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DO INTERNATIONAL REMITTANCES ALLEVIATE OR AGGRAVATE POVERTY IN DEVELOPING COUNTRIES?

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This study investigates the effect of surging increase in international remittances on poverty level in developing countries controlling for income, inequality, and other sources of external funding. Using the newly suggested remittance variable, the method of panel data analysis was applied across 66 developing countries for 9 panel years from 1981 to 2005. Results suggest that international remittances helped in alleviating poverty in developing countries as manifested by the significant negative relationship of remittances on dimensions of poverty such as level, depth and severity of poverty using the methods of pooled ordinary least square method. However, the significance of this alleviating effect of remittances vanishes when using panel data approach suggesting that the alleviating effect of remittances on poverty is less apparent in developing countries when controlling for individual country specific effect.

Keywords: remittances, poverty, developing countries, panel data

1. INTRODUCTION

Migration is an old-age phenomenon. For centuries, people have migrated in search for better economic and social opportunities. According to the International Organization for Migration (2006), the global estimates show that there are more than 200 million estimated international migrants in the world today representing 3% of the world's global population. Migration with economic motives is increasingly being perceived as a force that can contribute to development because it has become one of the main sources of capital for developing countries (UNPF, 2006).

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Over the past three decades, a new trend of migration issue has attracted significant attentions from government, academics, and media for the fact that this phenomenon is depicting a continuous and robust growth. This trend refers to one of the interesting consequences of international migration, the remittances. Remittances refer to the unrequited monetary transfer usually from international migrant workers in developed countries to their families in developing countries. This unrequited transfer has begun to significantly exceed the official development aid (ODA) and is now reputed as the second highest source of external funding next to foreign direct investment (FDI) (Ratha and Maimbo, 2005)[2]. In 2007, remittances sent to developing countries accounts almost 75% of the world's total remittances. However, during the recession period, Ratha and Mohapatra (2009) forecasted a sharp decline in remittances ranging from 5% to 8% in year 2009 but this decline is small relative to the projected fall in private capital flows or official aid to developing countries.

Number one target under the first goal of Millennium Development Goal of eradicating extreme poverty and hunger is to halve the proportion of people living in extreme poverty whose income is less than or equal to US$1.00 dollar a day between 1990 and 2015 (UN, 2009). To address this goal, one of the potential ways to lift people out from poverty is to increase their income level. Despite the argument that poverty alleviation could not just happen in an instant as it is rooted from various and complex factors with varying dimensions, remittances proved to dispel this by increasing the income level of families left behind by migrant workers (Seriño and Kim, 2011). However, major issue remains- are the poor really the one receiving and benefiting from these remittances? Though remittances significantly increase the income level of households left in home countries, this does not necessarily mean that the poor directly received this financial flow[3].

On a macro perspective, most of the world's remittances were received mostly by developing countries thus several studies have explored the impact of such income transfers on poverty level in developing countries. Hardly a clear consensus of views can be achieved. On the positive side, remittances could be used by recipient households to either fund current consumption or finance asset accumulation (Chami et al., 2008) or as insurance against income shocks (Yang and Choi, 2007). Remittances were also argued to fuel economic development,

[2] In a heavily remittance dependent economy, level of remittances even exceed the level of foreign direct investment (IFAD, 2007; and OSSA, 2005)

[3] See Devesh Kapur's Remittances: The New Development Mantra as cited by Ratha and Maimbo (2005)

promote poverty alleviation by lifting out people from poverty (Acosta et al., 2008), smooth consumption, and have multiplier effect through increased household spending (Gupta et al., 2009). However, argument continues that poor households are actually not benefitting from remittances since they don't have the capacity to migrate, thus increasing income inequality (Lipton, 1980; Stahl, 1982; and Adams, 1989). Also the potential moral hazard by migrants' households (Chami et al., 2003; and Naiditch and Vranceanu, 2009) and "Dutch disease" which could retard the whole economy (Chami et al., 2008), which point out the negative implication of remittances could not be disregarded.

Region specific or country specific studies conducted evaluating the effect of remittances on poverty is common in the literature. However, studies covering a wide range of developing countries are very limited. Thus, this study fills that gap by covering broad range of developing countries with the main objective of evaluating whether remittances alleviate or aggravate poverty in developing countries. Results of the study will add to the literature of macroeconomic implications of remittances on poverty issues by highlighting two major points. First, this study uses a concise and representative account of remittances. In the past, there has been no clear definition of remittance variable. Until recently, Chami et al. (2008) suggested using a specific series in the World Development Indicator (WDI) capturing the behavior of remittances. Common practice is to aggregate the three subcomponents of remittances[4] and represent it as remittance measure. Such practice could result to misleading conclusions (Chami et al., 2008). Based on their suggestion, this study only utilizes worker's remittance in the World Development Indicator as measure of remittances. Second, this study uses a more heterogeneous sample of developing countries and aside from the conventional ordinary least square regression, we employ the methods of panel data analysis to control for time invariant country specific characteristics.

1.1. Remittances and Poverty in Developing Countries

A handful of earlier studies evaluating the effect of remittances on poverty showed that remittances tend to worsen income inequality and eventually increase poverty level (Lipton, 1980; Stahl, 1982). Both studies imply that better-off households will be capable of migrating and sending remittances while poor households cannot. Clearly, better-off households who reap the

[4]In the past WDI reports three subcomponents of remittances such as (1) workers' remittances, (2) compensation of employees, and (3) migrant transfers.

benefits from remittances and not the poor. Study on worker's remittances and inequality in rural Egypt by Adams (1989) indicated that remittances from abroad worsened rural household income distribution-both in gross terms and in per capita terms- because they were earned mainly by upper income villagers. This shows that on top income quantile households benefited the most from remittances. This leads to an increase in income inequality between household. The rich become richer and eventually the poor becomes poorer relative to the rich. Estudillo (2007) in her study about the income inequality in the Philippines from 1961 – 1991 found that income from remittances is one of the inequality increasing factors in the Philippines. Rodriguez (1998) concludes that while remittances increase household income it suggests also a rise in income inequality. He stated that further emigration could slow down any gains in economic welfare by further worsening income distribution in Philippines where progress toward equality has been sluggish.

In another strand, remittances seem to show consistent and positive impact in reducing poverty in several regions and country specific studies. However, current literature has limited study which covers a broad and wide range of developing countries. Adams and Page (2005) conducted a cross-section analysis using new data set on international migration, remittances, inequality, and poverty across 71 developing countries and analyzes the effect of migration and remittances on poverty in developing world. Their results showed that both international migration and remittances significantly reduce the level, depth, and severity of poverty in the developing world. Result showed that a 10% increase in per capita official international remittances will lead to a 3.5% decline in the share of people living in poverty. Meanwhile, another study using a large cross-country panel dataset suggests that remittances in Latin American and Caribbean (LAC) countries reduced inequality and poverty however, corresponding changes are generally small in magnitude. Thus, reductions in poverty are achieved mostly through the higher levels of income of migrant-sending households (Acosta et al., 2008). In Sub-Sahara Africa (SSA), Gupta et al. (2009) assesses the impact of the steadily growing remittance flows on poverty and inequality. Though the region receives only a small portion of the total recorded remittances to developing countries, and the volume of aid flows to SSA swamps remittances, they find that remittances, which are a stable, private transfer, have a direct poverty mitigating effect, and promote financial development. Jongwanich (2007) examines the impact of workers' remittances on growth and poverty reduction in developing 17 Asia-Pacific countries using panel data over the period 1993-2003. Remittances have a significant direct

impact on poverty reduction through increasing income, smoothing consumption and easing capital constraints of the poor. Results suggest that a one percent increase in remittance reduces poverty by 0.43 percent.

Country-specific studies too showed that remittances negatively affect poverty. This means that remittances tend to lower down level of poverty. Adams (2006) concludes that international remittances reduce the level, depth and severity of poverty in Ghana. Brown and Jimenez (2008) in their comparative study between Fiji and Tonga conclude that the estimated effects of remittances on poverty alleviation were found to be stronger and remittances have substantial effect in alleviating poverty. In the Philippines, Yang and Martinez (2005) and Pernia (2008) found that an increase in remittances would lead to a reduction in poverty because of its spill-over effect.

2. METHODOLOGY

2.1. Empirical Model

To capture the effect of remittances on poverty, this study utilized the empirical model developed by Ravillion (1997) and Ravillion and Chen (1997). It states that poverty can be expressed as a function of mean income, measures of income distribution, and the variable of interest, international remittances. The model used in this study is similar to what Adams and Page (2005), Jongwanich (2007), Gupta et al. (2009) and Seriño (2014) employed. The poverty equation is postulated as follows:

$$P_{it} = \alpha_{it} + \beta_1 \log(Gini_{it}) + \beta_2 \log(GDP_{it}) + \beta_3 \log(Remit_{it}) + \beta_4 \log(X_{it}) + \partial_i + \varepsilon_{it} \quad (1)$$

where P_{it} represents the measures of poverty such as headcount ratio, poverty gap and squared poverty gap, *Gini* is an index of income inequality, *GDP* refers to the per capita gross domestic product at 2000 constant prices, *Remit* is our main variable of interest representing the total amount of remittances coursed through banks measured as ratio to gross domestic product, *X* is a set of control variables, ∂_i is the country specific effect and ε_{it} is the error term. The subscript *t* refers to year and *i* denotes the individual country. The control variables considered are other main sources of external funding in developing countries such foreign direct investment (FDI), and level of official aid. The foreign direct investment refers to the private transfer of companies or private firms to other countries or any form of investment that earns interest in enterprises which function outside of the domestic territory of the investor while official aid are

monetary transfers granted by developed countries (OECD members) to developing countries with the main objective of promoting economic welfare and development (OECD, 2008).

The main concern of this study is β_3. Based on the existing studies, β_3 could either be positive or negative. If $\beta_3>0$, then remittances would tend to worsen poverty but if $\beta_3<0$, then remittances tend to reduce poverty. Controlling for inequality, country's income, and external funding, this study estimates the magnitude and sign of β_3 which relates to the extent how poverty in developing countries is affected with the surging increase of international remittances. Since independent variables are expressed in logarithmic form while dependent variable is in level form, then β_3 is expressed as $\beta_3/100$. This is interpreted as the change associated with a percentage increase in remittances (Wooldrigde, 2006).

For the other estimates, β_1 is expected to be positive since higher poverty is associated with higher inequality; β_2 is expected to be negative since it is evident that poverty will reduce as country's income increases. Other control variables are expected to be negative as it is assumed to positively contribute to economic growth thereby having the tendency to reduce poverty.

In this study, it is assumed that all specified variables are exogenous. That is reverse causality is not working. Hence, the relationship captured in this analysis is not causal in nature but correlational. Although it can be argued for the case of remittances, poverty might fuel remittances through migration. However, it should be noted that an increase in migration does not guarantee an increase in remittances since it is suspected that substantial number of migrant workers don't remit especially those on long term migration. In addition, people living in extreme poverty don't have the capacity to migrate. Thus, it is assumed that remittance is an exogenous variable since migration has already taken place (Acosta et al. as cited by Ozden and Schiff, 2007) and remittances flow regardless of poverty level. Nevertheless, this study recognized that potential endogeneity might be possible. Table 1 shows the summary of independent variables used in the analysis and their hypothesized relationships to poverty.

2.2. Data Used

This study utilizes panel data for 115 developing countries covering nine panel years from 1981 to 2005[5]. Due to missing observation, the total number of countries included is 66 developing countries making the panel set-up

[5] This study considers the following panel year of analysis: 1981, 1984, 1987, 1990, 1993, 1996, 1999, 2002 and 2005.

unbalanced. Data were retrieved from different online databases such as World Development Indicator (WDI), World Bank's PovcalNet and OECD database.

Table 1. Summary of the variables used in the analysis and their hypothesized relationship with poverty.

Variable	Description	Data source	Hypothesize relationship with Poverty
Gini index	Index on income inequality. A value closer to 1 means higher inequality and a value closer to zero means more equitable income distribution	World Bank's PovcalNet Database	Positive. A worsening income distribution is associated with higher levels of poverty
GDP per capita	Measures the average income per person in a country. This measures national income or national output divided by the population.	World Development Indicator	Negative. Improvement in national income will reduce poverty
Foreign direct investment	Refers to cross-border investment measuring the equity flows in the reporting economy. It is the sum of equity capital, reinvestment of earnings, and other capital made by a company or individual in one country in business interests in another country	World Development Indicator	Negative. Higher investments translate to more job opportunities hence it will be bring down incidence of poverty
Development aid	It consists of disbursements of loan or financial assistance usually given by governments of developed economies to support the economic, political, social and environmental development of developing countries.	World Development Indicator	Negative. More assistance will facilitate economic development.
Remittances	It consists of current unrequited transfers in cash or in kind received by resident households from workers who are employed in an economy where they are not resident.	World Development Indicator	Negative / Positive. The effect of remittances could be positive or negative

Measures of poverty were taken from World Bank's PovcalNet database[6]. The interactive PovcalNet database allows researchers to set the

[6] PovcalNet is an interactive computational tool that allows you to replicate the calculations made by the World Bank's researchers in estimating the extent of absolute poverty in the world, including the $1 a day poverty measures, as published in the background papers by Chen and Ravallion and in the World Development Indicators.

The World Bank's estimates use unit record household data whenever possible while PovcalNet uses grouped distribution (deciles,ventiles or percentile). There are some small discrepancies between online replications and the Bank's estimates, such as in the WDI.

poverty line. Headcount ratio, poverty gap squared and squared poverty gap are the poverty measures used to represent different dimensions of poverty such as level, depth, and severity of poverty. These measures are expressed in percentages. Headcount ratio means the percentage of population living below the poverty line. Poverty gap, which captures the depth of poverty, measures in percentage terms how far the average expenditures (income) of the poor fall short of the poverty line. For instance, a poverty gap of 10% means that the average poor person's expenditure (income) is 90% of the poverty line. The squared poverty gap indicates the severity of poverty. Squared poverty gap is the mean of the squared distance below the poverty line expressed as a proportion of the poverty line. It is more sensitive to the distribution of the poor. In other words, while a transfer of income from poor to poor will not change the headcount or the poverty gap, it will decrease the squared poverty gap since distribution among poor would tend to be equitable. (Adams and Page, 2005 and Gupta et al., 2009). The poverty line used in this study is the international poverty threshold set at US$ 1.00 a day by the World Bank. This poverty threshold is used to account the number people living in extreme poverty.

The Gini index which measures income inequality was also source out from PovcalNet database. Per capita gross domestic product (GDP) at 2000 constant prices, and foreign direct investment (FDI) data were retrieved from the World Development Indicator (WDI) while the official development assistance was taken from OECD database although this data set could also be retrieved from WDI. Worker's remittances (US dollars) in WDI were used to represent the level of remittances sent to developing countries. Other components of remittances were not used in this study considering the arguments raised by Chami *et al*. (2008). However, it should be noted that the remittances measured here are only those transfers course through banks and other formal channels.

2.3. Estimation Procedure

Prior to estimating the panel model postulated in equation 1, the model was first analyzed using pooled OLS estimation with time and regional dummies included. To check for presence of heteroskedasticity, Breusch-Pagan (BP) test

If the survey data for the reference year is not available, the data of nearest survey year will be used. If the reference year is between two survey years, estimation will be conducted for both year and then time interpolation will be used to form the estimation of reference year (PovcalNet, 2009).

was employed[7]. If the null hypothesis of homoskedasticty can be rejected, robust standard errors were used.

After conducting pooled OLS and checking for presence of heteroskedasticity, panel regression analysis was employed. In the estimation of panel data regression models, two approaches are available: the random effects and the fixed effects approach. In the fixed effect model, unobserved country specific term, ∂_i, is assumed to be correlated with the independent variables specified while for the random effects model, ∂_i term is assumed uncorrelated with the rest of independent variables. The random effects approach is appropriate if it is found that ∂_i is uncorrelated with each explanatory variable (Wooldridge, 2006) while fixed effects model best control for omitted variable problem as it takes into account the unobserved country specific characteristics.

To determine if country specific term (∂_i) is correlated with explanatory variables, Hausman test was employed. Under the hypothesis of no correlation, estimates of both random and fixed effect are consistent, but estimates from fixed effect are inefficient. While under the alternative, fixed effect is consistent but random effect is not. Therefore, under the null hypothesis, the two estimates should not differ systematically (Wooldridge, 2006).

3. RESULTS AND DISCUSSIONS

The logarithmic transformation of the independent variables with dependent variables on level form allows us to interpret the coefficients as the change associated with a percentage increase in the independent variable. In other words, for the remittance estimate, $\beta_3/100$ is the unit change in poverty measures when the ratio of remittance to GDP increases by 1%.

Prior to estimating the postulated models, test for heteroskedasticity using Bruesch-Pagan (BP) test was conducted. Results show that there is strong evidence to indicate that data set suffers from heteroskedasticity problem[8]. In all three estimations, presence of heteroskedasticity was detected. This necessitates the use of robust standard errors throughout the estimation procedure. In addition, Hausman test was employed to determine which of the two panel methods (random effects and fixed effects method) would be appropriate to use.

[7] BP-test requires regressing the squared residuals of pooled OLS on the independent variables.

[8] The F- value of heteroskedasticity test with headcount ratio, poverty gap, and squared poverty gap as dependent variable were 6.0, 6.02, and 3.98 respectively (with P-values = 0.0). The null hypothesis of no heteroskedasticity was rejected. There is strong evidence to indicate that data set suffers from heteroskedasticity problem.

Results showed that Hausman test fails to judge which of the two panel methods would be appropriate to use[9]. But even if Hausman test was inconclusive, it is suspected that the unobserved country specific effect is correlated with independent variables and so fixed effects would be a good option of analysis over random effects.

3.1. Pooled OLS estimation results

The estimation results using headcount ratio as dependent variable are presented in Table 1. In pooled OLS, time and regional dummies were included to control for time and regional effects with year 1981 as base year and Europe and Central Asia (ECA) as control regional group. Results show that in year 1984 and 1987 headcount ratio was higher than its 1981 level but starting from year 1990 and onwards, headcount ratio was observed to be lower than the base year. However, estimates of time dummies were insignificant. Nevertheless, the negative effect of time dummies relative to headcount ratio since 1990 is in line with the Millennium Development Goals (MDG) of halving extreme poverty from 1990 to 2015. With respect to regional dummies, East Asia and Pacific (ESP), Latin America and Caribbean (LAC), South Asia (SA) and Sub-Sahara Africa (SSA) were observed to have higher incidence of poverty as compared to Europe and Central Asia (ECA). Sub-Sahara Africa (SSA) was observed to display the highest level of headcount ratio followed by East Asia and Pacific (ESP). Among the regional aggregates considered, only the Middle East and North African Countries (MENA) was observed to have highly significant lower estimate of headcount ratio compared to ECA. In terms of significance, LAC was insignificant while SA was significant at 10% and the rest of regional dummies were highly significant. This implies that changes in headcount ratio were strongly influenced by the regional aggregations.

Looking at the other variables, Gini coefficient, GDP per capita, AID, FDI, and remittances show the expected signs with only FDI estimate being insignificant. Interpreting the estimates, Gini coefficient shows that a percentage increase in Gini index is associated with an increase in headcount ratio by 0.13 holding other factors constant. Meanwhile, a 1 percentage increase in GDP per capita is associated with a reduction in poverty measured by headcount ratio by

[9] Results of Hausman test indicate that $\chi^2 < 0$ in all three tests. This implies that model fitted on those data fails to meet the asymptotic assumptions of the Hausman test. Hence, Hausman test is inconclusive as to what type of panel regression method is best suited for the analysis.

0.17 and a percentage increase in official ODA is associated with 0.01 reduction in headcount ratio, respectively holding other factors constant.

Turning to the main variable of concern, the remittances, result shows significant negative association with headcount ratio. This implies that an increase in remittances sent by migrant workers to developing countries is associated with the reduction of headcount ratio. Holding other factor constant, a percentage increase in remittance is associated with a reduction in headcount ratio by 0.012. Pooled OLS estimate is of good fit with an R^2 close to 80%. However, the fact that there may be unobserved country specific factors affecting the dependent variable (∂_i) which may be correlated or uncorrelated with the independent variables cannot be disregarded. Hence, the regression results under pooled OLS may not actually yield the reducing effect of remittances towards poverty since the generated estimates might be biased and inconsistent. Thus, estimation using random effects or fixed effects method is deemed necessary.

3.2. Estimation results using panel data analysis

Random effects estimation assumes that the country-specific effect ∂_i is uncorrelated with each independent variable across time periods considered. Under random effects assumption, estimators are said to be consistent but eliminating ∂_i would result to an inefficient estimators (Wooldridge, 2006). Results show that estimates of time dummies were consistent with previous estimation result. Headcount ratio was observed to be relatively higher in 1984 and 1987 compared to its 1981 level but starting from year 1990 up to 2005, time dummies displayed negative association with headcount ratio implying that headcount ratio from these years have been lower compared to 1981 level. Regional aggregates show that MENA had a headcount ratio significantly lower than ECA while SSA posted higher headcount ratio compared to ECA. Random effects estimation shows variables considered have the expected sign. Aside from the intercept, only Gini and GDP per capita displayed significant results. An increase in Gini index tends to increase the level of headcount ratio which appeared to be logical since an increase in income inequality would worsen poverty level. The GDP per capita shows the largest poverty reducing effect with 0.15 reductions in headcount ratio holding other factor constant. This result is expected since an increase in income would lift people out of poverty.

Turning to the main variable which is remittance, results show that remittance has reducing effect on headcount ratio as manifested by its negative

sign. However, estimate is not statistically significant. Now, compared to pooled OLS result with significant estimate, random effects estimation reported lesser reducing effect in terms of magnitude. This means that level of remittances has weak mitigating effect in reducing headcount ratio as manifested by its insignificant estimate. However, the fact that remittance is negatively associated with headcount ratio shows inclination in alleviating poverty. Moreover, results of random effect might suffer from omitted variable problem as well as result from pooled OLS estimation. Thus, estimation using fixed effects method which handedly took care of omitted variable problem was carried out.

Fixed effects estimation assumes that ∂_i is correlated with the rest of explanatory variables. If the unobserved effect is not eliminated, this would cause bias to the estimates. Using fixed effects estimation, the ∂_i term was eliminated and in order to make the estimate unbiased and consistent (Wooldridge, 2006). In addition, fixed effects take care of possible bias from omitted variable problem. Table 1 also reports the results from fixed effects estimation. Results of the time dummies showed the same behavior observed with pooled OLS and random effects method. With regards to other variables, results show that Gini coefficient, GDP per capita, and FDI show the expected sign but surprisingly ODA and remittances show the other way around. Result for ODA is unexpected since this would mean that an increase in aid would tend to increase poverty. Result is somehow counter-intuitive and contrary to the objectives of official aid in improving welfare of developing countries. However, this unexpected sign probably captures the behavior of increasing humanitarian aid or development aid when the country experienced negative shocks such as natural disasters, political chaos, and economic turmoil. With regards to remittances, positive association was observed but the effect is very marginal. This suggests that increasing the level of remittances may worsen headcount ratio implying that poverty worsens as remittances increases. This result gives an interesting view regarding impact of remittances in developing countries since it contradicts results from previous estimation. Even though it may imply worsening effect of remittance on headcount ratio, evidence is weak since estimate is insignificant and its effect is very minimal judging from its magnitude. Other estimates show that Gini coefficient and GDP per capita have highly significant effect on headcount ratio.

Comparing the results of the three regression presented in Table 1 and focusing on the main variable; the remittances, results show that estimate of remittance in pooled OLS is relatively higher compared to random effects and fixed effects in absolute terms. The difference could be attributed to the possible

bias encountered with pooled OLS estimation. Somehow, there is agreement in the result of pooled OLS and random effects showing that remittances could have contributed to the decrease in headcount ratio. However, result from fixed effects method is telling a different story. This tendency to worsen poverty is possibly due to increasing income inequality.

Table 1. Estimation results with headcount ratio as dependent variable.

Variables	OLS		Random Effects		Fixed Effects	
	coef	se	coef	se	coef	se
lnGINI	13.171**	5.988	20.651***	6.751	26.880**	12.443
lnGDP per capita	-16.872***	1.409	-15.493***	2.142	-17.974***	4.428
lnFDI (ratio to GDP)	-0.421	0.419	-0.294	0.314	-0.279	0.484
lnAID (ratio to GDP)	-1.100***	0.299	-0.250	0.501	0.638	0.565
lnREMIT (ratio to GDP)	-1.185**	0.533	-0.203	0.555	0.095	0.980
y84	1.469	4.288	1.651	2.584	1.628	1.348
y87	2.073	4.352	0.628	2.750	0.186	1.970
y90	-1.168	3.855	-2.050	2.457	-2.434	2.050
y93	-4.317	3.397	-4.090*	2.342	-3.830	2.951
y96	-3.245	3.511	-4.599**	2.306	-4.614	2.808
y99	-3.012	3.455	-4.573*	2.402	-4.353	3.327
y02	-2.739	3.500	-4.778**	2.380	-4.360	3.145
y05	-1.736	3.648	-4.820*	2.588	-4.202	3.584
ESP	8.336***	2.603	7.555	6.318		
LAC	3.605	2.726	-1.808	4.557		
MENA	-6.812***	2.081	-11.107***	4.113		
SA	6.107*	3.268	5.871	7.888		
SSA	17.754***	3.152	15.265**	6.347		
constant	86.925***	24.507	64.201**	29.470	70.409	50.766
N	295		295		295	
No. of countries			66		66	
R^2	0.8017		0.7792		0.6391	
F-statistics	78.54					

note: *** p<0.01, ** p<0.05, * p<0.1

Table 2 shows the estimation results using poverty gap as dependent variable with robust standard errors reported. Poverty gap measures the depth of poverty while headcount ratio measures the level of poverty. Results show that poverty gap in developing countries reduces with time. The same observation was depicted as in Table 1. With regards to regional dummies, only Sub-Sahara Africa (SSA) posted a significant and higher level of poverty gap

compared to control region (ECA). This relate to the observation that poverty gap in SSA is not getting better.

Table 2. Estimation results with poverty gap as dependent variable.

Variables	OLS		Random Effects		Fixed Effects	
	coef	se	coef	se	coef	se
lnGINI	12.472***	3.835	18.452***	5.299	21.755**	9.064
lnGDP per capita	-7.078***	0.788	-6.226***	1.110	-6.410**	2.490
lnFDI (ratio to GDP)	-0.188	0.239	-0.155	0.198	-0.188	0.331
lnAID (ratio to GDP)	-0.311*	0.159	-0.174	0.278	0.122	0.316
lnREMIT (ratio to GDP)	-0.759**	0.342	-0.319	0.382	-0.226	0.597
y84	0.973	2.280	1.147	1.348	1.122	0.742
y87	1.300	2.564	0.882	1.663	0.678	1.489
y90	-0.713	2.009	-0.836	1.303	-1.051	1.154
y93	-2.322	1.842	-1.602	1.173	-1.513	1.418
y96	-1.797	1.978	-2.062	1.291	-2.170	1.677
y99	-1.545	1.903	-2.322*	1.299	-2.447	1.828
y02	-1.507	1.955	-2.582**	1.307	-2.648	1.738
y05	-0.535	2.032	-1.852	1.393	-1.884	1.835
ESP	0.170	1.329	-0.463	2.794		
LAC	0.494	1.465	-3.379	2.321		
MENA	-1.870	1.239	-4.521**	2.273		
SA	0.061	1.702	-0.499	3.432		
SSA	6.680***	1.763	5.616*	3.391		
_cons	9.708	15.225	-13.219	20.154	-22.193	33.184
N	293		293		293	
No. of countries			65		65	
R^2	0.6981		0.678		0.5469	
F-statistics	37.56					

note: *** p<0.01, ** p<0.05, * p<0.1

The rest of the variables considered bear the expected sign. Focusing on remittances, results show significant effect with poverty gap. Holding other factor constant, 1 percentage increase in the inflow of remittances sent to developing countries is associated with 0.008 reductions in poverty gap. But as mentioned earlier, results from pooled OLS estimation might be bias and inconsistent and should be interpreted with caution. Thus, the model was analyzed further using the methods of panel data regression.

Random effects estimation result shows the negative relationship of remittance towards poverty gap. The inverse relationship claims to alleviate poverty level. However, the estimate is not statistically significant. Other estimates of random effects estimation bear the expected. Only Gini and GDP per

capita were reported to have highly significant estimates affirming their strong impact on poverty. On the other hand, estimates of time dummies showed similar results from Table 1. The effect of time towards poverty gap was found to be important since in terms of magnitude of estimates, time dummies were higher than the three major sources of external funding.

Results from fixed effects estimation shows that remittance has negative relationship with poverty gap. This negative relationship signals that the potential capacity of remittance to reduce poverty does exist. However, estimates could not be confidently interpreted since it is insignificant. On the other hand, official aid was observed to be worsening the level of poverty gap since it posted unexpected sign; positive relationship with poverty. The same argument for official aid could hold in this case that humanitarian aid increases when developing countries experienced huge negative economic shock. Time dummies were reported to behave similar to previous results and rest of the estimates show the expected sign.

With poverty gap as the measure of poverty, estimation results show that remittances have negative relationship with poverty. This may imply that remittances alleviate level of poverty gap in developing countries. Evidence is strong in pooled OLS at 5% significance level but evidence from random effects and fixed effects were weak since estimates were insignificant (Table 2).

Comparing the magnitude of remittance estimates, pooled OLS estimate is higher in magnitude relative to random and fixed effects estimate with fixed effects estimate reporting the least in magnitude. This could be attributed to the fact that pooled OLS and random effects does not take into account the bias resulting from omitted variable problem. Though, random effects takes into account this unobserved effect, but it assumed uncorrelated with the rest of explanatory variables which is suspected to be correlated. Thus, fixed effects could better reflect the effect of remittances on poverty gap since bias from omitted variable problem is being taken cared. It is worth noting that the negative relationship of time dummies with poverty is in accordance with the scope year of Millennium Development Goals. The same observation was drawn from Table 1 and SSA reported to have significant higher incidence of poverty gap.

The third measure of poverty is squared poverty gap. It measures the severity of poverty and this measure is more sensitive to the distribution of the poor. Result is reported in Table 3. Pooled OLS estimation and random effects displayed similar results in comparison to the previous estimations with pooled OLS being significant while random effects estimate is insignificant. In this

estimation (Table 3) most regional dummies were lower than the control group and insignificant except only for SSA. Considering results from pooled OLS, remittance shows negative association with squared poverty gap and is significant at 5% level. The negative sign of remittance shows the tendency of remittances to reduce squared poverty gap. Holding other factor constant, a 1% increase in the bulk of remittances sent to developing countries coursed through banks is associated with 0.005 reduction in squared poverty gap. This implies that this monetary transfer contributed to improvement of poverty distribution in developing countries, *ceteris paribus*.

Table 3. Estimation result with squared poverty gap as dependent variable.

Variables	OLS		Random Effects		Fixed Effects	
	coef	se	coef	se	coef	se
lnGINI	9.624***	2.736	14.010***	3.950	16.518**	6.676
lnGDP per capita	-3.889***	0.530	-3.301***	0.710	-2.968*	1.678
lnFDI (ratio to GDP)	-0.119	0.166	-0.084	0.147	-0.120	0.240
lnAID (ratio to GDP)	-0.082	0.111	-0.130	0.176	-0.034	0.207
lnREMIT (ratio to GDP)	-0.529**	0.245	-0.303	0.296	-0.268	0.446
y84	0.659	1.460	0.805	0.868	0.786	0.496
y87	1.047	1.815	0.913	1.226	0.787	1.179
y90	-0.374	1.278	-0.325	0.839	-0.475	0.754
y93	-1.445	1.197	-0.814	0.732	-0.776	0.844
y96	-0.992	1.317	-1.088	0.865	-1.242	1.119
y99	-0.926	1.238	-1.435*	0.848	-1.641	1.181
y02	-0.974	1.272	-1.666*	0.853	-1.854	1.129
y05	-0.198	1.328	-0.907	0.910	-1.094	1.164
ESP	-1.117	0.905	-1.702	1.630		
LAC	-0.067	0.959	-2.923**	1.484		
MENA	-0.670	0.872	-2.477*	1.492		
SA	-0.581	1.146	-1.118	1.987		
SSA	3.028***	1.172	2.438	2.131		
_cons	-5.105	10.600	-23.164	14.692	-35.294	24.050
N	293		293		293	
No. of Countries			65		65	
R^2	0.61		0.5882		0.4352	
F-statistics	22.41					

note: *** p<0.01, ** p<0.05, * p<0.1

On the other hand, results from random effects showed that remittances displayed negative relationship with squared poverty gap while controlling for time and regional dummies, Gini coefficient, GDP per capita, and other source of

external funding. The expected negative sign is giving signal of the capacity of remittance to ease the severity of poverty in developing countries even though estimate is insignificant.

With fixed effects estimation, remittance shows the expected negative sign but somehow estimate is insignificant. The same result was observed from regressing remittances on poverty gap. The negative association of remittance on squared poverty gap tends to ease severity of poverty. This would translate to a better distribution among poor people in developing countries. But the effect of remittances is not that strong since estimates are not significantly different from zero. Other variables considered show the expected sign with only Gini coefficient and GDP per capita reported to have significant effect on squared poverty gap. Gini coefficient and GDP per capita were consistent in its effect towards poverty. Gini coefficient has positive significant effect to squared poverty while GDP per capita showed significant reducing effect to the squared poverty level. This observation conforms to the fact that increase in inequality worsens poverty while increase in country's income lifts people out of poverty. Notably time dummies displayed similar results with other estimation. This reaffirms to the claim that decrease in poverty is in accordance with the Millennium Development Goals.

In this study, other sources of external funding such as FDI and ODA were considered as control variables in analyzing the effect of remittances to level, depth, and severity of poverty aside from controlling income inequality and GDP per capita. However, results in the estimation of official aid with fixed effects estimation showed inconsistency with what is expected relative to its effect to poverty. In two estimations using fixed effects method, ODA displayed positive association with measures of poverty (Table 1 and 2). This suggests that controlling for country specific effect an increase in official aid tends to worsen level of poverty. However, this should be interpreted with caution since all estimates were insignificant in the first place. Nevertheless, it can be argued that such behavior of development aid captures the increasing humanitarian aid when the country experienced negative shock such as natural disasters, political chaos, and economic turmoil. Meanwhile, the effect of FDI reported the expected sign having negative association with poverty but in all estimation it turned out to be insignificant. Although FDI is reputed as the biggest source of external funding in developing countries, its effect seems not reaching the poor since the effect is not that pronounced. With regards to the main variable, the level of remittance remains significant at 5% level in pooled OLS estimation but rest of the panel estimations effect is insignificant. Though estimates show negative

sign, it is hardly evident that such estimate is significantly different from zero. It is only in pooled OLS estimation that remittances proved to be significant in its effect in reducing poverty. However, estimates from pooled OLS do not have the confidence of bias free estimate.

The difference in behavior of these main sources of external funding may relate to the effects of each transfer to the economy according to who receive these monetary transfers. Note that FDI and ODA are transfers from institutions to institutions while remittances are individual unrequited transfers. Remittances being private transfers at household level directly benefited families of the migrant workers left behind in developing countries. Institution level transfer and household level transfer could have a different effect towards affecting poverty. The assumption that remittances have a reducing effect on poverty holds but it is not at all evidently supported by the panel data analysis. So then, it depends on the country's capacity to maximize the economic benefits gained from these transfers.

Contrary to the significant and mitigating effect of remittances in reducing poverty in developing countries found in the literature, findings in this study could help us understand the real impact of remittances in the developing world. Chami *et al*. (2008) on their article reminded authors of published articles who summed the three aggregates of remittances to reconsider their claim towards effect of remittances. Results might not reflect the true behavior of remittances. In this study, only data on worker's remittances were exclusively used in analyzing effect of remittance on poverty rather than summing all the three series of remittances (worker's remittances, compensation of employees and migrant transfers). Chami *et al*. (2008) showed that such practice of summing the three series is problematic and could lead to faulty conclusions. This would imply that in the past, remittance variable might have been over represented thereby bloating the level remittances and so do its effect on poverty and other economic indicators.

4. SUMMARY AND CONCLUSION

This study investigates the effect of rising international remittances on dimensions of poverty in developing countries. The panel data analysis was conducted across 66 developing countries from year 1981 to 2005 with three year intervals. The panel set-up in this study is unbalanced. Measures of poverty such as headcount ratio, poverty gap, and squared poverty gap were used to represent different dimensions of poverty such as level, depth and severity of

poverty. The data used to account the volume of international remittances coursed through banks was based on a study conducted by Chami *et al*. (2008). Workers' remittances in World Development Indicator (WDI) best reflect the unrequited, nonmarket monetary transfer through formal institutions sent by migrant workers to their families left behind in developing countries.

Results from pooled OLS analysis suggest that remittances have a significant reducing effect towards headcount ratio, poverty gap, and squared poverty gap. However, results from pooled OLS estimation might suffer from bias due to omitted variable problem and the results might not reflect the true impact of remittances on poverty. To handle this bias, panel data estimation was employed. Random effects estimation showed that remittances contribute to reduction of poverty in developing countries as consistently exhibited by the negative relationship of remittances to the three measures of poverty. However, estimates were insignificant in asserting its effect. Results from fixed effects showed that with headcount ratio as dependent variable, remittances contribute to aggravating poverty level in developing countries as manifested by its positive relationship. But with poverty gap and squared poverty gap as dependent variable, remittance displayed negative relationship. This implies that impact of remittance is mixed. But effect is more inclined in alleviating poverty considering the negative association of remittances on depth and severity of poverty. However, estimates derived were somehow insignificant in all estimations. Considering this fact, evidence is weak in asserting the effect of remittances on the level, depth, and severity of poverty.

Based from the results of the study, the following conclusions can be drawn. Remittances may contribute to the reduction of poverty as manifested by the negative relationship of remittances to the level, depth, and severity of poverty. However, this effect vanishes when controlling for individual country specific effect. This implies that effect of remittances on poverty is mixed and further analysis at the household level might help clarify this mixed results. Since remittance is a matter of private household activity, government cannot directly regulate on how recipients will use these remittances. But it would be helpful for the government to empower the families of migrant workers in terms of its decision on how to best use the remittances they received. This could be a government program guiding migrant workers on how to maximize the benefit from remittances so that when migrant workers returned home they can still have a reliable source of income. It is recommended that remittance enhancing policy through formal channels should be encouraged by developing countries in order to properly account the level of remittances. In addition, it would be

interesting to conduct a cross-section analysis and investigate how different countries helped migrant workers better manage their remittances, what are their programs and what challenges are faced by the government. Results of this further study will provide significant input not just to policy makers but to the migrant workers and remittances recipient households on how to maximize the benefit of remittances.

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