Pakistan Journal of Commerce and Social Sciences
2016, Vol. 10 (2), 274-295
Pak J Commer Soc Sci

Distributional Consequences of Remittances: Evidence from Sixty-Five Developing Countries

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Abstract

This paper investigates the distributional consequences of international remittances using a panel data set from sixty five developing economies from 1970 to 2015. It focuses on complementarity between financial development and remittances in determining the inequality-impact of remittances using instrumental variables techniques of panel data for empirical analysis.

The study finds out that inequality-effect of remittances differs between developing economies depending upon the strength of financial sector. International remittances help to the poor by reducing inequality in developing countries where financial markets are comparatively developed. However, the inequality-effect of remittances turns out to be adverse in developing economies where financial markets are underdeveloped. This effect arises because the strength of financial sector and remittances has a complimentary role in determining inequality-effect of remittances. The empirical findings of the study are robust to different specifications, econometrics techniques, additional control variables and sub-samples.

This research paper contributes into the literature on inequality and remittances by highlighting the heterogeneity of developing economies in shaping the distributional effects of international remittances. It is first study of its kind, to my knowledge, that provides an empirical analysis of complementarity between financial development and remittances in shaping the inequality-effect of remittances. The main message of this research is that the strength of financial sector in remittances receiving economies is critical in determining the inequality impacts of remittances. Therefore, the governments of developing economies need to improve their financial sectors to take the maximum advantages of international remittances.

Key Words: income inequality; remittances; financial sector development; developing economies

1. Introduction

How remittances influence a recipient economy? The available literature provides mixed evidence on the effects of remittances inflows in a recipient economy. Remittances reduce poverty by directly supplementing the income of poor. In addition, remittances serve as an important source of finance for household investments and savings. However, remittances

also exert negative impacts in an economy through appreciation of real exchange rate, fueling inflation rate and negatively influencing labor market participation.

Although an ample body of the literature has investigated the macroeconomic impacts of inflows of international remittances but few studies have analyzed the distributional consequences of remittances. These studies analyzed the relationship of remittances with inequality using country or village specific case studies and do not provide a larger picture of the developing economies. Moreover, Koechlin and Leon (2007) note that available literature on remittances and inequality provides contrasting findings.

One strand of the literature argues that remittances exert favorable influence on income distribution. For instance, McKenzie and Rapoport (2004) conduct a case study of Mexico and find inequality decreasing effect of remittances. Likewise, De and Ratha (2005) also confirm a negative impact of remittances on inequality in the case of Sri Lanka. Similarly, Acosta et al. (2008) also find out a negative influence of remittance on inequality in Latin American economies.

In contrast, the literature also highlights inequality-increasing effects of remittances. For instance, Barhan and Boucher (1998) determine inequality impact of remittances for three coastal communities in the case of Nicaragua. They find out inequality increasing effect of remittances when remittances are considered as substitute for local production. Likewise, Adams (2005) shows inequality-widening effect of remittances in a case study of Ghana. Some studies show insignificant impact of remittances on inequality. For instance Adams (1992) determines insignificant impact of remittance on inequality in a case study of rural Pakistan.

Remittances also affect households' income through relaxing credit constraints. For instance, studies by Taylor (1992) and Taylor and Wyatt (1996) investigate the indirect effect of remittances inflows on the income of households for rural Mexico. Their empirical results exhibit that the indirect impact of remittances trough relaxing credit constraints was higher for those households having liquidity constraints.

Using households' data for EI Salvador, Anzoategui et al. (2014) analyze the relationship of remittances with financial inclusion. They find out that remittances help to increase financial inclusion because households having remittances increase the use of deposit accounts. They point out that remittances help to relax credit constraints and increase the demand for saving instruments. However, they do not find evidence that remittances increase demand and use of credit from formal financial institutions.

Thus, the literature on inequality impact of remittances can be classified into two strands of the literature. First strand of the literature documents inequality-decreasing impact of remittances (see, for example, McKenzie and Rapoport, 2004; De and Ratha, 2005; Acosta et al., 2008). The second strand of the literature documents inequality-increasing impact of remittances (Adams, 2005).

The role of financial development is critical in explaining variations in cross-country income distributions. The theoretical studies by Banerjee and Newman (1993) and Galor and Zeira (1993) predict that improvements in financial sectors are inversely associated with income inequality. In contrast, some studies such as Lamoreaux (1986), Maurer and Haber (2003), argue that access to financial services remains limited to the rich at initial stages of financial development, thereby increasing the income of rich and inequality.

The present study is at the cross-roads of these two different strands of the literature. This study argues that inequality-impact of remittances varies depending upon the strength of financial system of the remittance receiving economy. Why financial markets are important in explaining the actual inequality impact of remittances? This question can be answered by providing following two arguments. First, costs associated with transfers of foreign remittances determine the propensity to remittances in developing economies. Second, developed and efficient financial markets are positively associated with lucrative returns on remittances. Thus the strength of financial system compliments to the inequality-deceasing effect of remittances. The available literature has ignored the complementarity between remittances and financial development in reducing inequality. The present study fills this gap by modelling the role of complementarity of remittances with financial development.

The current study contributes two new dimensions to the existing literature. Firstly, a new comparable measure for inequality is constructed which covers a large set of developing countries and takes into account a long period of time. Secondly, this study analyses the role of remittances in reducing inequality while taking into account the interaction between remittances and financial sector development.

This study attempts to answer the question do the inequality impacts of international remittances vary depending upon the strength of financial sector of the recipient economy. Particularly, this study focuses on how the development of financial sector of remittances receiving economy helps to take advantage of increasing international remittances inflows. The complementarity between financial development and international remittances in determining inequality is virtually ignored in the literature, the present study fills the gap by incorporating the complementarity of financial sector with international remittances.

Remaining of the study is organized as follows: A brief literature review has been provided in Section 2. Methodology is discussed in Section 3. A description of the data used and estimation methods applied is given in Section 4. The empirical results have been discussion in Section 5 and finally Section 6 provides a conclusion.

2. Literature Review

This section provides a brief review of the relevant literature on inequality, remittances and other control variables that are used in subsequent analysis. This section is classified into two sub-sections where section 2.1 focuses on the relationship between inequality and remittances and section 2.2 reviews the said relationship in the light of finance and other control variables.

2.1 Literature on Inequality and Remittances

Although, the literature on remittances and economic growth is quite rich; the literature on remittances inflows and inequality is growing only in recent years. Besides limitedness, the empirical literature on the relationship of remittances with inequality provides mixed evidence depending on sample size and countries. For instance, in a case study of Egypt, Adams (1989) shows an inverse relationship between remittances and inequality while Adams (1992) finds neutral effect of remittances on inequality in a case study of rural Pakistan. Furthermore, Adams et al. (2008) find out inequality-widening impact of remittances in the case of Ghana.

Likewise, studies by Taylor (1992) and Taylor and Wyatt (1996) pointed out inequality-decreasing impact of remittances in a case study of Mexico. These studies argue that inequality- deceasing impact of remittances work through two channels. First, international remittances directly supplement to the income of poor rural households. Second, international remittances help the poor indirectly by providing collaterals to have an easy access to credit from financial markets. These direct and indirect impacts of remittances facilitate the poor households for financing the accumulation of productive assets that are likely to yield return in the future. In particular those households who face the problem of liquidity constraints, remittances help to ease the credit constraints, thereby reducing inequality.

In the literature, it is also argued that inequality-impacts of remittances depend on how remittances are treated. For instance, Barham and Boucher (1998) show for Nicaragua that remittances help to reduce inequality when they are treated as an exogenous source of income. Nevertheless, the inequality-impact of remittances is reversed when they are treated as a substitute for home income.

The literature provides another argument on the positive association between remittances and inequality that is wealthy households receive more remittances. In this regard, studies by Lipton (1980) and Stahl (1982) argue that richer households receive more remittances because comparatively richer households are in a better position to finance family member' search for job in urban areas or overseas. Another study by World Bank (2007) also supports this argument as it is observed that richer households in former Soviet Union East European countries receive more remittances as compared to the poor households.

Some studies argue that inequality-impact of remittances depends upon the levels of migration. For instance, McKenzie and Rapoport (2004) found out a non-linear relationship between inequality and migration for Mexico. They illustrate that inequality-impact of remittances is positive when migration is low while inequality tends to fall at higher levels of migration. Nevertheless, Koechlin and Leon (2007) point out that cost of migration tends to fall when the communities of migrants develop close networks in foreign country. Therefore, remittances do not increase inequality in the recipient economy.

Yang and Martinez (2006), in a sample of 26121 households, show that remittances do not exert significant influence on inequality. Using cross-country data for Latin American countries Acosta et al. (2008) find out inequality decreasing effect of remittances. Wouterse (2009) determines inequality impact of remittances for fours villages in Bukina Faso and finds mixed evidence. The intra-African remittances help to reduce inequality while intercontinental remittances increase inequality.

Garip (2014) argues migration causes the loss of assets for rich households because less labor force is available to maintain local economic activities as a result of migration while the poor gain assets. He tests the inequality impact of remittances and migration for 51 rural villages in Thailand. The analysis of his study is based on 5449 households' survey data. The empirical findings confirm the argument as migration and remittances cause equalizing effect on wealth distribution.

Using an urban household survey, Beyene (2014) investigates the poverty and inequality consequences of remittances for Ethiopia. Empirical findings of the study show that remittances significantly help to reduce poverty, however, inequality remains unchanged.

Majeed (2015) investigates the poverty consequences of remittances in developing countries. He found mixed evidence of the relationship of remittances with poverty.

Recently, Siddique et al. (2016) empirically determine poverty effects of migration and remittances in South Asian economies over the period 1980-2102. They used pooled OLS for empirical analysis. They found out that migration and remittances are important in reducing poverty in South Asian economies.

Thus, available literature on the inequality consequences of international remittances shows contradicting results. The empirical literature has mainly focused village specific or country specific analysis which cannot be generalized for the developing economies. Furthermore, studies have estimated a direct linear impact of remittances on inequality which can be misleading as remittances have complementarity with the strength of financial markets of the recipient economies. The present study takes care of these issues and attempts to provide a better understanding of the inequality impact of remittances.

2.2 Theory of Inequality Determinants

Before further analyzing international remittances as a cause of within-country inequality, we consider some other suggested causes. The most important may be economic development itself.

Kuznets (1955) suggested a non-monotonic relationship of income distribution with economic development implying that that the inequality-impact of economic development varies over the path of development. In the beginning, income distribution tends to worsen at lower levels of economic development, however, after a certain level of economic development income distribution begins to improve. The improvement in income distribution is referred to the outcome of trickle down effects of economic development where the poor of an economy also benefit from the increasing development of an economy. Does Kuznets Curve hold? The empirical literature does not show consensus in answering this question. Some earlier studies such as Ahluwalia (1976) confirm the presence of Kuznets Curve, nevertheless, some later studies such as Deininger and Squire, 1998 do not find evidence in favor of Kuznets Curve.

Financial development plays a central role in explaining cross-country differences of income distribution. The theoretical papers by Galor and Zeira (1993) and Banerjee and Newman (1993) predict that improvements in financial sectors are inversely associated with income inequality. In contrast, some studies such as Lamoreaux (1986), Maurer and Haber (2003), argue that access to financial services remains limited to the rich at initial stages of financial development, thereby increasing the income of rich and increasing inequality.

Greenwood and Jovnovie (1990) argued that at lower stages of financial development these are the rich who benefit more from financial development and therefore inequalities further increase. Nevertheless over time, with more improvements in financial services the poor also benefit from financial development and consequently income gaps between the poor and rich reduce. Thus, the relationship between financial development and inequality is not linear.

In a recent study, Prete (2013) argues that development in financial markets contributes to the rise in the skill premium and therefore increases wage inequality. Prete (2013) shows

that wages of skilled workers increased by 0.5%-6.3% in response to reforms in financial markets in USA while, on the other hand, wages of unskilled fell by 3.5%-8.7%.

Bahmani-Oskooee and Zhang (2015) explore the relationship of financial markets with inequality using time-series data and methods for 17 countries. They find mixed evidence. They found inequality-narrowing effect of financial development in the short-run for 10 countries while inequality-widening effect for five countries. However, in the long-run inequality-narrowing effect lasts only in three countries which are Turkey, Kenya and Denmark.

The increasing price levels hit poor hard and therefore cause adverse impact on income distribution. However, the literature provides mixed evidence on the impact of inflation on inequality. On the one hand, inflation is positively associated with inequalities as it affects real income of individuals adversely. On the other hand, inflation may cause negative effect on inequality when tax system is progressive. In developing economies, the inequality increasing effect of inflation is more likely to occur because wages of the poor remain behind increasing price levels. In the presence of weak institutions, the minimum wage laws are not helpful in developing economies and the poor workers are not compensated in terms of proportional rise in their wages while the rich having firms of production benefit from increasing prices and get further rich, thereby increasing inequalities (MacDonald and Majeed, 2010).

The government also plays a central role in influencing income distribution in the economy. The literature provides mixed evidence on the role of government in determining inequalities. On the one hand, government can improve equality in the society by transforming the resources from the rich towards the poor. However, in the presence of rent seeking activities, kickbacks and corruption, government spending are not transferred towards the poor and the influential rich get further rich by manipulating the government spending in their own favors. Papanek and Kyn (1986) argue that government spending often favors to elites such as politician, bureaucrats and army rather than to the poor. They empirically test the impact of government spending on inequality and their result do not confirm the claim that government spending help to reduce inequality. Nevertheless, some other cross-country studies find negative association between government spending and inequality (Boyd, 1998; MacDonald and Majeed, 2010).

The inequality effect of population growth is generally considered inequality-widening. For instance, Deaton and Paxon (1997) argue that these are the poor stratums where population growth increases the size of families. This causes higher dependency burden which, in turn, increases poverty and inequality. The investment in human capital is also one of the important causes of inequality as higher levels of human capital reflect better skills, higher productivity and income. Thus the impact of investment in human capital on inequality is likely to be negative.

This study is closely related to the research provided by Papanek and Kyn (1986), Jha (1996), and Clarke et al. (2006). Papanek and Kyn (1986) test the validity of Kuznets Curve using a cross-country data of 83 countries. Their empirical findings support the validity of Kuznets Curve, however, their results are not robust. Moreover, they do not find a systematic effect of government spending on inequality. Their study has certain flaws such as the availability of inequality series were rather short as more than fifty percent of the countries having only one observation of inequality. Above studies also suffer from the

problem of endogeneity and also the results are suffered from the problem of omitted variable bias as the role of finance is not incorporated into the analysis.

Using a pooled data of both developed and developing economies from 1960 to 1992, Jha (1992) tests the presence of Kuznets Curve and confirms it validity. However, this study has certain limitations. For instance, the author points out the issue of endogeneity but does not address it and leaves it for future research. Furthermore, the problem of omitted variables bias is not addressed because two important causes of inequality that is finance and government are ignored in the analysis of Jha (1992). The present study takes care of both issues that is the problems of endogenity and omitted variable bias. Furthermore, this study uses data over a longer period exclusively for the developing economies.

Using a pooled sample of 83 countries, Clarke et al. (2006) determine the inequality effect of finance from 1960 to1996. Their findings show that finance leads to reduction in inequality. The data used in this study does not cover the recent decades. Moreover, they do not distinguish between developing and developed economies and generalize their findings for both developed and developing economies.

This study differs from above reviewed studies in many ways. First, this study uses a panel data for a large set of developing economies over a long period (1970-2015). Second, it uses a new comparable statistics on inequality as it is averaged using household surveys. Third, this study also takes care of the omitted variable bias by including key determinants of inequality. Fourth, this study addresses the problem of endogeneity using instrument variables. Fifth, the study investigates the complementarity between international remittances and financial development in shaping the inequality impact of international remittances.

3. Methodology

This section comprises the econometric model for income inequality. The baseline model is based on the Kuznets Curve which has been used by many empirical studies such as Iradain (2005).

$$Log\ Ineq_{it} = \delta\gamma_{it} + \delta_1 logPCY_{it} + \delta_2 (logPCY_{it})^2 + \delta_3 X_{it} + \varepsilon_{it} \quad (1)$$

$$i = Country\ 1,2,3, \dots\dots\dots\dots\dots,65$$

$$t = Time\ 1970, \dots\dots\dots\dots\dots,2015$$

The income inequality which is dependent variable has been measured by taking the natural log of Gini index and denoted by the term $Log\ Ineq_{it}$. The independent variables $logY_{it}$ and $(logPCY_{it})^2$ are measured by taking the natural logs of real GDP Per Capita at constant prices, adjusted with purchasing power parity (PPP). The squared term $(logPCY_{it})^2$ is incorporated to test the validity of Kuznets Curve. The term X_{it} is a row matrix of control variables which affect income inequality. Finally, ε_{it} represents an error term.

The Kuznets Curve implies that inequality impact of economic development is non-monotonic. Thus the expected coefficient of δ_1 is greater than zero while expected coefficient of δ_2 is less than zero. In equation 2 we control for remittances which is the focused variable for the present study.

$$Log\ Ineq_{it} = \delta\gamma_{it} + \delta_1 logPCY_{it} + \delta_2 (logPCY_{it})^2 + \delta_3 (\frac{Rem}{Y})_{it} + \delta_4 X_{it} + \varepsilon_{it} \quad (2)$$

The expected sign of δ_3 could be either negative or positive. Some studies report negative sign of δ_3 (see, for example, McKenzie and Rapoport, 2004; De and Ratha, 2005; Acosta et al., 2008). While some studies such as Adams (2005) and Barhan and Boucher (1998) report positive sign of δ_3.

$$Log\ Ineq_{it} = \delta\gamma_{it} + \delta_1 logPCY_{it} + \delta_2(logPCY_{it})^2 + \delta_3(\frac{Rem}{Y})_{it} + \delta_4(\frac{Rem*FD}{Y})_{it} + \delta_5 X_{it} + \varepsilon_{it} \quad (3)$$

In equation 3 we control for the interactive effect of financial markets development with remittances. The expected sign of δ_4 is negative. The inequality also influences by other variables such as human capital, population growth and the size of the government. The literature provides mixed evidence on the role of government in determining inequalities. On the one hand, government can improve equality in the society by transforming the resources from the rich towards the poor. However, in the presence of rent seeking activities, kickbacks and corruption, government spending are not transferred towards the poor and the influential rich get further rich by manipulating the government spending in their own favors. Papanek and Kyn (1986) argue that government spending often favors to elites such as politician, bureaucrats and army rather than to the poor. The investment in human can also help to reduce inequalities. These additional control variables are referred with the row matrix X.

4. The Data Description and Estimation Procedure

For empirical analysis income inequality is measured with Gini coefficient. It is derived from the Lorenz Curve which shows the relationship between share of population and share of income received. The minimum value of a Gini coefficient could be zero implying perfect equality and maximum value of a Gini coefficient could be one implying perfect inequality. Since cross-country data on inequality may have definitions and methodological differences, to overcome this issue this study follows Iradain (2005) and takes the averages of two survey years. The data set covers 65 developing economies over the period 1970-2015. The data set for Gini is derived from UNU-WIDER (2015).

The data on real per capita GDP, remittances (as percentage of GDP), secondary school enrolment (a proxy of human capital), population growth rate, government expenditures (as ratio of GDP) and international trade (measured as sum of export and imports as percentage of GDP) are extracted from, *World Development Indicators* (2015). The data on inflation, private credit, M2 as % of GDP, and financial development are extracted from *International Financial Statistics* (2015).

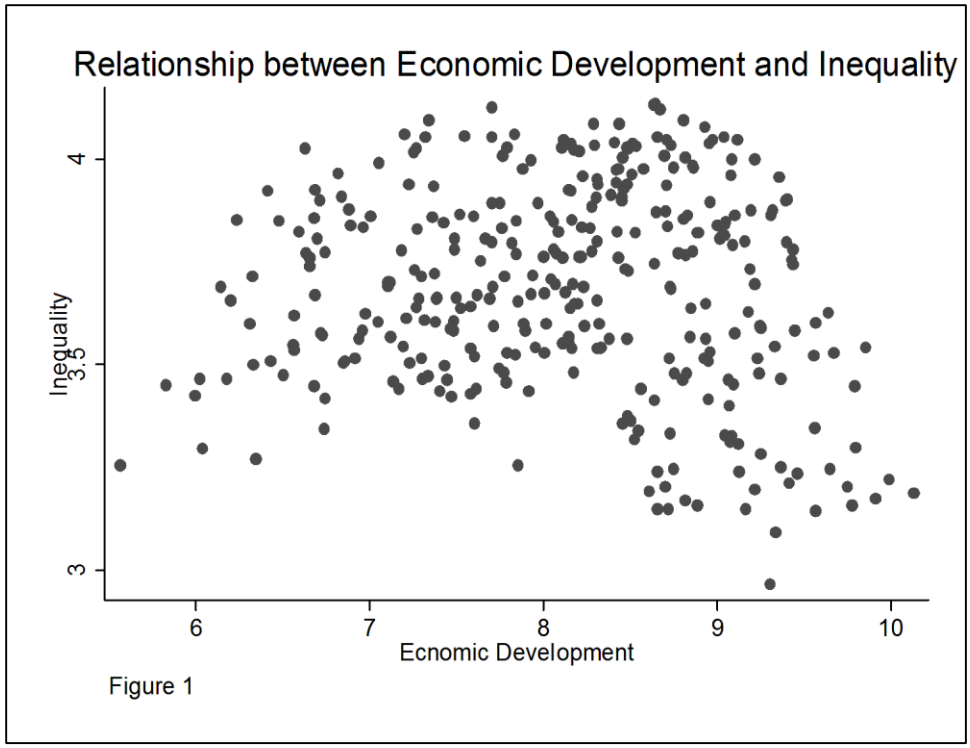

Figure 1

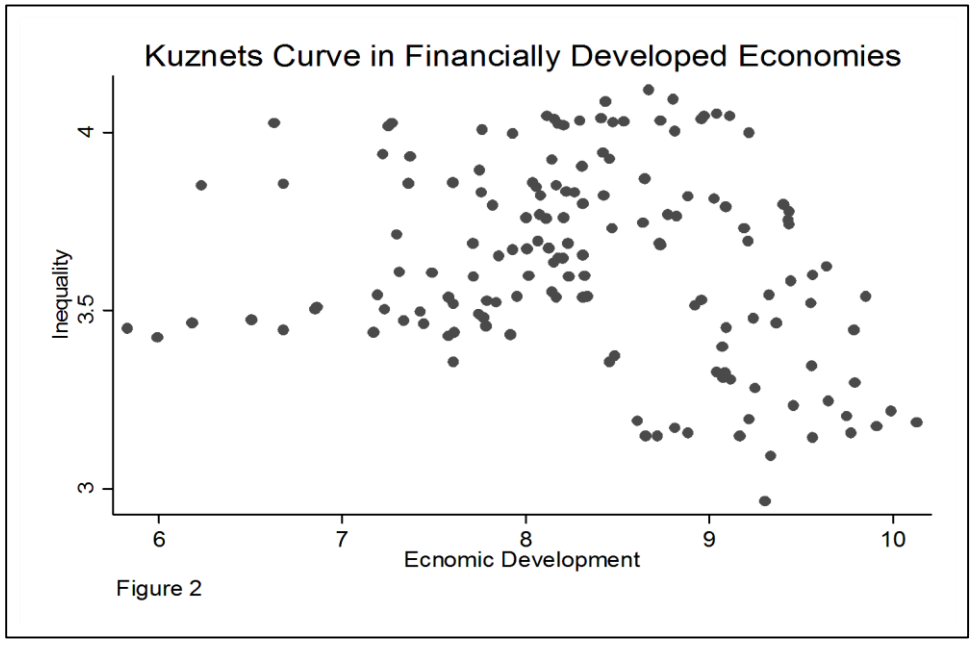

Figure 2

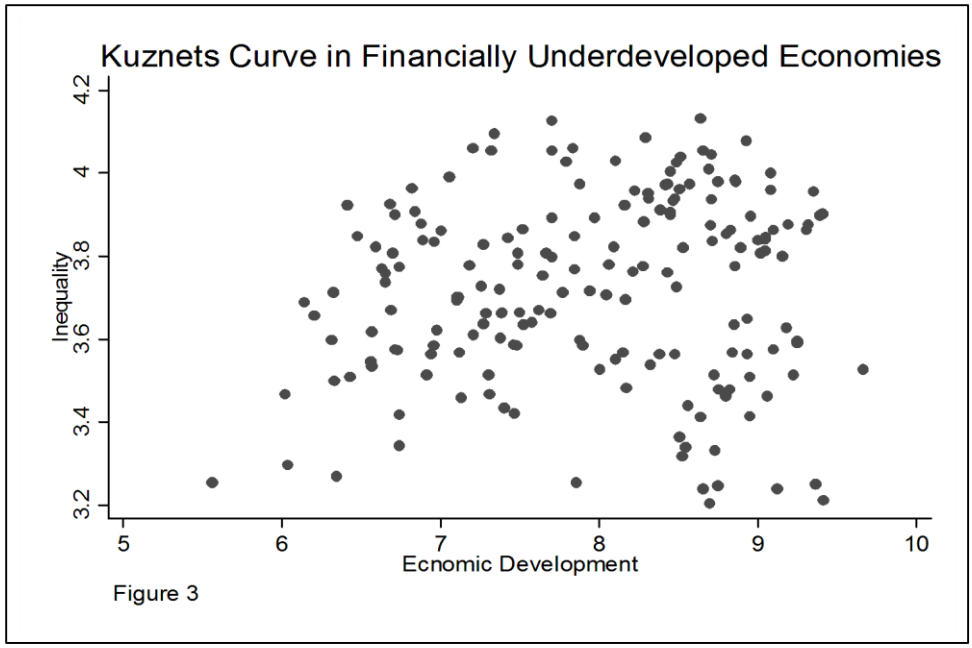

Figure 3

Following conventional wisdom of the literature, baseline empirical analysis is conducted using *Ordinary Least Square (OLS)* method of estimation. However, simple *OLS* does not address the problem of endogeneity. Moreover, *OLS* also does not address the bias created by omitted variables. To address these problems alternative econometrics techniques *Two Stage Least Squares (2SLS)*, *Limited Information Maximum Likelihood (LIML)* and *Generalized Methods of Moments (GMM)* are used.

5. Empirical Results

The empirical analysis is conducted in following steps: First, parameter estimates are obtained for full sample of developing countries applying *OLS*. Second, the sensitivity analysis is performed using additional control variables. Third, to test the complementarity between remittances and financial development joint impact of remittances and financial development on inequality is estimated. Fourth, to test the robustness of benchmark empirical findings, the empirical analysis is replicated in two sub-samples: 1) economies having relatively high financial development 2) economies with low level of financial development. Fifth and finally, the baseline results are replicated by applying different econometric techniques such as *General Method of Moments* to analyze the robustness of findings and to tackle the likely problem of endogeneity.

Table 1: Inequality and Remittances in Developing Countries-*OLS*

Variables	(1)	(2)	(3)	(4)	(5)	(6)
PCY	1.383***	1.378***	1.373***	1.383***	1.349***	1.395***
	(0.207)	(0.216)	(0.216)	(0.217)	(0.218)	(0.214)
PCY^2	-0.0882***	-0.0876***	-0.0790***	-0.0791***	-0.0773***	-0.0804***
	(0.0130)	(0.0135)	(0.0134)	(0.0134)	(0.0135)	(0.0132)
Remittances		0.00407**	0.00376*	0.00376*	0.00441**	0.0486***
		(0.00194)	(0.00209)	(0.00210)	(0.00221)	(0.0162)
Financial			-0.0471**	-0.0463**	-0.0436*	-0.00977
Development			(0.0222)	(0.0222)	(0.0225)	(0.0256)
Inflation			0.00106***	0.00105***	0.00102***	0.00104***
			(0.000319)	(0.000319)	(0.000321)	(0.000315)
Population			0.124***	0.114***	0.121***	0.129***
			(0.0130)	(0.0164)	(0.0133)	(0.0130)
Government			-0.00592***	-0.00615***	-0.00574***	-0.00537***
Expenditures			(0.00132)	(0.00134)	(0.00133)	(0.00132)
Human				-0.000800		
Capital				(0.000872)		
Trade					-0.000316	
Openness					(0.000341)	
Rem*FD						-0.0111***
						(0.00398)
Constant	-1.655**	-1.664*	-2.082**	-2.097**	-1.990**	-2.345***
	(0.821)	(0.854)	(0.860)	(0.860)	(0.866)	(0.854)
Countries	65	65	65	65	65	65
R-squared	0.129	0.146	0.450	0.452	0.452	0.466

Note: Standard errors are given in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 1 shows the empirical results for remittances and inequality for all selected developing economies. The reported results show that the Kuznets Curve exists in developing economies as the inequality effect of economic development is positive and significant in linear term while this impact is negative and significant in non-linear term. The presence of Kuznets Curve remains persistent in all columns of the Table 1 and also in the columns of subsequent Tables.

It is evident from columns (2-6) that remittances exert positive influence on inequality. The marginal impact of remittances is 0.004 which is consistent and significant in all columns of the Table 1. This finding implies that increasing inflows of remittances into developing economies are causing adverse impact on income distribution of these economies. Nevertheless, inequality-widening impact of remittances is not consistent across

developing economies having different levels of financial development. It is evident from the results that inequality-widening effect turns out be inequality-narrowing effect once complementarity between financial sector development and remittances is considered in estimations. The heterogeneous impacts of remittances depending upon the strength of financial development imply that countries having weaker financial markets are unable to take the advantages of international remittances. While the poor of economies having relatively developed financial markets have the capacity to take the advantages of international remittances. The marginal impacts of inflation and population growth are inequality-widening in all regressions while the marginal impact of government expenditures turns out to be inequality-narrowing in all regressions.

In Table 2 and 3, results have been reported using alternative econometric techniques. The baseline findings remain same as the direct impact of remittances remains inequality-widening while indirect impact trough financial development remains inequality-narrowing in all regressions of Tables 2 and 3. The empirical analysis implies that heterogeneous effects of remittances on inequality pointed out by the earlier studies in the literature could be belter understood by taking the complementarity role of financial development. The inequality impact of remittances, in effect, depends upon the strength of financial sector of the recipient economies. The poor of financially strong economies are in a better position to take the advantage of increasing remittances. Therefore remittances help to reduce inequalities in these economies. The empirical results lend support to the idea that independent impact of remittances on income distribution is likely to be adverse while interactive impact with financial sector is likely to be favorable.

The validity of instruments is checked by applying Sargan and Hansen tests. It is clear from the reported p-values of these tests that the null hypothesis of exogenous instrument is not rejected and it can be concluded that instruments are valid and empirical findings are not suffering from the problem of endogeneity.

Table 2: Inequality and Remittances in Developing Countries using 2SLS and LIML

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	2SLS	*2SLS*	*2SLS*	*LIML*	*LIML*	*LIML*
PCY	1.869***	1.900***	1.877***	1.872***	1.904***	1.880***
	(0.303)	(0.299)	(0.297)	(0.303)	(0.299)	(0.298)
PCY^2	-0.106***	-0.108***	-0.107***	-0.107***	-0.109***	-0.108***
	(0.0183)	(0.0181)	(0.0180)	(0.0184)	(0.0181)	(0.0181)
Financial	-0.000887**	-0.000337		-0.000896**	-0.000338	
Development	(0.000371)	(0.000415)		(0.000373)	(0.000417)	
Government	-0.00651***	-0.00558**	-0.00547**	-0.00654***	-0.00559**	-0.00546**
Expenditures	(0.00226)	(0.00230)	(0.00229)	(0.00228)	(0.00232)	(0.00232)
Population	0.121***	0.141***	0.141***	0.121***	0.142***	0.142***
	(0.0210)	(0.0231)	(0.0232)	(0.0211)	(0.0232)	(0.0233)
Remittances	0.00412	0.0721**	0.0813***	0.00411	0.0729**	0.0824***
	(0.00306)	(0.0295)	(0.0261)	(0.00307)	(0.0299)	(0.0264)
Remittances *FD		-0.0168**	-0.0190***		-0.0170**	-0.0193***
		(0.00722)	(0.00641)		(0.00732)	(0.00650)
Human	-0.00123	-0.000430	-0.000288	-0.00123	-0.000424	-0.000280
Capital	(0.00107)	(0.00112)	(0.00110)	(0.00107)	(0.00112)	(0.00110)
Inflation	0.00145**	0.00152**	0.00167***	0.00144**	0.00151**	0.00167***
	(0.000658)	(0.000646)	(0.000621)	(0.000660)	(0.000648)	(0.000623)
Anderson-Rubin	*4.48*	*3.48*	*3.79*	*4.57*	*3.54*	*3.80*
chi2-Test	*(0.11)*	*(0.18)*	*(0.15)*	*(0.10)*	*(0.17)*	*(0.15)*
Basmann-Test	*4.32*	*3.32*	*3.65*	*2.16*	*1.66*	*1.82*
	(0.12)	*(0.19)*	*(0.16)*	*(0.12)*	*(0.19)*	*(0.16)*
Constant	-4.336***	-4.592***	-4.507***	-4.348***	-4.607***	-4.525***
	(1.232)	(1.221)	(1.216)	(1.236)	(1.225)	(1.220)
Countries	65	65	65	65	65	65
R-squared	0.437	0.454	0.454	0.437	0.454	0.453

Table 3: Inequality and Remittances in Developing Countries using GMM

Variables	(1)	(2)	(3)
	GMM	*GMM*	*GMM*
PCY	1.814***	1.873***	1.868***
	(0.352)	(0.349)	(0.351)
PCY^2	-0.103***	-0.107***	-0.107***
	(0.0213)	(0.0210)	(0.0211)
Financial	-0.000873**	-0.000226	
Development	(0.000355)	(0.000368)	
Government	-0.00699***	-0.00576***	-0.00566**
Expenditures	(0.00232)	(0.00223)	(0.00222)
Population	0.118***	0.142***	0.142***
	(0.0184)	(0.0205)	(0.0207)
Remittances	0.00414	0.0827**	0.0908***
	(0.00346)	(0.0358)	(0.0335)
Remittances*FD		-0.0192**	-0.0212***
		(0.00868)	(0.00811)
Human	-0.00115	-0.000294	-0.000212
Capital	(0.000913)	(0.000975)	(0.000966)
Inflation	0.00148***	0.00151***	0.00158***
	(0.000535)	(0.000502)	(0.000497)
Constant	-4.086***	-4.480***	-4.468***
	(1.436)	(1.433)	(1.443)
Hansen's J chi2	3.63	3.52	4.34
	(0.16)	(0.1)	(0.11)
Countries	65	65	65
R-squared	0.437	0.452	0.449

5.1 Robustness Analysis

The combined sample for financially developed and underdeveloped economies may hide true relationships between remittances and inequality. To check the strength of baseline empirical findings this study also examines empirical findings in sub-samples of financially developed and underdeveloped economies.

Table 4 provides empirical results for a sub-sample of financially developed economies. All columns of Table 4 show that parameter estimate on remittances is 0.01 with positive sign and it is significant in all regression implying that remittances exert inequality-narrowing impact in financially developed economies. The results remain consistent to additional control variables such as trade and government expenditures. It is noteworthy that the role of government is also very conducive in narrowing inequality. Table 5 shows empirical results obtained using alternative econometric techniques. In this case benchmark findings remain consistent and stable.

Table 4: Inequality and Remittances in Financially Developed (FD) Countries

Variables	(1)	(2)	(3)	(4)	(5)	(6)
PCY	1.461***	1.582***	2.442***	2.426***	2.441***	2.424***
	(0.322)	(0.344)	(0.399)	(0.401)	(0.401)	(0.396)
PCY^2	-0.0935***	-0.101***	-0.143***	-0.141***	-0.143***	-0.143***
	(0.0196)	(0.0209)	(0.0240)	(0.0243)	(0.0241)	(0.0238)
Remittances		0.00335***	-0.00750*	-0.00711***	-0.00754*	-0.00939**
		(0.00267)	(0.00422)	(0.00430)	(0.00433)	(0.00435)
Inflation			0.00248**	0.00248**	0.00249**	0.00268**
			(0.00111)	(0.00112)	(0.00117)	(0.00111)
Population			0.110***	0.106***	0.109***	0.121***
			(0.0252)	(0.0264)	(0.0258)	(0.0259)
Government Expenditures			-0.00795***	-0.00823***	-0.00795***	-0.00749***
			(0.00198)	(0.00205)	(0.00199)	(0.00198)
Human				-0.000779		
Capital				(0.00147)		
Trade					2.18e-05	
Openness					(0.000532)	
FDI						0.00877
						(0.00542)
Constant	-1.967	-2.478*	-6.644***	-6.577***	-6.640***	-6.564***
	(1.314)	(1.411)	(1.639)	(1.649)	(1.649)	(1.627)
Observations	29	29	29	29	29	29
R-squared	0.182	0.215	0.487	0.488	0.487	0.500

Table 5: Inequality and Remittances in FD Countries Using Alternative Econometrics Techniques

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2SLS	*2SLS*	*2SLS*	*2SLS*	*GMM*	*GMM*	*GMM*
PCY	2.463***	2.452***	2.458***	2.450***	2.444***	2.445***	2.406***
	(0.427)	(0.428)	(0.427)	(0.421)	(0.409)	(0.402)	(0.402)
PCY^2	-0.144***	-0.143***	-0.144***	-0.144***	-0.142***	-0.144***	-0.142***
	(0.0256)	(0.0258)	(0.0256)	(0.0252)	(0.0249)	(0.0240)	(0.0239)
Remittances	-0.0129***	-0.0128***	-0.0133***	-0.0154***	-0.0150***	-0.0152***	-0.0181***
	(0.00465)	(0.00471)	(0.00473)	(0.00479)	(0.00492)	(0.00492)	(0.00525)
Inflation	0.00247**	0.00246**	0.00263**	0.00274**	0.00243***	0.00262***	0.00274***
	(0.00108)	(0.00108)	(0.00114)	(0.00107)	(0.000685)	(0.000764)	(0.000677)
Population	0.128***	0.126***	0.125***	0.144***	0.131***	0.130***	0.153***
	(0.0258)	(0.0265)	(0.0266)	(0.0264)	(0.0206)	(0.0237)	(0.0229)
Government	-0.0084***	-0.0085***	-0.0084***	-0.0078***	-0.0088***	-0.0083***	-0.0078***
Expenditures	(0.00193)	(0.00201)	(0.00193)	(0.00193)	(0.00164)	(0.00156)	(0.00160)
Human		-0.000543			-0.00106		
Capital		(0.00149)			(0.00143)		
Trade			0.000236			0.000273	
Openness			(0.000543)			(0.000546)	
FDI				0.0113**			0.0126*
				(0.00530)			(0.00694)
Constant	-6.762***	-6.715***	-6.712***	-6.708***	-6.674***	-6.644***	-6.527***
	(1.754)	(1.757)	(1.758)	(1.729)	(1.685)	(1.665)	(1.657)
Observations	29	29	29	29	29	29	29
R-squared	0.496	0.497	0.497	0.511	0.487	0.490	0.501

Finally, Tables 6 and 7 illustrate results for financially underdeveloped economies. In this sub-sample of economies the coefficient on remittances changes its sign from being negative to positive implying that remittances exert adverse influence in low financially developed economies. The coefficient on remittances is 0.008 which is lower relative to the coefficient reported for developed economies implying that adverse impact of remittances is weak which highlights the importance of development of financial sector to take the benefits of international remittance. The results remain same after controlling addition control variables and applying different econometric techniques.

Table 6: Inequality and Remittances in Financially Underdeveloped Countries

Variables	(1)	(2)	(3)	(4)	(5)	(6)
PCY	1.015***	0.847***	0.674**	0.656**	0.663**	0.652**
	(0.300)	(0.309)	(0.297)	(0.300)	(0.297)	(0.296)
PCY^2	-0.0633***	-0.0522***	-0.0354*	-0.0346*	-0.0347*	-0.0340*
	(0.0192)	(0.0198)	(0.0188)	(0.0189)	(0.0188)	(0.0187)
Remittances		0.00697**	0.00780***	0.00798***	0.00881***	0.00656***
		(0.00287)	(0.00219)	(0.00222)	(0.00233)	(0.00233)
Inflation			0.000955***	0.000968***	0.000874***	0.00101***
			(0.000299)	(0.000301)	(0.000305)	(0.000300)
Population			0.122***	0.129***	0.114***	0.127***
			(0.0137)	(0.0200)	(0.0151)	(0.0142)
Government			-0.00550***	-0.00534***	-0.00500***	-0.00531***
Expenditures			(0.00168)	(0.00172)	(0.00173)	(0.00168)
Human				0.000538		
Capital				(0.00107)		
Trade					-0.000604	
Openness					(0.000491)	
FDI						0.00583
						(0.00386)
Constant	-0.294	0.307	0.510	0.554	0.595	0.560
	(1.162)	(1.193)	(1.160)	(1.166)	(1.160)	(1.155)
Observations	36	36	36	36	36	36
R-squared	0.068	0.096	0.508	0.509	0.513	0.516

Table 7: Inequality and Remittances in Financially Underdeveloped Countries

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2SLS	*2SLS*	*2SLS*	*2SLS*	*GMM*	*GMM*	*GMM*
PCY	0.806**	0.803**	0.839**	0.761**	0.777**	0.753**	0.747**
	(0.345)	(0.347)	(0.343)	(0.342)	(0.367)	(0.368)	(0.363)
PCY^2	-0.0432**	-0.0431**	-0.0452**	-0.0402*	-0.0412*	-0.0399*	-0.0393*
	(0.0219)	(0.0219)	(0.0217)	(0.0217)	(0.0231)	(0.0230)	(0.0228)
Remittances	0.00841***	0.00845***	0.00947***	0.00738***	0.00857***	0.0097***	0.00762***
	(0.00236)	(0.00239)	(0.00257)	(0.00252)	(0.00124)	(0.00155)	(0.00117)
Inflation	0.00081**	0.00081**	0.00069**	0.00089***	0.00077***	0.00067**	0.00087***
	(0.000320)	(0.000320)	(0.000329)	(0.000323)	(0.000275)	(0.000287)	(0.000276)
Population	0.124***	0.126***	0.115***	0.129***	0.121***	0.113***	0.128***
	(0.0144)	(0.0209)	(0.0157)	(0.0148)	(0.0204)	(0.0129)	(0.0132)
Government Expenditures	-0.00533***	-0.00529***	-0.00477***	-0.00519***	-0.00556***	-0.00515**	-0.00549***
	(0.00173)	(0.00176)	(0.00179)	(0.00172)	(0.00200)	(0.00203)	(0.00188)
Human		0.000133			-0.000115		
Capital		(0.00112)			(0.000982)		
Trade			-0.000689			-0.000665	
Openness			(0.000535)			(0.000631)	
FDI				0.00548			0.00545
				(0.00401)			(0.00338)
Constant	-0.0509	-0.0428	-0.130	0.0960	0.0715	0.214	0.146
	(1.344)	(1.345)	(1.334)	(1.331)	(1.455)	(1.461)	(1.433)
Observations	36	36	36	36	36	36	36
R-squared	0.502	0.502	0.507	0.509	0.501	0.507	0.508

6. Conclusion

This study investigates the inequality consequences of international remittances using a panel data set of sixty five developing economies from 1970 to 2015. The study contributes into the literature on remittances and inequality by highlighting the heterogeneity of developing economies in shaping the distributional effects of international remittances. The empirical results are obtained by applying *OLS, 2SLSs, LIML* and *GMM* econometric techniques of panel data.

The empirical analysis shows that the inequality-effect of international remittances differs between developing economies having different levels of financial development. The high financial developing economies benefit from the international remittances as remittances help to reduce inequalities while low financial developing economies suffer from increasing international remittances because remittances increase inequality. Furthermore, the results show that the Kuznets Curve holds in developing economies. The inflation

exerts adverse influence on inequality in all economies while the role of government is favorable in reducing inequality.

This study is useful in the way that it helps to the governments of developing economies in terms of taking the maximum benefit of inflows of international remittances. The productive use of remittances can be ensured by developing better domestic financial markets. Furthermore, a check on increasing price levels can help to reduce inequality. Finally, an increase in government expenditures towards the poor can help to reduce inequality.

7. Research Limitations

The sample size for this study is small because there were many developing countries which are not having inequality series. The sensitively analysis for this research is limited as only selective causes of inequality are used to test the sensitivity of results. The panel data hides country-specific information as it aggregates the all countries in the sample. This study uses two indicators of financial sector development while some other indicators such as market capitalizations are also available but data is limited for other indicators.

8. Future Research Recommendations

Future studies can use panel cointegration techniques to analyze the dynamics of the relationship of remittances with inequality. In particular, heterogeneity of marginal effects of remittances across developing countries can be measured. The distribution of depend variable (inequality) also matters in explaining the inequality consequences of remittances. For this, a quantile regression analysis can be helpful for better understanding of the relationships between remittances and inequality. Since financial development has multiple dimensions, a Principle Component Analysis (PCA) can be conducted to capture the maximum variation of different measures of financial development to explain its interactive role with remittances.

9. Policy Recommendations

Findings of the study suggest that the governments of low-financial development economies need to implement more pro finance policies to safeguard the benefits of the poor while the governments of economies having high financial development need to increase inflows of remittances through lowering the costs of transfers to take the advantages of international remittances.

Acknowledgement

It is to acknowledge that this study has been substantially benefited from the constructive comments received from anonymous reviewers.

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Appendix

Table A1: List of Developing Economies

Algeria	Czech Rep.	Iran	Mauritania	Senegal
Argentina	Domin Rep	Ivory Coast	Mexico	Slovenia
Armenia	Ecuador	Jamaica	Morocco	Sri Lanka
Azerbaijan	Egypt	Jordan	Nepal	Tajikistan
Bangladesh	El Salvador	Kazakistan	Nigeria	Thailand
Belarus	Estonia	Korea Rep.	Pakistan	Tunisia
Brazil	Ethiopia	Kyrgyz Rep.	Panama	Turkey
Bulgaria	Georgia	Latvia	Paraguay	Uganda
Cameroon	Ghana	Lesotho	Peru	Ukraine
Chile	Honduras	Lithuania	Philippines	Uruguay
China	Hungary	Madagascar	Poland	Venezuela
Colombia	India	Malaysia	Romania	Vietnam
Costa Rica	Indonesia	Mali	Russia	Zambia