

Investigating Personal Remittances-Unemployment-Inequality Nexus in Emerging Markets

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Abstract: The paper investigated the personal remittances-unemployment-income inequality nexus in the case of emerging markets using panel data methods and data from 2003 to 2016. The argument by in the literature that income inequality is positively affected by its own lag was also supported when the dynamic GMM approach was used as an econometric estimation tool. In general, personal remittances were found to have increased income inequality because it is the rich who remit more funds back to the labour sending country. Although the two models under the fixed effects produced mixed effects, both random effects and the dynamic GMM approach shows that unemployment increased income inequality, a finding which is consistent with theoretical predictions (Ayala et al. 2001). In contrast to majority of literature on the subject matter, the pooled OLS noted that unemployment reduced income inequality. The results across all the four econometric estimation methods produced results which show that the complementarity between personal remittances and unemployment (a figure which does not take into self-employment enhanced by personal remittances inflows) reduced income inequality. The finding therefore agrees with Anyanwu and Erhijakpor (2010) whose study argued that personal remittances inflow promote the increase in small scale projects and general self-employment, whose statistical figures are not factored when computing unemployment figures. Emerging markets are therefore urged to craft and implement proper remittances inflow harnessing policies to ensure that they contribute towards both unemployment and income inequality reduction efforts.

Keywords: Inequality; Unemployment; Personal Remittances; Emerging Markets

JEL Classification: E24

1. Introduction

1.1. Background of the Study, Research Gaps and Problem Statement

The relationship between personal remittances and income inequality has received keen attention from scholars, academics and researchers in recent decades because of remittances' ability to contribute to income inequality reduction. In fact, there is no more contention when it comes to the positive role that personal remittances play in reducing income inequality. In other words, the relationship between personal remittances and income inequality is no longer a disputable matter in the field of finance and economics.

For example, Gubert et al (2010) noted that personal remittances improve the welfare of household members, boost household income and investment levels and enables them to venture into self-employment projects, all of which contributes towards lowering of income inequality gaps. Empirical

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literature whose results supported the personal remittances-led income inequality reduction hypothesis include Acharya and Leon-Gonzalez (2012), Azizi (2019), Hundenborn (2014) and Jamal and Amal (2014), among others.

However, these studies which concur that personal remittances reduces income inequality gap suffer from some methodological weaknesses. Firstly, they wrongly assume that personal remittances and income inequality have a linear relationship. Secondly, they do not consider the fact that income inequality data is dynamic in nature, in line with Azher (1995). Thirdly, they do not take care of the endogeneity problems that arises not only from the feedback effect between personal remittances and income inequality but from the fact that the explanatory variables of the income inequality also influence each other. Fourthly, they did not address Matthew and Johnson (2014)'s argument that the influence of one macroeconomic variable on another is not immediate. The current study addresses almost all these methodological weaknesses.

Researchers which argued that personal remittances are an engine for the creation of self-employment jobs in the labour sending country are available (Anyanwu and Erhijakpor. 2010; Mesnard. 2001). On the other hand, authors who noted that unemployment reduction is a channel through which income inequality gaps in the society are narrowed include Ayala et al (2001), Helpman et al (2010), Calvo-Armengol and Jackson (2004), Martinez and Ayala (2001) and Alamirew (2018). Clearly, the intricate relationship between personal remittances, unemployment and income inequality has not been researched yet there is evidence which shows that the inflow of personal remittances does not have a direct impact on income inequality reduction but does so through its ability to create self-employment projects in the labour sending country. The author is not aware of any empirical study which investigated whether personal remittances reduces income inequality through its ability to create self-employment among the recipients of remittances. It is against this background that the current study investigated whether unemployment or employment is a channel through which personal remittances influences income inequality in emerging markets.

1.2. Organization of the Paper

The remaining portion of the paper is structured into seven section. Section 2 discusses literature review on the impact of personal remittances on income inequality whilst Section 3 is the literature review on the influence of unemployment on inequality. Section 4 deals with the theoretical relationship between remittances and unemployment. Section 5 discusses the control variables of the model and each of them affects income inequality. Section 6 deals with the research methodology whereas Section 7 concludes the paper. Section 8 is the bibliography.

2. The impact of Personal Remittances on Income Inequality – Literature Review

According to Gubert et al (2010), personal remittances have a deleterious impact on income inequality because they directly increase household income, improve the welfare of the household members and might enhance their investment into small projects that can sustainably generate more income in the future.

Table 1. Summarizes Empirical Research on the Influence of Personal Remittances on Inequality.

Author	Country/Countries of study	Methodology	Results
Gubert et al (2010)	Mali	Descriptive statistics	Remittances inflow was found to have significantly reduced inequality and poverty.
Ebeke and Goff (2011)	Developing countries	Descriptive statistics	Remittances were found to have reduced inequality in developing countries studied.
Acharya and Leon-Gonzalez (2012)	Nepal	Multiple regression analysis	The ability of remittance to reduce income inequality in Nepal depended on the maturity of the migration process and to what level the poor people in the society participate in the migration process.
Azizi (2019)	Developing countries	Panel data analysis	Income inequality was found to have been significantly reduced by remittances inflows in developing countries.
Barham and Boucher (1998)	Atlantic Coast Port	Descriptive statistics	Remittances inflows increased income inequality.
Koehlin and Leon (2007)	78 developing countries	Panel data analysis	During the initial stages of migration, remittances inflow increases income inequality whilst the later stages of migration induces a deleterious effect on income inequality.
Hundenborn (2014)	South Africa	Multiple regression analysis	Income inequality was slightly reduced by remittances inflows in the case of South Africa
Richard et al (2008)	Ghana	Two stage multinomial logit model	Remittances were observed to have an increasing effect on income inequality in Ghana.
Cuong et al (2009)	Vietnam	Multiple regression analysis	International personal remittances inflow was found to lead to income inequality in Vietnam.
Jamal and Amal (2014)	Morocco	Descriptive statics	Income inequality was significantly reduced by the inflow of international personal remittances into rural areas of Morocco.

Bang et al (2018)	Nigeria	Instrumental Variable Quantile Regression	The U-shape characterized the relationship between remittances and income inequality.
Pernia (2008)	Philippines	Descriptive statistics	Remittances inflow did not have a tangible influence on income inequality at regional level

Source: Author compilation

3. The Influence of Unemployment on Inequality – Literature Review

Ayala et al (2001) argued that unemployment exacerbates income inequality because the employed are the ones who received better education, come from rich backgrounds and normally receives higher salaries at the workplace whilst the unemployed are the poor and come from poor backgrounds. Empirical literature which found out that unemployment increased the income inequality gap were done by Helpman et al (2010), Martinez and Ayala (2001), Calvo-Armengol and Jackson (2004) and Alamirew (2018).

4. A Theoretical Relationship between Remittances and Unemployment

Anyanwu and Erhijakpor (2010) noted that remittances inflow provide finance to the communities to begin small scale projects and enterprises and consequently enhances self-employment. The same study also argued that the increase in household consumption inspired remittances triggers the increased the demand for goods and products manufactured at community level hence promoting local community development and local employment creation. Mesnard (2001) also argued that remittances push up the quantity of funds flowing into small businesses hence promoting entrepreneurship and self-employment in the economy.

5. Control Variables

According to Richmond and Triplett (2017) noted that information and communication technology (ICT) development increase income equality because it creates a bigger gap in the access and skills possession by the people relying on the existing income class of individuals concerned. Individuals using internet (% of population) is a proxy used to measure ICT. The expectation is that ICT has a positive impact on income inequality.

Becker and Chiswick (1966) argued that high human capital development (HCD) has got a deleterious effect on income inequality in the country, society and at an individual level. This happens as education boosts skills level hence the people’s productivity at work and in pursuing their entrepreneurship projects. On the contrary, HCD was found not to have enough impact influence to reduce income inequality as supported by Castello-Climent and Domenech (2014). Human capital development was measured using human capital development index and is expected to have a negative influence on income inequality.

According to Dhrifi (2013), financial development (FIN) ensures that the rich people's ability to access credit becomes even more better hence further widening the income inequality gap between the rich and the poor. On the contrary, financial development allows the poor people to have access to financial services that promotes their welfare and standard of living thereby reducing income inequality gaps in the society (Stiglitz. 1998; World Bank. 2001). Market capitalization of listed domestic companies (% of GDP) is a proxy of financial development that was used. The impact of financial development on income inequality is expected to be either way.

Foreign direct investment (FDI) ensures that the host country's people are empowered through reduction in unemployment, skills empowerment, increase in productivity and general enhancement of economic growth opportunities. This according Boakye-Hyasi and Li (2015) contributes to income inequality reduction. However, Jaumotte et al (2013) noted that FDI increases income inequality because foreign investors in most cases are not interested in the development of host country's communities but repatriating profits back to the home country. Net FDI inflows (% of GDP) is a measure of foreign direct investment that was used and that FDI is expected to have to influence income inequality in either direction.

According to Balassa (1978) argued that trade openness reduces income inequality because it enhances the capability of local firms to contribute to economic growth through allowing them to effectively compete at international level. Such a scenario enables the local companies to create more jobs for the local people thus effectively contributing to income inequality reduction. The proxy for trade openness that was used in this study is the total of exports and imports (% of GDP). The expectation is that trade openness influence income inequality in a positive manner.

6. Research Methodology

6.1. Data, Description and Collection

The study investigated the nexus between personal remittances, unemployment and income inequality in emerging markets using panel data ranging from 2003 to 2016. The selection of emerging markets is in line with International Monetary Fund (2015) and availability of data. The fourteen emerging markets used in this study include Argentina, Brazil, China, Colombia, Czech Republic, Greece, Indonesia, Mexico, Peru, Poland, Portugal, Russia, Thailand and Turkey. The data was obtained from United Nations Development Programme, International Financial Statistics, International Monetary Fund and World Development Indicators.

6.2 Personal remittances-unemployment-income inequality trends in emerging markets

Table 4. Personal Remittances-Unemployment-Income Inequality Trends Analysis

	GINI co-efficient	Personal remittances received (% of GDP)	Unemployment total (% of total labour force)
Argentina	44.7	0.2	9.1
Brazil	54.1	0.2	8.4
China	41.0	0.2	4.5
Colombia	53.2	1.9	10.8
Czech Republic	26.5	0.9	6.4
Greece	34.8	0.5	15.9
Indonesia	36.5	1.1	5.9
Mexico	49.2	2.3	4.3
Peru	46.9	1.7	3.8
Poland	34.0	1.7	11.2
Portugal	36.7	0.2	10.4
Russia	40.3	0.4	6.6
Thailand	39.4	1.2	0.9
Turkey	40.5	0.2	9.9
Overall mean	41.26	0.90	7.73

Source: Author's compilation

Argentina, Brazil, Colombia, Mexico and Peru are the emerging markets out of the fourteen whose mean GINI co-efficient were greater than the overall mean GINI co-efficient of 41.26. Looking at Table 4, Brazil, Colombia, Czech Republic, Greece, Indonesia, Mexico and Poland are outliers because their mean GINI co-efficient far much deviated from the overall mean GINI co-efficient of 41.26.

When it comes to personal remittances, Colombia, Indonesia, Mexico, Peru, Poland and Thailand are characterised with mean personal remittances (% of GDP) which exceeded the overall mean personal remittances ratio of 0.90% of GDP. Outliers include Argentina, Brazil, China, Colombia, Greece, Mexico, Peru, Poland, Portugal, Russia, and Turkey because their mean personal remittances ratio far much deviated from the overall mean personal remittances ratio.

China, Czech Republic, Indonesia, Mexico, Peru, Russia and Thailand had the mean unemployment ratio which are below the overall mean unemployment ratio of 7.73% of total labour force. Emerging markets which can be regarded as outliers include China, Greece, Mexico, Peru, Poland and Thailand for the same reason that their mean unemployment ratios far much deviated from the overall mean unemployment ratio of 7.73% of total labour force.

6.3. Correlation analysis

Table 5. Correlation Analysis

	INEQ	REMIT	UNEMPL	ICT	HCAP	FIN	FDI	OPEN
INEQ	1.00							
REMIT	0.18***	1.00						
UNEMPL	-0.05	-0.19***	1.00					
ICT	-0.27***	-0.25***	0.23***	1.00				
HCAP	-0.41***	-0.10	0.37***	0.43***	1.00			
FIN	0.17**	0.04	-0.35***	-0.35***	-0.25***	1.00		
FDI	0.08	0.21	-0.14*	-0.01	-0.03	0.10	1.00	
OPEN	-0.65***	0.18**	-0.25***	0.12	0.26***	0.08	0.16**	1.00

Note: ***/**/* denotes statistical significance at the 1%/5%/10% level respectively.

Source: Author compilation from E-Views

Table 5 shows that personal remittances and financial development were individually related with income inequality in a significant positive manner, in line with theoretical predictions. Variables which were negatively and significantly correlated with income inequality include information and communication technology, human capital development and trade openness, results of which are supported by existing literature. The correlation between unemployment and income inequality was found to be negative but insignificant, a finding that contradicts available literature. However, FDI and income inequality were found to be non-significantly and positively related, results which are explainable in the existing literature. Consistent with Stead (1996), Table 5 shows that the existence of a multi-collinearity problem between and among the variables studied could not be detected.

6.4. Descriptive Statistics

Table 6. Descriptive Statistics

	INEQ	REMIT	UNEMPL	ICT	HCAP	FIN	FDI	OPEN
Mean	41.3	0.90	7.73	39.3	0.78	40.4	2.88	63.14
Median	40.2	0.60	7.28	38.3	0.78	36.02	2.72	53.8
Maximum	57.6	3.30	27.5	90.6	0.94	127.1	10.7	160.9
Minimum	25.9	0.10	0.49	2.39	0.60	5.67	0.15	22.1
Standard. deviation	7.69	0.77	4.60	21.3	0.07	22.0	1.58	32.3
Skewness	0.10	0.82	1.59	0.27	0.06	1.24	1.00	1.31
Kurtosis	2.41	2.56	7.16	2.24	2.39	4.76	5.66	3.92
Jarque-Bera	3.19	23.6	224.1	7.2	3.2	75.7	90.6	63.2
Probability	0.20	0.00	0.00	0.03	0.20	0.00	0.00	0.00
Observations	196	196	196	196	196	196	196	196

Note: ***/**/* denotes statistical significance at the 1%/5%/10% level respectively.

Source: Author compilation from E-Views

The range for financial development and trade openness which exceeds 100 provides evidence that there exist abnormal values in these two variables. All the variables were skewed to the right, showing the absence of normal distribution of the data used. The probability of the Jarque-Bera criteria was found to be equal to zero for variables such as personal remittances, unemployment, financial development, foreign direct investment and trade openness, evidence that the data for these variables was not normally distributed. The two statistical problems identified such as data failing to follow a normal distribution and the existence of outliers or abnormal values in the data sets for some variables could only be decisively dealt with by converting the data into natural logarithms before employing it for final data analysis, consistent with Aye and Edoja (2017) and Nor et al (2015).

6.5. General and econometric estimation methods

The following econometric model as represented in the form of equation 1.

$$INEQ = f(REMIT, UNEMPL, ICT, HCAP, FIN, FDI, OPEN) \quad [1]$$

Where INEQ, REMIT, UNEMPL, ICT, HCAP, FIN, FDI and OPEN respectively stands for income inequality, personal remittances, unemployment, information and communication technology, human capital development, financial development, foreign direct investment and trade openness.

Econometric equation 2 summarizes the income inequality function.

$$INEQ_{it} = \beta_0 + \beta_1REMIT_{it} + \beta_2UNEMPL_{it} + \beta_3ICT_{it} + \beta_4HCAP_{it} + \beta_5FIN_{it} + \beta_6FDI_{it} + \beta_7OPEN_{it} + \epsilon \quad [2]$$

Table 7. Equation 2 Signs and Their Interpretations

INEQ _{it}	Income inequality in country i at time t
REMIT _{it}	Personal remittances in country i at time t
UNEMPL _{it}	Unemployment in country i at time t
ICT _{it}	Information and communication technology in country i at time t
HCAP _{it}	Human capital development in country i at time t
FIN _{it}	Financial development in country i at time t
FDI _{it}	Foreign direct investment in country i at time t
OPEN _{it}	Trade openness in country i at time t
ε	Error term
<i>i</i>	Country
<i>t</i>	Time
β ₀	Intercept term
β ₁ to β ₇	Co-efficient of the independent variables

Source: Author Compilation

Consistent with Anyanwu and Erhijakpor (2010) whose argument is that remittances inflow provide finance to the communities to begin small scale projects and enterprises and consequently enhances self-employment and reduce income inequality, the study investigated the impact of personal remittance inflow and unemployment on income inequality (see equation 3). In other words, personal remittances inflow is expected to reduce both unemployment and income inequality.

$$INEQ_{it} = \beta_0 + \beta_1REMIT_{it} + \beta_2UNEMPL_{it} + \beta_3(REMIT_{it} \cdot UNEMPL_{it}) + \beta_4ICT_{it} + \beta_5HCAP_{it} + \beta_6FIN_{it} + \beta_7FDI_{it} + \beta_8OPEN_{it} + \epsilon \quad [3]$$

Fixed effects, random effects and pooled OLS are the econometric methods used to estimate equation 3.

$$INEQ_{it} = \beta_0 + \beta_1 INEQ_{it-1} + \beta_2REMIT_{it} + \beta_3UNEMPL_{it} + \beta_4(REMIT_{it} \cdot UNEMPL_{it}) + \beta_5ICT_{it} + \beta_6HCAP_{it} + \beta_7FIN_{it} + \beta_8FDI_{it} + \beta_9OPEN_{it} + \epsilon \quad [4]$$

$INEQ_{it-1}$ is the lag of income inequality, consistent with Azher’s (1995) argument.

Arellano and Bond (1991)’s dynamic panel GMM method was used to estimate equation 4.

6.6. Panel Root and Co-Integration Tests

Table 8. Panel Root Tests At Level

	Variable	LLC	IPS	ADF	PP
Individual intercept	INEQ	-2.2778**	-0.6965	23.7261	45.6359***
Individual intercept	REMIT	0.4805	0.6250	24.7036	23.9831
Individual intercept	UNEMPL	-3.5912***	-1.5118**	37.4992	29.2698
Individual intercept	ICT	-9.8032***	-3.8113***	65.8202***	124.112***
Individual intercept	HCAP	-9.2113***	-5.8058***	85.0009***	87.4627***
Individual intercept	FIN	-4.1735***	-1.9833**	41.5015**	84.6438***
Individual intercept	FDI	-4.7064***	-2.9274***	55.0792***	73.6813***
Individual intercept	OPEN	-0.4027	0.7575	25.8273	32.2890

Note: LLC, IPS, ADF and PP stands for Levin, Lin and Chu (2002); Im, Pesaran and Shin (2003); ADF Fisher Chi Square and PP Fisher Chi Square tests respectively. *, ** and *** denote 1%, 5% and 10% levels of significance, respectively.

Table 9. Panel Root Tests at First Difference

	Variable	LLC	IPS	ADF	PP
Individual intercept	INEQ	-5.2146***	-4.1669***	35.5815***	85.2108***
Individual intercept	REMIT	-4.5790***	-2.9899***	55.6313***	81.3618***
Individual intercept	UNEMPL	-3.6641***	-2.1702***	44.5714**	59.7954***
Individual intercept	ICT	-2.3808***	-1.4115*	136.1076***	87.1088***
Individual intercept	HCAP	-18.3312***	-	168.046***	229.666***
Individual intercept	FIN	-10.3156***	-7.4946***	106.543***	238.571***
Individual intercept	FDI	-9.3678***	-8.1364***	113.502***	200.153***
Individual intercept	OPEN	-7.4736***	-5.2868***	78.4021	173.691***

Note: LLC, IPS, ADF and PP stands for Levin, Lin and Chu; Im, Pesaran and Shin; ADF Fisher Chi Square and PP Fisher Chi Square tests respectively. *, ** and *** denote 1%, 5% and 10% levels of significance, respectively.

The panel tests (see results in Table 8 and 9) were done consistent using Im et al (2003), Fisher-tests, Levin et al (2002) and Breitung (2000) approaches, in line with Taiwo and Olayemi (2015). In support

of Odhiambo (2009), all the variables studied were found to be integrated of order 1 (all the variables were found to be stationary at first difference).

Table 10. Results of Kao Co-Integration Tests Using Kao (1999) Methodology

Series	ADF t-statistic
INEQ REMIT UNEMPL ICT HCAP FIN FDI OPEN	-7.2438***

Source: Author compilation

A long run relationship between and among the variables used was observed (see Table 10), hence clearing way for main data analysis.

6.7. Main Data Analysis, Results Discussion and Interpretation

Table 11. Fixed Effects Results

	Without interaction variable (Model 1)			With interaction variable (Model 2)		
	Co-efficient	Std. Error	t-statistic	Co-efficient	Std. Error	t-statistic
REMIT	0.0014	0.0120	0.1131	0.1677***	0.0310	5.4183
UNEMPL	0.0567***	0.0144	3.9264	-0.0593***	0.0138	-4.3094
REMIT.UNEMPL	-	-	-	-0.0657***	0.0152	-4.3072
ICT	-0.0053	0.0074	-0.7232	-0.0071	0.0122	-0.5812
HCAP	-0.0587	0.0784	-0.7491	-0.1629	0.1111	-1.4665
FIN	0.0175*	0.0095	1.8367	0.0339**	0.0150	2.2644
FDI	0.0111*	0.0066	1.6797	0.0592***	0.0114	5.1821
OPEN	-0.0434	0.0309	-1.4054	-0.36278***	0.0206	-17.5965
Adjusted R-squared	0.9389			Adjusted R-squared 0.7136		
F-statistic	150.8429			F-statistic 61.7430		
Probability(F-statistic)	0.0000			Probability(F-statistic) 0.0000		

Notes: GDP per capita is the dependent variable. ***, ** and * denote 1%, 5% and 10% levels of significance, respectively.

Source: Author's compilation from E-Views

In Table 11, personal remittances had a non-significant impact on income inequality in model 1 whilst a significant positive relationship running from personal remittances on income inequality in model 2. The results mean that personal remittances increased income inequality, in line with Barham and Boucher's (1998) findings. In model 1, unemployment had a significant positive influence on income inequality, consistent with Ayala et al (2001) whose study noted that unemployment increases income inequality because the poor are the ones mostly unemployed yet the people who hailed from rich backgrounds normally are employed. In model 2, unemployment was found to have a significant deleterious effect on income inequality, results which contradicts majority of literature on the subject matter. The complementarity between personal remittances and unemployment was found to have a significant negative impact on income inequality. It is clear from Table 11 that unemployment was found to be a channel through which personal remittances reduced income inequality in emerging markets, a finding which is in contradiction to available literature. The possible and reasonable explanation could be that unemployment figures used does not consider informal employment figures.

Table 12. Random Effects Results

	Without interaction variable (Model 1)			With interaction variable (Model 2)		
	Co-efficient	Std. Error	t-statistic	Co-efficient	Std. Error	t-statistic
REMIT	0.0048	0.0111	0.4305	0.0200	0.0212	0.9435
UNEMPL	0.0487***	0.0133	3.6612	0.0430***	0.0135	3.1754
REMIT.UNEMPL	-	-	-	-0.0078	0.0101	-0.7704
ICT	-0.0093	0.0071	-1.3083	-0.0123	0.0075	-1.6430
HCAP	-0.1296*	0.0752	-1.7227	-0.1437*	0.0749	-1.9199
FIN	0.0193**	0.0094	2.0526	0.0194**	0.0094	2.0705
FDI	0.0147**	0.0066	2.2403	0.0163**	0.0066	2.4690
OPEN	-0.0975***	0.0269	-3.6308	-0.1163***	0.0265	-4.3885
Adjusted R-squared	0.6518			Adjusted R-squared 0.505		
F-statistic	121.72			F-statistic 87.13		
Probability(F-statistic)	0.0000			Probability(F-statistic) 0.0000		

Notes: GDP per capita is the dependent variable. ***, ** and * denote 1%, 5% and 10% levels of significance, respectively.

Source: Author's compilation from E-Views

Table 12 results shows that in both models 1 and 2, personal remittances had an insignificant positive influence on income inequality. The results generally agree with findings by Barham and Boucher (1998), Richard et al (2008), Cuong et al (2009) and Koechlin and Leon (2007) during the early stage of migration. In both models 1 and 2, unemployment had a significant positive effect on income inequality, a finding which agrees with Ayala et al (2001) whose noted that unemployment exacerbates income inequality because as opposed to the poor people, the rich people are normally insulated from the effects of unemployment. However, the interaction between personal remittances and unemployment had an insignificant negative impact on income inequality, a finding which means that personal remittances could have reduced employment and consequently income inequality, a finding which supports literature (Anyanwu and Erhijakpor. 2010).

Table 13. Pooled OLS

	Without interaction variable (Model 1)			With interaction variable (Model 2)		
	Co-efficient	Std. Error	t-statistic	Co-efficient	Std. Error	t-statistic
REMIT	0.0394***	0.0088	4.4698	0.1677***	0.0310	5.4183
UNEMPL	-0.0567***	0.0144	-3.9430	-0.0593***	0.0138	-4.3094
REMIT.UNEMPL	-	-	-	-0.0657***	0.0152	-4.3072
ICT	0.0046	0.0124	0.3741	-0.0071	0.0122	-0.5812
HCAP	-0.1644	0.1162	-1.4154	-0.1629	0.1111	-1.4665
FIN	0.0339**	0.0157	2.1633	0.0339**	0.0150	2.2644
FDI	0.0468***	0.0116	4.0495	0.0592***	0.0114	5.1821
OPEN	-0.3562***	0.0215	-16.5728	-0.3627***	0.0206	-17.5965
Adjusted R-squared	0.6869			Adjusted R-squared 0.7136		
F-statistic	138.09			F-statistic 141.05		
Probability(F-statistic)	0.0000			Probability(F-statistic) 0.0000		

Notes: GDP per capita is the dependent variable. ***, ** and * denote 1%, 5% and 10% levels of significance, respectively.

Source: Author's compilation from E-Views

Table 13 shows that personal remittances had a significant positive influence on income inequality, a finding which means that remittances increased income inequality in line with some few available literature (Richard et al. 2008; Barham and Boucher. 1998; Koechlin and Leon. 2007; Cuong et al. 2009). In contradiction to majority of theoretical predictions on the subject matter, unemployment was found to have had a significant negative impact (reduced income inequality) on income inequality.

Table 13 is clear that unemployment was a channel through which personal remittances income inequality was reduced. In a way, the finding is consistent with Anyanwu and Erhijakpor (2010) whose study argued that remittances inflow avail finances to the communities to begin small scale projects and enterprises and consequently enhances self-employment. The latter is not normally factored when calculating unemployment figures, especially in emerging markets but is central to the reduction of income inequality in the society.

Table 14. Dynamic GMM Results

	Without interaction variable (Model 1)			With interaction variable (Model 2)		
	Co-efficient	Std. Error	t-statistic	Co-efficient	Std. Error	t-statistic
INEQ	0.8855***	0.0272	32.6033	0.8734***	0.0282	30.9719
REMIT	0.0010	0.0036	0.2577	0.0206	0.0134	1.5406
UNEMPL	0.0021	0.0059	0.3543	0.0009	0.0059	0.1497
REMIT.UNEMPL	-	-	-	-0.0098	0.0064	-1.5274
ICT	-0.0041	0.0048	-0.8511	-0.0057	0.0049	-1.1652
HCAP	-0.0692	0.0451	-1.5319	-0.0702	0.0450	-1.5612
FIN	0.0063	0.0061	1.0274	0.0067	0.0061	1.0927
FDI	0.0061	0.0047	1.3147	0.0085	0.0049	1.7404
OPEN	-0.0264**	0.0131	-2.0144	-0.0319**	0.0135	-2.3536
Adjusted R-squared	0.9529			Adjusted R-squared 0.9532		
J-statistic	187.00			J-statistic 186.00		
Probability(J-statistic)	0.0000			Probability(J-statistic) 0.0000		

Notes: GDP per capita is the dependent variable. ***, ** and * denote 1%, 5% and 10% levels of significance, respectively.

Source: Author's compilation from E-Views

In line with Azher's (1995), the lag of income inequality had a significant positive effect on income inequality. A non-significant positive relationship running from personal remittances towards income inequality was observed under the dynamic GMM method, a finding which generally is consistent with Barham and Boucher (1998), Richard et al (2008), Cuong et al (2009) and Koechlin and Leon (2007). However, unemployment was found to have an insignificant positive effect on income inequality, a finding which is in general agreement with Ayala et al (2001) and other empirical researchers such as Helpman et al (2010), Calvo-Armengol and Jackson (2004), Martinez and Ayala (2001) and Alamirew (2018). Under the dynamic GMM approach, the interaction between personal remittances and unemployment had a non-significant influence on income inequality. The findings are in line with Mesnard (2001) whose study argued that personal remittances encourage the proliferation of self-employment figures, a statistic which is not considered when computing unemployment figures especially for emerging markets.

7. Conclusion

The paper investigated the personal remittances-unemployment-income inequality nexus in the case of emerging markets using panel data methods and data from 2003 to 2016. The argument by in the literature that income inequality is positively affected by its own lag was also supported when the dynamic GMM approach was used as an econometric estimation tool. In general, personal remittances

were found to have increased income inequality because it is the rich who remit more funds back to the labour sending country. Although the two models under the fixed effects produced mixed effects, both random effects and the dynamic GMM approach shows that unemployment increased income inequality, a finding which is consistent with theoretical predictions (Ayala et al. 2001). In contrast to majority of literature on the subject matter, the pooled OLS noted that unemployment reduced income inequality. The results across all the four econometric estimation methods produced results which show that the complementarity between personal remittances and unemployment (a figure which does not take into self-employment enhanced by personal remittances inflows) reduced income inequality. The finding therefore agrees with Anyanwu and Erhijakpor (2010) whose study argued that personal remittances inflow promote the increase in small scale projects and general self-employment, whose statistical figures are not factored when computing unemployment figures. Emerging markets are therefore urged to craft and implement proper remittances inflow harnessing policies to ensure that they contribute towards both unemployment and income inequality reduction efforts.

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