the remittances per capita measurement controls for population, the alternative measure controls for economic size. However, the alternative figure utilizes all remittances, including compensation of employees as outlined in the data section, which may slightly affect the comparability of the findings. The natural log transformation of the remittances per capita variable will be utilized in the interest of verifying whether the conclusions drawn from the original specification are not overly sensitive to the functional form assumptions. It also may be able to capture additional non-linearities in the relationship between remittances and income inequality. Finally, a slightly modified set of control variables will be employed in the regression analysis justified by the potential existence of "bad" controls within the original model. There are many avenues through which a control variable may be deemed as inappropriate, with the most pressing in this context being the possibility of control variables representing potential outcomes. This refers to control variables that may be affected by the treatment variable, remittances per capita. Previous empirical analysis exploring the effect of remittances on GDP per capita, the growth of GDP per capita, and unemployment have suggested that an effect may exist, potentially deeming these controls to be weak and possibly amplifying biases (Cazachevici et al., 2020; Elorabi et al., 2024). For this reason, Model 4 will be re-estimated with the omission of the named variables.

# 5    Results

This section presents the results of the fixed effects and two-way fixed effects regression models outlined in the methodology section. In addition to its presentation, the results will be interpreted, analyzed, and possibly justified with inferences drawn from the data and previous research within the field.

Table 5.1 presents the final regression analysis results for Models 1, 2, 3, and 4. In the interest of readability and clarity, certain aspects of the results have been summarized, namely the regional interaction effects and the fixed year effects. The full regression results can be found within Entry 7 of the appendix.

The remittances per capita variable is negative and significant at the 1% level across all four models. The added controls in Models 2 and 4 result in the variable's coefficient increasing in magnitude in absolute terms, becoming more negative. The negative sign of the coefficients suggests that as remittances per capita increase, the wealth disparity between the top 10% and bottom 50% of a nation diminishes, supporting the hypothesis established in the literature review section of the paper. Specifically, on average, a $1 increase in remittances per capita is associated with a reduction in the income disparity between the top 10% and the bottom 50% by 0.005 percentage points according to the most conservative estimate, or by 0.039 percentage points according to the largest estimate, ceteris paribus. The relatively small magnitude of the coefficients was to be expected, as the income inequality measure represents a large amount of wealth within a nation and a unit increase in the variable of interest corresponds to just a single US dollar. Thus, even small numerical changes indicate substantial financial rearrangements. A 1% shift in income from the top 10% to the bottom 50% could be worth billions of US dollars in larger economies within the sample. The small coefficients observed in the analysis are consistent with the substantial financial scale of the income inequality measure utilized.

A 191 US dollar increase in remittances per capita, which is equivalent to the average remittance per capita figure in the sample displayed in Table 3.1, provides a decrease in the income disparity between the top 10% and bottom 50% by 0.955 percentage points according to the most conservative estimate, or by 7.449 percentage points according to the largest estimate, ceteris paribus. These magnitudes are evidently much larger and correspond to immense shifts in wealth. The negative relationship could potentially be substantiated through the mechanism discovered by Stark et al. (1986), where the Mexican village with a larger legacy of migration exhibited a negative relationship between remittances and income inequality, while the village with little history of migration saw remittances further bolster income inequality. The sample at hand, consisting only of nations with at least five successive years of net emigration, corresponds to the former village to a greater degree than it does to the latter. While

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it is impossible to quantify a culture or legacy of migration, sampling nations based on their migration status, rather than their development level, inherently ensures a closer alignment with countries characterized by high migration activity.

In a similar vein, the interaction effect between remittances per capita and net migration is insignificant in both instances of its inclusion. This relationship may have been able to provide a clear mechanism behind the discovered negative relationship between remittances per capita and income inequality. A significant and negative coefficient would have corresponded to the notion that the more migrants a nation sends, the stronger the equalizing effect, loosely matching the discovery of Stark et al. (1986). The absence of significance may further reinforce the fact that quantification of a nation's migration legacy purely through outward migration statistics is imperfect or may simply show that the conclusion of Stark et al. (1986) is only applicable when examining domestic trends as opposed to international ones.

The squared remittances per capita variable is negative and significant at the 1% level across both models, suggesting that there may be an aspect of non-linearity in the relationship between remittances and income inequality. The negative coefficient further suggests the existence of a diminishing marginal effect. Initially, as remittances per capita increase, income inequality rises, yet as remittances continue to grow, the unequalizing impact diminishes and may even reverse when considering the negative value of the remittances per capita coefficient. Mathematically, the point of reversal is calculated as the maximum value of the parabolic relationship. However, due to the presence of multiple interaction effects in the analysis, the concept of turning points becomes less interpretable as they are contingent upon specific observations. Each nation experiences a distinct turning point each year, influenced by the annual fluctuations in GDP per capita and net migration as a percentage of the population. This variability renders these turning points unreliable for meaningful interpretation.

Koechlin and Leon (2007) justify their inverted U-shape discovery through the notion of high initial barriers to migration causing early migrants to come from relatively wealthier households. The negative coefficients in the results of Models 2 and 4 also suggest an inverted U-shape in the relationship between remittances and income inequality. In the given context, one would infer that an increase in remittances received reflects the fact that migration has become more accessible, thus spreading remittance inflows across the income spectrum, bolstering the equalizing effect. It is difficult to discredit this mechanism, as previous findings using microdata related to quintiles, such as Adams (1989), Adams and Mahmood (1992), and Cuecuecha et al. (2013), discovered that the poorest households were never the primary recipients of remittances, causing remittances to initially elevate inequality. The results align with previously established theory, and this replication may strengthen the overall confidence of the observed effect.

The interaction effect between remittances per capita and GDP per capita is positive and significant at the 1% level in both instances of its inclusion. This suggests that higher GDP per capita values correspond to weaker equalizing effects of remittances. The beneficial impact of remittances on decreasing income disparity is stronger in poorer countries and weakens as countries become richer. Aspects of this result corroborate well-established theories relating to remittances and poverty alleviation. It is likely that income supplements in the form of remittances in poorer nations are utilized for more essential purposes that aid in breaking the cycle of poverty, alleviating income inequality. Wang et al. (2021) concluded that in Kyrgyzstan, one of the poorest nations in Central Asia and within the sample, remittance receipts supplemented spending on housing and medical expenses. Moreover, increases in remittances in wealthy households were associated with elevated consumption of less essential consumer goods. Yang (2008) concluded that remittances in the Philippines, another nation within the sample, led to increases in expenditures related to schooling, and simultaneously led to a decrease in child labor. Inherently, remittances in wealthier nations with higher standards of living are more likely to be saved, invested, or spent on less essential goods.

The second hypothesis that was posited predicted that the Southern Asia region would see the largest positive effect. This was based both upon previous research in the field and high migration costs that continue to affect the region, creating barriers to migration that only the wealthy could overcome. The specific coefficients of each regional interaction with the remittances per capita variable, displayed in Entry 7 of the appendix, contradicts the formed hypothesis. Of all the significant interactions, it was Eastern Asia that yielded the largest positive effect. Southern Asia lagged Central America, Central Asia, Eastern Asia, and Southern Europe in this area. However, the relatively small number of countries per region, six in Southern Asia and three in Eastern Asia, cause the generalizability of these results to be limited. Further research with a larger and more diverse sample of countries is necessary to confirm these findings and provide a more robust understanding of the regional variations in the effect of remittances.

The yearly coefficients, included in the interest of investigating the general trend of income inequality in the sample, can be found in Entry 7 of the appendix. From 2009 to 2021, the coefficients are predominantly negative and significant, indicating that in these years in general, a significantly more equal income distribution was observed when compared to 2002. Interestingly, not a single year between 2003 and 2008 exhibited a significant coefficient. Therefore, it may be very possible that the Great Recession created a permanent effect on income distributions across the world. The significance of these variables suggests that temporal factors play a crucial role in affecting income inequality. The inclusion of year fixed effects in both Models 3 and 4 allows for said models to capture annual variations, further isolating the effect of remittances on income inequality and providing added internal validity.

Table 5.1: Regression Results for Models 1, 2, 3, and 4.

| Variable | (1) Fixed Effects | (2) Fixed Effects with Heterogeneity Checks | (3) Two-Way Fixed Effects | (4) Two-Way Fixed Effects with Heterogeneity Checks |
|---|---|---|---|---|
| Remittances per Capita | -0.005*** | -0.039*** | -0.003*** | -0.038*** |
| | (0.001) | (0.008) | (0.001) | (0.008) |
| Control of Corruption | 2.872*** | 3.312*** | 2.981*** | 3.364*** |
| | (0.703) | (0.695) | (0.695) | (0.688) |
| FDI Net Inflows (% of GDP) | -0.052 | -0.028 | -0.081** | -0.069* |
| | (0.035) | (0.035) | (0.036) | (0.036) |
| GDP per Capita | 0.000 | -0.000** | 0.000 | -0.000* |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| GDP per Capita Growth | -0.025 | -0.029 | -0.039 | -0.039 |
| | (0.026) | (0.026) | (0.030) | (0.030) |
| Government Expenditure (% of GDP) | -0.277*** | -0.295*** | -0.268*** | -0.295*** |
| | (0.052) | (0.053) | (0.052) | (0.053) |
| Government Effectiveness | 2.300*** | 2.671*** | 1.691** | 2.050*** |
| | (0.676) | (0.658) | (0.673) | (0.658) |
| HDI | -0.179*** | -0.064*** | 0.213*** | 0.237*** |
| | (0.039) | (0.043) | (0.079) | (0.079) |
| Political Stability and Absence of Violence/Terrorism | -1.061*** | -0.776** | -0.894*** | -0.641** |
| | (0.316) | (0.321) | (0.314) | (0.319) |
| Regulatory Quality | -0.191 | -0.301 | -0.151 | -0.159 |
| | (0.661) | (0.654) | (0.667) | (0.662) |
| Rule of Law | 1.136 | -0.427 | 0.295 | -0.899 |
| | (0.776) | (0.809) | (0.795) | (0.822) |
| Total Natural Resources Rents (% of GDP) | 0.041 | 0.017 | -0.002 | -0.030 |
| | (0.029) | (0.029) | (0.031) | (0.030) |
| Trade (% of GDP) | 0.004 | 0.002 | 0.009 | 0.006 |
| | (0.007) | (0.007) | (0.007) | (0.007) |
| Unemployment | 0.003 | 0.093** | 0.039 | 0.114** |
| | (0.044) | (0.044) | (0.045) | (0.044) |
| Voice and Accountability | -2.059*** | -1.929*** | -1.905*** | -1.770*** |
| | (0.576) | (0.570) | (0.569) | (0.564) |
| Net Migration (% of Population) | -69.086 | -21.392 | -55.622 | -7.824 |
| | (45.208) | (68.188) | (46.653) | (68.065) |
| Remittances per Capita$^2$ | | -0.000*** | | -0.000*** |
| | | (0.000) | | (0.000) |
| Remittances per Capita * GDP per Capita | | 0.000*** | | 0.000*** |
| | | (0.000) | | (0.000) |
| Remittances per capita * Net Migration (% of Population) | | -0.056 | | -0.077 |
| | | (0.112) | | (0.111) |
| Regional Interactions | No | Yes | No | Yes |
| Country Fixed Effects | Yes | Yes | Yes | Yes |
| Year Fixed Effects | No | No | Yes | Yes |
| Constant | 50.655*** | 44.200*** | 25.930*** | 25.492*** |
| | (2.611) | (2.784) | (4.978) | (4.959) |
| Observations | 1276 | 1276 | 1276 | 1276 |
| $R^2$ | 0.080 | 0.005 | 0.077 | 0.119 |

*Note.* Standard errors are within parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

# 6    Robustness Check

The robustness checks will re-evaluate Model 4 with a series of alterations. Model 5 replaces the remittances per capita variable with the alternative measure—remittances as a percentage of GDP. Model 6 will utilize a natural log transformation of the remittances per capita variable. Model 7 will omit the potentially "bad" control variables outlined previously. Table 6.1 presents the summarized results of Models 5, 6, and 7. The full regression results can be found in Entries 8, 9, and 10 of the appendix.

The remittance coefficients in Models 5 and 7 are negative and significant at the 1% level, whereas the coefficient in Model 6 is, contrarily, positive and significant at the 1% level. According to the output of Model 5, on average, a 1% increase in remittances as a percentage of GDP decreases the income disparity between the top 10% and bottom 50% of a nation by 0.445 percentage points, all else held equal. Despite the substantial increase in coefficient magnitude, the practical impact is negligible, considering that a 1% change relative to GDP may equate to billions of US dollars in remittances. The omission of the GDP per capita, GDP per capita growth, and unemployment variables in Model 7 results in a negligible change in the value of the coefficient. In stark contrast to the other models, Model 6, which includes a natural log transformation of the remittances per capita variable, presents a positive and significant coefficient. Under this interpretation, on average, an increase in remittances is associated with an increase in income inequality, all else held equal. There is a myriad of possible justifications for the reversal of the coefficient. The most plausible explanation is the existence of a much stronger non-linear relationship between remittances and income inequality than anticipated. While the squared term in the original models aims to capture potential curvature in the relationship, the natural log transformation may aid in further linearizing the relationship. The reversal is rather concerning, pointing to a potential lack of validity concerning the previous results and perhaps indicating that the results are reliant on the functional form of the treatment variable.

Relative to Model 4, the squared value of the remittance variable loses significance in Model 5, yet in Models 6 and 7 the direction and significance of the coefficient remain unaltered. The GDP per capita interaction effect is positive and significant across every model. The persistence of these results adds confidence in the establishment of a diminishing marginal effect and a wealth-reliant effect regarding remittances. When examining regional trends, the previously formed hypothesis is substantiated in Model 5 as the Southern Asia interaction has the largest significant coefficient of all regions. However, Models 6 and 7 exhibit contrasting results, suggesting that the regional hierarchy of effect magnitude is rather random and requires deeper investigation.

While the robustness check may have failed to confirm previous findings in terms of the negative relationship between remittances and income inequality, it displayed the persistence of a non-linear relationship and a wealth-based interaction. The disagreement in results regarding the coefficient of the remittance variable may serve to corroborate the existing lack of unanimity regarding how remittances truly affect income inequality.

Table 5.1: Regression Results for Models 5, 6, and 7

| Variable | (5) Model 4 with Alternative Remittance Measure | (6) Model 4 with Log Transformation of Remittances per Capita | (7) Model 4 Omitting Bad Controls |
|---|---|---|---|
| Remittance Variable | -0.445*** | 1.639*** | -0.037*** |
| | (0.128) | (0.635) | (0.008) |
| Control of Corruption | 2.658*** | 3.649*** | 3.016*** |
| | (0.686) | (0.691) | (0.685) |
| FDI Net Inflows (% of GDP) | -0.056 | -0.034 | -0.080** |
| | (0.037) | (0.035) | (0.036) |
| GDP per Capita | -0.000 | -0.000*** | |
| | (0.000) | (0.000) | |
| GDP per Capita Growth | -0.047 | -0.026 | |
| | (0.030) | (0.029) | |
| Government Expenditure (% of GDP) | -0.268*** | -0.291*** | -0.261*** |
| | (0.052) | (0.053) | (0.052) |
| Government Effectiveness | 1.725*** | 1.892*** | 1.934*** |
| | (0.661) | (0.656) | (0.661) |
| HDI | 0.278*** | 0.274*** | 0.202** |
| | (0.078) | (0.081) | (0.079) |
| Political Stability and Absence of Violence/Terrorism | -0.940*** | -0.848*** | -0.890*** |
| | (0.310) | (0.321) | (0.313) |
| Regulatory Quality | -0.687 | -1.056 | -0.112 |
| | (0.683) | (0.664) | (0.665) |
| Rule of Law | -0.185 | -0.629 | -0.750 |
| | (0.811) | (0.819) | (0.815) |
| Total Natural Resources Rents (% of GDP) | -0.005 | -0.022 | -0.031 |
| | (0.030) | (0.030) | (0.030) |
| Trade (% of GDP) | 0.015** | 0.007 | 0.005 |
| | (0.007) | (0.007) | (0.007) |
| Unemployment | 0.051 | 0.077* | |
| | (0.044) | (0.046) | |
| Voice and Accountability | -2.166*** | -1.884*** | -1.608*** |
| | (0.582) | (0.553) | (0.565) |
| Net Migration (% of Population) | -44.698 | -98.294 | -19.061 |
| | (82.470) | (158.037) | (68.326) |
| Remittance Variable$^2$ | -0.002 | -0.728*** | -0.000** |
| | (0.002) | (0.072) | (0.000) |
| Remittance Variable * GDP per Capita | 0.000*** | 0.000*** | 0.000*** |
| | (0.000) | (0.000) | (0.000) |
| Remittance Variable * Net Migration (% of Population) | -2.120 | 3.514 | -0.058 |
| | (5.199) | (27.279) | (0.111) |
| Regional Interactions | Yes | Yes | Yes |
| Country Fixed Effects | Yes | Yes | Yes |
| Year Fixed Effects | Yes | Yes | Yes |
| Constant | 21.861*** | 19.490*** | 27.752*** |
| | (4.946) | (5.166) | (4.906) |
| Observations | 1276 | 1276 | 1276 |
| $R^2$ | 0.119 | 0.099 | 0.119 |

*Note.* Standard errors are within parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Remittance measure is remittances as a percentage of GDP in Model 5, log of remittances per capita in Model 6, and remittances per capita in Model 7.

# 7    Conclusion

The focal point of this paper was to investigate the effect of international remittances on income inequality in migrant-sending nations, motivated by the proliferation of remittance flows over the past two decades that exhibits no indication of decelerating. Moreover, the matter of income inequality stands as one of the paramount concerns in the field of economics. The existence of the surge in remittances and the intractability of income inequality as an economic issue replicates the dynamic of an unstoppable force meeting an immovable object. The consequences of such burgeoning economic phenomena must be studied and attempts to establish a unanimous understanding of the aforementioned relationship have failed. By utilizing more novel data coupled with a differing sampling technique of nations, the paper provides a meaningful addition to the existing research.

The investigation of the relationship was approached through analyzing a sample of 84 migrant-sending nations in intervals ranging between 2002 and 2021. The 1276 country-year pairings were examined using both fixed effects models and two-way fixed effects models, exploiting the country-specific and year-specific controls that the frameworks of the models provide. The regression results of the aforementioned models were then examined for robustness through an alteration of the variable measuring remittances, a natural log transformation of the remittance variable, and an alternative set of control variables.

Six of the seven regression instances provided a negative and significant estimate for the effect of remittances on income inequality, with the only deviance occurring when the remittances per capita variable was logged, resulting in a positive and significant coefficient. The overarching trend translates to a negative relationship—an increase in remittance amounts is associated with a decrease in income inequality in the sample. However, as Model 6 showed, this specific result may be a product of econometric circumstance and is not entirely reliable. Additionally, all seven models found a positive and significant coefficient for the GDP per capita interaction effect, suggesting that this negative relationship may be more profound in poorer nations. Similarly, six of seven models suggested that remittances may yield a diminishing marginal effect; the unequalizing effect diminishes with every added dollar received in remittances. This specific finding is consistent with previous economic theory and empirical conclusions.

The relative unanimity in this result as opposed to the clear discrepancy in results regarding the isolated remittance variable aptly reflects the current state of research in the field. As presented in the literature review, there is very little agreement among scholars and analysts when discussing the direct effect of remittances on income inequality. However, the inverted U-shape idea proposed by Koechlin and Leon (2007) was built upon very solid foundations in

migration theory and has yet to have been conclusively refuted. The results of this paper's research further substantiate their claim.

Furthermore, heterogeneity in terms of regions was explored, and the findings suggested that the degree of the potentially equalizing effect ranges significantly depending on the region that the country belongs to. Unfortunately, the specifics regarding the justification of these differences were not analyzed and may be beyond the scope of this paper.

The answer to the previously established research question of "What are the effects of remittances on income inequality in migrant-sending nations?" is complex and multi-faceted. It cannot be stated with confidence that remittances generally decrease or increase income inequality given the variation in the remittance coefficient. Additionally, the paper cannot conclusively state that there is an effect given the endogeneity issues. However, the research results indicate that the possible effect is highly non-linear; initially, remittances further bolster income inequality, but as the volume of remittances increases, this trend slows and possibly reverses. This suggests that remittances may alleviate or exacerbate the income inequality issue, most likely contingent on the initial relative wealth of the recipient households. This phenomenon may also help explain the constant disagreement among scholars, economists, and analysts, with respect to the impact that remittances have on income inequality. The effect seems to be highly reliant upon the sample and context of the analysis.

The conclusion that remittances may aid in mitigating income inequality brings with it several policy implications. Evidently, governments should encourage remittance flows, and there are numerous channels through which this can be achieved. Governments could bolster the magnitude of these flows by fostering competition among money transfer operators and instituting regulatory reforms. Lower transaction costs correspond to a larger proportion of remitted funds reaching the intended recipients, thereby amplifying their potential to alleviate income inequality. Portions of funds being lost to intermediaries represent losses in efficiency, and while the average transaction cost of remittances continues to decline, it is yet to reach the 3% target figure outlined by Goal 10 of the United Nations Sustainable Development Goals (Beck et al., 2022).

In tandem with a reduction in transaction costs, promoting access to financial services will further alleviate difficulties in remittance transfers. Increasing the regulatory support for digital or mobile banking, especially in underserved areas, will increase accessibility and financial inclusion. This increased inclusion may streamline the remittance process, encouraging transfers and further alleviating income inequality.

When reviewing the presence of a diminishing marginal effect, it becomes clear that nations should aim to make emigration affordable to the masses. If the barriers to migration are relatively high, then income inequality will be further exacerbated by remittances, which is

obviously problematic. According to the results, an increase in remittances will only alleviate income inequality when they are sufficiently widespread across the income spectrum.

Despite the strengths of the paper, weaknesses exist that may hinder the validity of results, both internally and externally. Most importantly, the methodology failed to establish causality. While it is incredibly arduous to set up an observational analysis that does establish causality, the lack of it still constitutes a limitation and signifies that the findings of the analysis cannot be taken as entirely conclusive. Another limitation manifests itself in the form of data constraints. A significant portion of remittances are sent through informal channels and therefore are not documented or recorded. Analysts at the World Bank and the International Monetary Fund estimate this number at anywhere from 35-75% (Freund & Spatafora, 2005). This issue is rather insoluble in terms of methodological approaches and plagues practically all modern cross-country analyses utilizing remittance statistics. While the system through which the International Monetary Fund quantifies its statistics is rather reliable, it is still imperfect, and this reality needs to be considered when discussing the validity of the paper's conclusions. As difficult as this issue is, enhancing the efficacy and cost of the legal process of international remittance transfers, as highlighted previously, may mitigate the severity of the informal transfer problem.

The field of research pertaining to remittances and inequality will continue to be a contentious topic characterized by varying opinions, conclusions, and approaches. In terms of possible extensions to the paper, the field would greatly benefit from a detailed analysis within the scope of heterogeneity between regions. Answers as to why the effect of remittances on income inequality depends on a nation's region to such an extent would provide interesting and valuable additions to the scholarship in this field. Additionally, differential analysis in this realm may be able to provide substantiated mechanisms behind the general relationship between remittances and income inequality.

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# 9    Appendix

Entry 1: Nations, Years, and Designation of Regions of the Sample

| Country | Country Code | Years | Region |
|---|---|---|---|
| Albania | ALB | 2002-2021 | Southern Europe |
| Argentina | ARG | 2002-2011 | South America |
| Armenia | ARM | 2002-2021 | Western Asia |
| Burkina Faso | BFA | 2006-2021 | Western Africa |
| Bangladesh | BGD | 2002-2021 | Southern Asia |
| Bulgaria | BGR | 2002-2021 | Eastern Europe |
| Bosnia | BIH | 2002-2021 | Southern Europe |
| Belarus | BLR | 2002-2008 | Eastern Europe |
| Bolivia | BOL | 2002-2021 | South America |
| Brazil | BRA | 2003-2009 | South America |
| Bhutan | BTN | 2010-2016 | Southern Asia |
| China | CHN | 2002-2021 | Eastern Asia |
| Ivory Coast | CIV | 2015-2020 | Western Africa |
| Cameroon | CMR | 2002-2013 | Middle Africa |
| Colombia | COL | 2002-2015 | South America |
| Comoros | COM | 2003-2012, 2014-2021 | Eastern Africa |
| Cape Verde | CPV | 2007-2021 | Western Africa |
| Dominican Republic | DOM | 2002-2021 | Caribbean |
| Algeria | DZA | 2002-2021 | Northern Africa |
| Ecuador | ECU | 2002-2013 | South America |
| Egypt | EGY | 2005-2010, | Northern Africa |
| Estonia | EST | 2002-2014 | Northern Europe |
| Georgia | GEO | 2002-2021 | Western Asia |
| Ghana | GHA | 2017-2021 | Western Africa |
| Guinea | GIN | 2002-2008, 2011-2021 | Western Africa |
| Gambia | GMB | 2003-2021 | Western Africa |
| Guinea Bissau | GNB | 2005-2020 | Western Africa |
| Greece | GRC | 2004-2021 | Southern Europe |
| Guatemala | GTM | 2002-2021 | Central America |
| Honduras | HND | 2002-2020 | Central America |
| Croatia | HRV | 2002-2021 | Southern Europe |
| Haiti | HTI | 2002-2021 | Caribbean |
| Indonesia | IDN | 2002-2021 | South-eastern Asia |
| India | IND | 2002-2015, 2017-2021 | Southern Asia |
| Jamaica | JAM | 2002-2019 | Caribbean |
| Kazakhstan | KAZ | 2014-2021 | Central Asia |
| Kenya | KEN | 2010-2021 | Eastern Africa |
| Kyrgyzstan | KGZ | 2002-2018 | Central Asia |
| Cambodia | KHM | 2002-2021 | South-eastern Asia |
| South Korea | KOR | 2002-2008 | Eastern Asia |
| Laos | LAO | 2002-2016 | South-eastern Asia |
| Lebanon | LBN | 2015-2021 | Western Asia |

| | | | |
|---|---|---|---|
| Sri Lanka | LKA | 2002-2008, 2015-2021 | Southern Asia |
| Lesotho | LSO | 2007-2021 | Southern Africa |
| Lithuania | LTU | 2002-2021 | Northern Europe |
| Latvia | LVA | 2002-2021 | Northern Europe |
| Morocco | MAR | 2002-2021 | Northern Africa |
| Moldova | MDA | 2002-2021 | Eastern Europe |
| Mexico | MEX | 2002-2010, 2017-2021 | Central America |
| Macedonia | MKD | 2002-2021 | Southern Europe |
| Mali | MLI | 2002-2021 | Western Africa |
| Mongolia | MNG | 2002-2013 | Eastern Asia |
| Mauritius | MRT | 2017-2021 | Western Africa |
| Namibia | NAM | 2002-2021 | Southern Africa |
| Nicaragua | NIC | 2002-2021 | Central America |
| Nepal | NPL | 2002-2019 | Southern Asia |
| Oman | OMN | 2002-2009 | Western Asia |
| Pakistan | PAK | 2002-2021 | Southern Asia |
| Peru | PER | 2002-2014 | South America |
| Philippines | PHL | 2002-2014 | South-eastern Asia |
| Poland | POL | 2002-2008, 2010-2021 | Eastern Europe |
| Portugal | PRT | 2010-2016 | Southern Europe |
| Paraguay | PRY | 2002-2021 | South America |
| Romania | ROU | 2002-2021 | Eastern Europe |
| Rwanda | RWA | 2010-2021 | Eastern Africa |
| Sudan | SDN | 2002-2013 | Northern Africa |
| Senegal | SEN | 2002-2021 | Western Africa |
| El Salvador | SLV | 2002-2021 | Central America |
| Suriname | SUR | 2006-2010 | South America |
| Slovakia | SVK | 2002-2006 | Eastern Europe |
| Eswatini | SWZ | 2002-2021 | Southern Africa |
| Togo | TGO | 2009-2021 | Western Africa |
| Tajikistan | TJK | 2002-2021 | Central Asia |
| Tunisia | TUN | 2002-2010, 2012-2021 | Northern Africa |
| Turkey | TUR | 2017-2021 | Western Asia |
| Tanzania | TZA | 2002-2012 | Eastern Africa |
| Uganda | UGA | 2002-2015 | Eastern Africa |
| Ukraine | UKR | 2014-2020 | Eastern Europe |
| Uruguay | URY | 2002-2015 | South America |
| Uzbekistan | UZB | 2005-2021 | Central Asia |
| Venezuela | VEN | 2002-2014 | South America |
| Vietnam | VNM | 2002-2021 | South-eastern Asia |
| Yemen | YEM | 2002-2018 | Western Asia |
| Zimbabwe | ZWE | 2009-2021 | Eastern Africa |

Entry 2: Durbin-Wu-Hausman Test Results

| Variable | (F) FE Coef. | (R) RE Coef. | (F-R) | SE of Diff. |
|---|---|---|---|---|
| Control of Corruption | 3.313 | 3.329 | -0.016 | |
| FDI Net Inflows (% of GDP) | -0.029 | -0.029 | -0.000 | |
| GDP per Capita | -0.000 | -0.000 | 0.000 | |
| GDP per Capita Growth | -0.029 | -0.047 | 0.018 | |
| Government Expenditure (% of GDP) | -0.295 | -0.320 | 0.025 | |
| Government Effectiveness | 2.671 | 2.191 | 0.480 | |
| HDI | -0.065 | -0.123 | 0.058 | 0.014 |
| Political Stability and Absence of Violence/Terrorism | -0.776 | -0.838 | 0.062 | |
| Regulatory Quality | -0.302 | -0.312 | 0.010 | |
| Rule of Law | -0.428 | -0.628 | 0.201 | 0.043 |
| Total Natural Resources Rents (% of GDP) | 0.018 | 0.038 | -0.021 | |
| Trade (% of GDP) | 0.003 | -0.002 | 0.005 | |
| Unemployment | 0.093 | 0.035 | 0.058 | 0.009 |
| Voice and Accountability | -1.929 | -1.739 | -0.191 | 0.128 |
| Net Migration (% of Population) | -21.393 | 18.411 | -39.804 | |
| Remittances per Capita | -0.039 | -0.033 | -0.007 | 0.002 |
| Remittances per Capita$^2$ | -0.000 | -0.000 | 0.000 | 0.000 |
| Caribbean * Remittances per Capita | 0.026 | 0.023 | 0.003 | 0.003 |
| Central America * Remittances per Capita | 0.036 | 0.031 | 0.005 | 0.002 |
| Central Asia * Remittances per Capita | 0.038 | 0.031 | 0.007 | 0.002 |
| Eastern Africa * Remittances per Capita | -0.032 | -0.029 | -0.003 | 0.002 |
| Eastern Asia * Remittances per Capita | 0.081 | 0.039 | 0.041 | 0.013 |
| Eastern Europe * Remittances per Capita | 0.032 | 0.023 | 0.010 | 0.002 |
| Middle Africa * Remittances per Capita | 0.311 | 0.346 | -0.035 | 0.023 |
| Northern Africa * Remittances per Capita | 0.030 | 0.023 | 0.007 | 0.003 |
| Northern Europe * Remittances per Capita | 0.021 | 0.012 | 0.009 | 0.003 |
| South America * Remittances per Capita | -0.011 | -0.002 | -0.010 | 0.003 |
| South Eastern Asia * Remittances per Capita | -0.008 | -0.007 | -0.002 | 0.002 |
| Southern Africa * Remittances per Capita | 0.063 | 0.065 | -0.002 | 0.005 |
| Southern Asia * Remittances per Capita | 0.035 | 0.029 | 0.006 | 0.002 |
| Southern Europe * Remittances per Capita | 0.038 | 0.027 | 0.011 | 0.003 |
| Western Asia * Remittances per Capita | 0.035 | 0.030 | 0.005 | 0.002 |
| Remittances per capita * GDP per Capita | 0.000 | 0.000 | -0.000 | |
| Remittances per Capita * Net Migration (% of Population) | -0.056 | -0.138 | 0.082 | |

Test of $H_0$: Difference in coefficients not systematic

$\chi^2(22) = 67.000; P(\chi^2 > 67) = 0.000$

Entry 3: Full Regression Equation for Model 1

$$IncomeInequalityMeasure_{it} = \beta_0 + \alpha_i + \beta_1 RemittancesPerCapita_{it}$$
$$+ \beta_2 Corruption_{it} + \beta_3 FDI_{it} + \beta_4 GDPperCapita_{it} + \beta_5 GDPperCapitaGrowth_{it} + \beta_6 GovernmentExpenditure_{it}$$
$$+ \beta_7 GovernmentEffectiveness_{it} + \beta_8 HDI_{it} + \beta_9 PoliticalStability_{it}$$
$$+ \beta_{10} RegulatoryQuality_{it} + \beta_{11} RuleofLaw_{it} + \beta_{12} NaturalResourcesRent_{it} + \beta_{13} Trade_{it}$$
$$+ \beta_{14} Unemployment_{it} + \beta_{15} VoiceandAccountability_{it} + \beta_{16} NetMigration_{it} + \epsilon_{it}$$

Entry 4: Full Regression Equation for Model 2

$$IncomeInequalityMeasure_{it} = \beta_0 + \alpha_i + \beta_1 RemittancesPerCapita_{it}$$
$$+ \beta_2 Corruption_{it} + \beta_3 FDI_{it} + \beta_4 GDPperCapita_{it} + \beta_5 GDPperCapitaGrowth_{it} + \beta_6 GovernmentExpenditure_{it}$$
$$+ \beta_7 GovernmentEffectiveness_{it} + \beta_8 HDI_{it} + \beta_9 PoliticalStability_{it}$$
$$+ \beta_{10} RegulatoryQuality_{it} + \beta_{11} RuleofLaw_{it} + \beta_{12} NaturalResourcesRent_{it} + \beta_{13} Trade_{it}$$
$$+ \beta_{14} Unemployment_{it} + \beta_{15} VoiceandAccountability_{it} + \beta_{16} NetMigration_{it} + \beta_{17} RemittancesPerCapita_{it}^2$$
$$+ \beta_{18}(RemittancesPerCapita_{it} * GDPperCapita_{it}) + \beta_{19}(RemittancesPerCapita_{it} * NetMigration_{it})$$
$$+ \beta_{21}(Caribbean * RemittancesPerCapita_{it}) + \beta_{22}(CentralAmerica * RemittancesPerCapita_{it})$$
$$+ \beta_{23}(CentralAsia * RemittancesPerCapita_{it}) + \beta_{24}(EasternAfrica * RemittancesPerCapita_{it})$$
$$+ \beta_{25}(EasternAsia * RemittancesPerCapita_{it}) + \beta_{26}(EasternEurope * RemittancesPerCapita_{it})$$
$$+ \beta_{27}(MiddleAfrica * RemittancesPerCapita_{it}) + \beta_{28}(NorthernAfrica * RemittancesPerCapita_{it})$$
$$+ \beta_{29}(NorthernEurope * RemittancesPerCapita_{it}) + \beta_{30}(SouthAmerica * RemittancesPerCapita_{it})$$
$$+ \beta_{31}(SouthEasternAsia * RemittancesPerCapita_{it}) + \beta_{32}(SouthernAfrica * RemittancesPerCapita_{it})$$
$$+ \beta_{33}(SouthernAsia * RemittancesPerCapita_{it}) + \beta_{34}(SouthernEurope * RemittancesPerCapita_{it})$$
$$+ \beta_{35}(WesternAsia * RemittancesPerCapita_{it}) + \epsilon_{it}$$

Entry 5: Full Regression Equation for Model 3

$$IncomeInequalityMeasure_{it} = \beta_0 + \alpha_i + \beta_1 RemittancesPerCapita_{it}$$
$$+ \beta_2 Corruption_{it} + \beta_3 FDI_{it} + \beta_4 GDPperCapita_{it} + \beta_5 GDPperCapitaGrowth_{it} + \beta_6 GovernmentExpenditure_{it}$$
$$+ \beta_7 GovernmentEffectiveness_{it} + \beta_8 HDI_{it} + \beta_9 PoliticalStability_{it}$$
$$+ \beta_{10} RegulatoryQuality_{it} + \beta_{11} RuleofLaw_{it} + \beta_{12} NaturalResourcesRent_{it} + \beta_{13} Trade_{it}$$
$$+ \beta_{14} Unemployment_{it} + \beta_{15} VoiceandAccountability_{it} + \beta_{16} NetMigration_{it}$$
$$+ \beta_{17} 2003 + \beta_{18} 2004 + \beta_{19} 2005 + \beta_{20} 2006 + \beta_{21} 2007 + \beta_{22} 2008 + \beta_{23} 2009 + \beta_{24} 2010$$
$$+ \beta_{25} 2011 + \beta_{26} 2012 + \beta_{27} 2013 + \beta_{28} 2014 + \beta_{29} 2015 + \beta_{30} 2016 + \beta_{31} 2017 + \beta_{32} 2018$$
$$+ \beta_{33} 2019 + \beta_{34} 2020 + \beta_{35} 2021 + \gamma_t + \epsilon_{it}$$

Entry 6: Full Regression Equation for Model 4

$$IncomeInequalityMeasure_{it} = \beta_0 + \alpha_i + \beta_1 RemittancesPerCapita_{it}$$
$$+ \beta_2 Corruption_{it} + \beta_3 FDI_{it} + \beta_4 GDPperCapita_{it} + \beta_5 GDPperCapitaGrowth_{it} + \beta_6 GovernmentExpenditure_{it}$$
$$+ \beta_7 GovernmentEffectiveness_{it} + \beta_8 HDI_{it} + \beta_9 PoliticalStability_{it}$$
$$+ \beta_{10} RegulatoryQuality_{it} + \beta_{11} RuleofLaw_{it} + \beta_{12} NaturalResourcesRent_{it} + \beta_{13} Trade_{it}$$
$$+ \beta_{14} Unemployment_{it} + \beta_{15} VoiceandAccountability_{it} + \beta_{16} NetMigration_{it} + \beta_{17} RemittancesPerCapita_{it}^2$$
$$+ \beta_{18}(RemittancesPerCapita_{it} * GDPperCapita_{it}) + \beta_{19}(RemittancesPerCapita_{it} * NetMigration_{it})$$
$$+ \beta_{21}(Caribbean * RemittancesPerCapita_{it}) + \beta_{22}(CentralAmerica * RemittancesPerCapita_{it})$$
$$+ \beta_{23}(CentralAsia * RemittancesPerCapita_{it}) + \beta_{24}(EasternAfrica * RemittancesPerCapita_{it})$$
$$+ \beta_{25}(EasternAsia * RemittancesPerCapita_{it}) + \beta_{26}(EasternEurope * RemittancesPerCapita_{it})$$
$$+ \beta_{27}(MiddleAfrica * RemittancesPerCapita_{it}) + \beta_{28}(NorthernAfrica * RemittancesPerCapita_{it})$$
$$+ \beta_{29}(NorthernEurope * RemittancesPerCapita_{it}) + \beta_{30}(SouthAmerica * RemittancesPerCapita_{it})$$
$$+ \beta_{31}(SouthEasternAsia * RemittancesPerCapita_{it}) + \beta_{32}(SouthernAfrica * RemittancesPerCapita_{it})$$
$$+ \beta_{33}(SouthernAsia * RemittancesPerCapita_{it}) + \beta_{34}(SouthernEurope * RemittancesPerCapita_{it})$$
$$+ \beta_{35}(WesternAsia * RemittancesPerCapita_{it})$$
$$+ \beta_{36}2003 + \beta_{37}2004 + \beta_{38}2005 + \beta_{39}2006 + \beta_{40}2007 + \beta_{41}2008 + \beta_{42}2009 + \beta_{43}2010$$
$$+ \beta_{44}2011 + \beta_{45}2012 + \beta_{46}2013 + \beta_{47}2014 + \beta_{48}2015 + \beta_{49}2016 + \beta_{50}2017 + \beta_{51}2018$$
$$+ \beta_{52}2019 + \beta_{53}2020 + \beta_{54}2021 + \gamma_t + \epsilon_{it}$$

Entry 7: Full Regression Results for Models 1, 2, 3, and 4

| Variable | (1) Fixed Effects | (2) Fixed Effects with Heterogeneity Checks | (3) Two-Way Fixed Effects | (4) Two-Way Fixed Effects with Heterogeneity Checks |
|---|---|---|---|---|
| Remittances per Capita | -0.005*** | -0.039*** | -0.003*** | -0.038*** |
| | (0.001) | (0.008) | (0.001) | (0.008) |
| Control of Corruption | 2.872*** | 3.312*** | 2.981*** | 3.364*** |
| | (0.703) | (0.695) | (0.695) | (0.688) |
| FDI Net Inflows (% of GDP) | -0.052 | -0.028 | -0.081** | -0.069* |
| | (0.035) | (0.035) | (0.036) | (0.036) |
| GDP per Capita | 0.000 | -0.000** | 0.000 | -0.000* |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| GDP per Capita Growth | -0.025 | -0.029 | -0.039 | -0.039 |
| | (0.026) | (0.026) | (0.030) | (0.030) |
| Government Expenditure (% of GDP) | -0.277*** | -0.295*** | -0.268*** | -0.295*** |
| | (0.052) | (0.053) | (0.052) | (0.053) |
| Government Effectiveness | 2.300*** | 2.671*** | 1.691** | 2.050*** |
| | (0.676) | (0.658) | (0.673) | (0.658) |
| HDI | -0.179*** | -0.064*** | 0.213*** | 0.237*** |
| | (0.039) | (0.043) | (0.079) | (0.079) |
| Political Stability and Absence of Violence/Terrorism | -1.061*** | -0.776** | -0.894*** | -0.641** |
| | (0.316) | (0.321) | (0.314) | (0.319) |
| Regulatory Quality | -0.191 | -0.301 | -0.151 | -0.159 |
| | (0.661) | (0.654) | (0.667) | (0.662) |
| Rule of Law | 1.136 | -0.427 | 0.295 | -0.899 |
| | (0.776) | (0.809) | (0.795) | (0.822) |
| Total Natural Resources Rents (% of GDP) | 0.041 | 0.017 | -0.002 | -0.030 |
| | (0.029) | (0.029) | (0.031) | (0.030) |
| Trade (% of GDP) | 0.004 | 0.002 | 0.009 | 0.006 |
| | (0.007) | (0.007) | (0.007) | (0.007) |
| Unemployment | 0.003 | 0.093** | 0.039 | 0.114** |
| | (0.044) | (0.044) | (0.045) | (0.044) |
| Voice and Accountability | -2.059*** | -1.929*** | -1.905*** | -1.770*** |
| | (0.576) | (0.570) | (0.569) | (0.564) |
| Net Migration (% of Population) | -69.086 | -21.392 | -55.622 | -7.824 |
| | (45.208) | (68.188) | (46.653) | (68.065) |
| Remittances per Capita$^2$ | | -0.000*** | | -0.000*** |
| | | (0.000) | | (0.000) |
| Remittances per Capita * GDP per Capita | | 0.000*** | | 0.000*** |
| | | (0.000) | | (0.000) |
| Remittances per capita * Net Migration (% of Population) | | -0.056 | | -0.077 |
| | | (0.112) | | (0.111) |
| Caribbean * Remittances per Capita | | 0.026*** | | 0.026*** |
| | | (0.009) | | (0.009) |
| Central America * Remittances per Capita | | 0.036*** | | 0.037*** |
| | | (0.008) | | (0.008) |
| Central Asia * Remittances per Capita | | 0.038*** | | 0.040*** |
| | | (0.008) | | (0.008) |
| Eastern Africa * Remittances per Capita | | -0.031** | | -0.037*** |
| | | (0.012) | | (0.012) |
| Eastern Asia * Remittances per Capita | | 0.080** | | 0.087*** |
| | | (0.034) | | (0.033) |
| Eastern Europe * Remittances per Capita | | 0.032*** | | 0.032*** |
| | | (0.008) | | (0.008) |
| Middle Africa * Remittances per Capita | | 0.310 | | 0.280 |
| | | (0.311) | | (0.309) |
| Northern Africa * Remittances per Capita | | 0.029** | | 0.026** |
| | | (0.013) | | (0.013) |
| Northern Europe * Remittances per Capita | | 0.021** | | 0.020** |
| | | (0.009) | | (0.009) |
| South America * Remittances per Capita | | -0.011 | | -0.008 |
| | | (0.014) | | (0.014) |
| South Eastern Asia * Remittances per Capita | | -0.008 | | -0.001 |
| | | (0.012) | | (0.012) |
| Southern Africa * Remittances per Capita | | 0.062*** | | 0.056*** |
| | | (0.016) | | (0.016) |
| Southern Asia * Remittances per Capita | | 0.035*** | | 0.035*** |
| | | (0.009) | | (0.009) |
| Southern Europe * Remittances per Capita | | 0.038*** | | 0.036*** |
| | | (0.009) | | (0.009) |

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Western Asia * Remittances per Capita | 0.035*** (0.008) | | | 0.034*** (0.008) |
| 2003 | | | -0.084 (0.568) | -0.099 (0.541) |
| 2004 | | | 0.025 (0.582) | 0.159 (0.562) |
| 2005 | | | -0.186 (0.600) | 0.190 (0.586) |
| 2006 | | | -0.731 (0.626) | -0.162 (0.621) |
| 2007 | | | -0.412 (0.663) | 0.277 (0.667) |
| 2008 | | | -1.004 (0.704) | -1.110 (0.710) |
| 2009 | | | -1.859*** (0.713) | -1.121 (0.714) |
| 2010 | | | -2.212*** (0.730) | -1.377** (0.736) |
| 2011 | | | -2.974*** (0.785) | -1.961** (0.793) |
| 2012 | | | -3.512*** (0.815) | -2.498*** (0.824) |
| 2013 | | | -3.473*** (0.857) | -2.434*** (0.864) |
| 2014 | | | -4.116*** (0.886) | -2.842*** (0.896) |
| 2015 | | | -4.079*** (0.906) | -3.013*** (0.912) |
| 2016 | | | -4.171*** (0.942) | -3.227*** (0.946) |
| 2017 | | | -4.026*** (0.975) | -3.039*** (0.984) |
| 2018 | | | -4.030*** (1.016) | -2.960*** (1.027) |
| 2019 | | | -4.233*** (1.061) | -3.081*** (1.074) |
| 2020 | | | -3.675*** (1.059) | -2.313** (1.076) |
| 2021 | | | -3.806*** (1.060) | -1.993* (1.080) |
| Constant | 50.655*** (2.611) | 44.200*** (2.784) | 25.930*** (4.978) | 25.492*** (4.959) |
| Observations | 1276 | 1276 | 1276 | 1276 |
| $R^2$ | 0.080 | 0.005 | 0.077 | 0.119 |

*Note.* Standard errors are within parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Entry 8: Full Regression Results for Model 5

| Variable | (5) Model 4 with Alternative Remittance Measure |
|---|---|
| Remittances as a Percentage of GDP | -0.445*** |
| | (0.128) |
| Control of Corruption | 2.658*** |
| | (0.686) |
| FDI Net Inflows (% of GDP) | -0.056 |
| | (0.037) |
| GDP per Capita | -0.000 |
| | (0.000) |
| GDP per Capita Growth | -0.047 |
| | (0.030) |
| Government Expenditure (% of GDP) | -0.268*** |
| | (0.052) |
| Government Effectiveness | 1.725*** |
| | (0.661) |
| HDI | 0.278*** |
| | (0.078) |
| Political Stability and Absence of Violence/Terrorism | -0.940*** |
| | (0.310) |
| Regulatory Quality | -0.687 |
| | (0.683) |
| Rule of Law | -0.185 |
| | (0.811) |
| Total Natural Resources Rents (% of GDP) | -0.005 |
| | (0.030) |
| Trade (% of GDP) | 0.015** |
| | (0.007) |
| Unemployment | 0.051 |
| | (0.044) |
| Voice and Accountability | -2.166*** |
| | (0.582) |
| Net Migration (% of Population) | -44.698 |
| | (82.470) |
| Remittances as a Percentage of GDP$^2$ | -0.002 |
| | (0.002) |
| Remittances as a Percentage of GDP * GDP per Capita | 0.000 |
| | (0.000) |
| Remittances as a Percentage of GDP * Net Migration (% of Population) | -2.120 |
| | (5.199) |
| Caribbean * Remittances as a Percentage of GDP | 0.051 |
| | (0.236) |
| Central America * Remittances as a Percentage of GDP | 0.398** |
| | (0.180) |
| Central Asia * Remittances as a Percentage of GDP | 0.580*** |
| | (0.125) |
| Eastern Africa * Remittances as a Percentage of GDP | -0.619*** |
| | (0.191) |
| Eastern Asia * Remittances as a Percentage of GDP | 0.031 |
| | (0.456) |
| Eastern Europe * Remittances as a Percentage of GDP | 0.643*** |
| | (0.190) |
| Middle Africa * Remittances as a Percentage of GDP | 5.290 |
| | (5.869) |
| Northern Africa * Remittances as a Percentage of GDP | 0.538 |
| | (0.401) |
| Northern Europe * Remittances as a Percentage of GDP | -1.109*** |
| | (0.430) |
| South America * Remittances as a Percentage of GDP | 0.708** |
| | (0.382) |
| South Eastern Asia * Remittances as a Percentage of GDP | -0.687*** |
| | (0.249) |

| | |
|---|---|
| Southern Africa * Remittances as a Percentage of GDP | 0.668*** |
| | (0.184) |
| Southern Asia * Remittances as a Percentage of GDP | 0.671*** |
| | (0.159) |
| Southern Europe * Remittances as a Percentage of GDP | 0.437** |
| | (0.184) |
| Western Asia * Remittances as a Percentage of GDP | 0.441*** |
| | (0.167) |
| 2003 | -0.262 |
| | (0.547) |
| 2004 | -0.198 |
| | (0.564) |
| 2005 | -0.548 |
| | (0.582) |
| 2006 | -1.190* |
| | (0.611) |
| 2007 | -1.030 |
| | (0.649) |
| 2008 | -1.643** |
| | (0.688) |
| 2009 | -2.390*** |
| | (0.697) |
| 2010 | -2.740*** |
| | (0.713) |
| 2011 | -3.600*** |
| | (0.769) |
| 2012 | -4.186*** |
| | (0.801) |
| 2013 | -4.268*** |
| | (0.842) |
| 2014 | -4.699*** |
| | (0.871) |
| 2015 | -4.643*** |
| | (0.889) |
| 2016 | -4.896*** |
| | (0.926) |
| 2017 | -4.764*** |
| | (0.962) |
| 2018 | -4.882*** |
| | (1.005) |
| 2019 | -4.984*** |
| | (1.051) |
| 2020 | -4.063*** |
| | (1.056) |
| 2021 | -4.179*** |
| | (1.055) |
| Constant | 21.861*** |
| | (4.946) |
| Observations | 1276 |
| $R^2$ | 0.119 |

*Note.* Standard errors are within parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Entry 9: Full Regression Results for Model 6

| Variable | (6) Model 4 with Log Transformation of Remittances per Capita |
|---|---|
| Ln(Remittances per Capita) | 1.639*** |
| | (0.635) |
| Control of Corruption | 3.649*** |
| | (0.691) |
| FDI Net Inflows (% of GDP) | -0.034 |
| | (0.035) |
| GDP per Capita | -0.000*** |
| | (0.000) |
| GDP per Capita Growth | -0.026 |
| | (0.029) |
| Government Expenditure (% of GDP) | -0.291*** |
| | (0.053) |
| Government Effectiveness | 1.892*** |
| | (0.656) |
| HDI | 0.274*** |
| | (0.081) |
| Political Stability and Absence of Violence/Terrorism | -0.848*** |
| | (0.321) |
| Regulatory Quality | -1.056 |
| | (0.664) |
| Rule of Law | -0.629 |
| | (0.819) |
| Total Natural Resources Rents (% of GDP) | -0.022 |
| | (0.030) |
| Trade (% of GDP) | 0.007 |
| | (0.007) |
| Unemployment | 0.077* |
| | (0.046) |
| Voice and Accountability | -1.884*** |
| | (0.553) |
| Net Migration (% of Population) | -98.294 |
| | (158.037) |
| Ln(Remittances per Capita)$^2$ | -0.728*** |
| | (0.072) |
| Ln(Remittances per Capita) * GDP per Capita | 0.000*** |
| | (0.000) |
| Ln(Remittances per Capita) * Net Migration (% of Population) | 3.514 |
| | (27.279) |
| Caribbean * Ln(Remittances per Capita) | 1.585 |
| | (1.464) |
| Central America * Ln(Remittances per Capita) | 4.192*** |
| | (1.037) |
| Central Asia * Ln(Remittances per Capita) | 4.765*** |
| | (0.690) |
| Eastern Africa * Ln(Remittances per Capita) | -1.344* |
| | (0.791) |
| Eastern Asia * Ln(Remittances per Capita) | 2.398** |
| | (1.007) |
| Eastern Europe * Ln(Remittances per Capita) | 2.463*** |
| | (0.714) |
| Middle Africa * Ln(Remittances per Capita) | 1.403 |
| | (1.809) |
| Northern Africa * Ln(Remittances per Capita) | 1.855** |
| | (0.738) |
| Northern Europe * Ln(Remittances per Capita) | 1.164 |
| | (0.940) |
| South America * Ln(Remittances per Capita) | -0.180 |
| | (0.812) |
| South Eastern Asia * Ln(Remittances per Capita) | -0.234 |
| | (0.623) |

| | |
|---|---|
| Southern Africa * Ln(Remittances per Capita) | 0.911 (1.004) |
| Southern Asia * Ln(Remittances per Capita) | 4.292*** (0.754) |
| Southern Europe * Ln(Remittances per Capita) | 2.754** (1.285) |
| Western Asia * Ln(Remittances per Capita) | 4.911*** (0.972) |
| 2003 | -0.217 (0.543) |
| 2004 | 0.140 (0.566) |
| 2005 | 0.070 (0.591) |
| 2006 | -0.387 (0.628) |
| 2007 | 0.129 (0.670) |
| 2008 | -0.212 (0.716) |
| 2009 | -1.081 (0.723) |
| 2010 | -1.379** (0.741) |
| 2011 | -2.042** (0.799) |
| 2012 | -2.513*** (0.831) |
| 2013 | -2.459*** (0.869) |
| 2014 | -2.929*** (0.902) |
| 2015 | -3.064*** (0.920) |
| 2016 | -3.303*** (0.954) |
| 2017 | -3.011*** (0.991) |
| 2018 | -2.978*** (1.034) |
| 2019 | -3.064*** (1.078) |
| 2020 | -2.161** (1.079) |
| 2021 | -2.323** (1.071) |
| Constant | 19.490*** (4.946) |
| Observations | 1276 |
| $R^2$ | 0.099 |

*Note.* Standard errors are within parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Entry 10: Full Regression Results for Model 7

| Variable | (6) Model 4 Omitting Bad Controls |
|---|---|
| Remittances per Capita | -0.037*** |
| | (0.008) |
| Control of Corruption | 3.016*** |
| | (0.685) |
| FDI Net Inflows (% of GDP) | -0.080** |
| | (0.036) |
| GDP per Capita | |
| GDP per Capita Growth | |
| Government Expenditure (% of GDP) | -0.261*** |
| | (0.052) |
| Government Effectiveness | 1.934*** |
| | (0.661) |
| HDI | 0.202** |
| | (0.079) |
| Political Stability and Absence of Violence/Terrorism | -0.890*** |
| | (0.313) |
| Regulatory Quality | -0.112 |
| | (0.665) |
| Rule of Law | -0.750 |
| | (0.815) |
| Total Natural Resources Rents (% of GDP) | -0.031 |
| | (0.030) |
| Trade (% of GDP) | 0.005 |
| | (0.007) |
| Unemployment | |
| Voice and Accountability | -1.608*** |
| | (0.565) |
| Net Migration (% of Population) | -19.061 |
| | (68.326) |
| Remittances per Capita$^2$ | -0.000** |
| | (0.000) |
| Remittances per Capita * GDP per Capita | 0.000*** |
| | (0.000) |
| Remittances per Capita * Net Migration (% of Population) | -0.058 |
| | (0.111) |
| Caribbean * Remittances per Capita | 1.585 |
| | (1.464) |
| Central America * Remittances per Capita | 0.037*** |
| | (0.008) |
| Central Asia * Remittances per Capita | 0.040*** |
| | (0.008) |
| Eastern Africa * Remittances per Capita | -0.034*** |
| | (0.012) |
| Eastern Asia * Remittances per Capita | 0.088*** |
| | (0.033) |
| Eastern Europe * Remittances per Capita | 0.032*** |
| | (0.008) |
| Middle Africa * Remittances per Capita | 0.303 |
| | (0.310) |
| Northern Africa * Remittances per Capita | 0.029** |
| | (0.013) |
| Northern Europe * Remittances per Capita | 0.025*** |
| | (0.009) |
| South America * Remittances per Capita | -0.006 |
| | (0.014) |
| South Eastern Asia * Remittances per Capita | 0.002 |
| | (0.012) |
| Southern Africa * Remittances per Capita | 0.054*** |
| | (0.016) |
| Southern Asia * Remittances per Capita | 0.038*** |
| | (0.009) |

| | |
|---|---|
| Southern Europe * Remittances per Capita | 0.039*** |
| | (0.009) |
| Western Asia * Remittances per Capita | 0.037*** |
| | (0.008) |
| 2003 | -0.196 |
| | (0.542) |
| 2004 | -0.069 |
| | (0.559) |
| 2005 | -0.100 |
| | (0.581) |
| 2006 | -0.548 |
| | (0.611) |
| 2007 | -0.201 |
| | (0.649) |
| 2008 | -0.614 |
| | (0.683) |
| 2009 | -1.423** |
| | (0.686) |
| 2010 | -1.831*** |
| | (0.710) |
| 2011 | -2.418*** |
| | (0.761) |
| 2012 | -2.905*** |
| | (0.795) |
| 2013 | -2.835*** |
| | (0.837) |
| 2014 | -3.273*** |
| | (0.870) |
| 2015 | -3.371*** |
| | (0.897) |
| 2016 | -3.589*** |
| | (0.934) |
| 2017 | -3.465*** |
| | (0.970) |
| 2018 | -3.404*** |
| | (1.011) |
| 2019 | -3.511*** |
| | (1.057) |
| 2020 | -2.441** |
| | (1.028) |
| 2021 | -2.552** |
| | (1.054) |
| Constant | 27.752*** |
| | (4.906) |
| Observations | 1276 |
| $R^2$ | 0.119 |

*Note.* Standard errors are within parentheses; *** p<0.01, ** p<0.05, * p<0.1.