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EFFECTS OF REMITTANCES ON HUMAN CAPITAL DEVELOPMENT: AN EMPIRICAL ANALYSIS

Lavlu Mozumdar[1]
Mohammad Amirul Islam[2]

Abstract

This study explores the effect of remittances on human capital development in terms of educational attainment on a global perspectives using GLS modeling. Data from different valid international sources are used in the analyses. Furthermore, it investigates the relationship of remittances with human capital development by region, gender, democracy and financial development. The results reveal significant positive effects of remittances on the changes in average schooling years and secondary enrollment rate in the developing countries. There are regional, genders and financial level variations in human capital development due to remittances flow. Finally, some important policy recommendations have been suggested.

Keywords: Remittances; Human capital; Developing countries; Gender; and GLS modeling

I. INTRODUCTION

The remittance flow is getting more attention among economists and development experts not only for its increasing volume but also for its increasing impact on building and expanding the regional and local economy of many developing countries. Total amount of officially recorded remittances to the developing countries in 2012 is reported as $ 406 billion, which is at least three times of the amount to the net official development assistance and aid received by them (World Bank, 2012). The actual amount of remittances might even be more than the reported amount because of the informal channels. The World Bank reports that about half of the total remittances are moving globally through informal channels. Moreover, the formal remittances have increased on an average around 16 per cent annually to the developing countries since the very beginning of the current century (World Bank, 2006). It is true that the growth of remittances has somewhat slowed down since 2009 in the Latin America and the Caribbean due to the enduring consequences of global financial crisis in the United States and Spanish economy as well as in the Middle East and North Africa due to the effects of 'Arab Spring'. Apart from the severe global financial crisis of 2008, the flow of remittances has risen to all the six developing regions (East Asia and the Pacific, Europe and Central Asia,

[1] Assistant Professor, Dept. of Rural Sociology, Faculty of Agricultural Economics and Rural Sociology, Bangladesh Agricultural University, Mymensingh-2202. E-mail: lavlurs@yahoo.com; lavlu.mozumdar@wur.nl

[2] Professor, Dept. of Agricultural Statistics, Faculty of Agricultural Economics and Rural Sociology, Bangladesh Agricultural University, Mymensingh-2202. E-mail: maislam_soton@yahoo.com

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Latin America and the Caribbean, Middle East and North Africa, South Asia, and Sub-Saharan Africa) around the world in 2011 (World Bank, 2011a).

Before the 1980s, when people referred to international financial flows to the developing countries, the debate would focus more on the issues related to foreign direct investment (FDI), private debt and official development assistance (ODA). However, since the late 90s, remittances of international migrants have become more prominent in the discussion on international financial flows along with the other three flows (Gupta et al., 2009). Now the question may arise what are the reasons behind it. Natures and trends of financial flows to the developing countries reveal that remittances flow is continuously an increasing trend since 1991 except for the period of 2009 due to the serious financial crisis of 2008 around the world. Meanwhile, FDI and private debt are much more volatile, while ODA shows more or less a stagnant situation during this period. All the mentioned four foreign financial flows to the developing countries have turned downward in 2009. After 2009, remittances flow is again on an increasing trend. In addition, remittances flow is comparatively more stable than the other flows (see more details in Migration and Remittances Factbook, 2011, World Bank, 2011b). This is one of the reasons of why remittances flow to the developing countries is getting more focus during recent times together with FDI and than the other two financial flows namely private debt and ODA.

One of the advantages of remittances over other sources of foreign currencies is that it comes with no conditions from donor agencies. Government can spend the remittances to any of the development programs of its own with full control. Hence, increase in remittances flow is seen as a key factor to sustainable development especially in human capital for developing countries. However, less is known about the impact of remittances flow on the development of human capital on a global perspective. The current study sheds light on the issue from a global point of view.

Remittances and Human Capital

Human capital development is becoming an important concern around the world during the period of globalization. Educated people are considered more attractively as the most critical asset to an information economy whereas the most talented and informative people can have more opportunities to preside over the entire economy (Becker, 1993). From that perspective, physical or financial capital can't be a prominent source of competitive advantage in the long-run to an emerging economy, whereas, peoples' know-how or their abilities, experiences, competencies and skills as well as access to human capital can be a powerful driver to building the economy more competitive. Unluckily the developing countries are not able enough to invest in human capital accumulation due to the lack of resources. Moreover, remittances to developing countries can help in this regard through increased investment in education (Yang, 2006).

The concept of human capital does not have a fuller definition despite many attempts by experts in this field. Even the famous author Gary S. Becker, who is thought to be pioneer in this line and has received Nobel Prize for his renowned article entitled 'Human Capital',

wouldn't define the term evidently. He reports that spending on training, education and medical care can promote human capital but not financial or physical capital. This is because we can't disconnect a human being from his or her health and/or values, skills and knowledge but it can be the possible way to move the physical and financial capital at the same time according to the desires of the proprietor (Becker, 1993, p., 16). Others like Lucas (1988) highlights the measures of human capital based on feasible expenditure on education whereas Schultz (1992) explores about human capital investment. On the other hand, Martin Husz found different form the other authors who defines that "By human capital we mean the time, experiences, knowledge and abilities of an individual household or generation, which can be used in the production process" (Husz, 1998, p., 9). Therefore, we define that human capital is an intangible asset that represents the people's competencies, capabilities and commitments within a particular arena or framework like organization, society or country. In relation to the structure of a society education, trainings, medical care etc. are different ways to creating and developing human into capital. Among them education is considered as the most important mechanism for the development of human capital (Becker, 1993).

A large number of household studies have already been done more specifically in the field of remittances and human capital. Using micro-level or household data, empirical studies related to the impact of remittances on education have been conducted by Hanson and Woodruff (2003) in Mexico, Edwards and Ureta (2003) in El Salvador, Lopez-Cordova (2005) in Mexico and Yang (2006) in case of Philippines. Most of them suggest that remittances may contribute to the improved schooling of children relaxing the credit and liquidity constraints of poor households. Kanaiaupuni and Donato (1999), Lopez-Cordova (2005) as well as Hildebrandt and McKenzie (2005) studied the impact of remittances on health, more specifically on infant mortality and birth weight and they reported that remittances might be related with higher weight of children at birth at least to the remittance recipients' households. It may also help to lower infant mortality. This is because it can provide and motivate the pregnant women to take the improved and healthy balanced diet along with appropriate medical check-up on a regular basis at prenatal period.

In a study related to remittances and education using Ecuadorian case, Calero et al (2009) report that remittances can increase the enrolment of school children and may reduce the incidence of child labor in rural areas especially for girls. Amuedo-Dorantes and Pozo (2010) reveal the effects of remittances on school attendance of children in the Dominican Republic and explore a positive response of rising school attendance for girls with the receipt of remittances and more particularly the secondary school children's attendance. They also explain that the higher order brothers and sisters are mostly benefitted from it. In addition, when they expand the samples to include the children in the migrants' households they find the negative impacts of migration on the children's school attendance, though it may cancel-out by the positive impact of remittances. Moreover, remittances can help the remaining family members, especially the children of migrants' family to go to school by easing or removing the credit constraints (Dustmann and Glitz, 2011).

Bredl (2011) finds a significant effect of remittances on education using the data from three Haitian communities and supports the positive idea of findings and argues that remittances can play a vital role to preventing the budget constraints of poor households where financial shortage is recognized as the crucial character in schooling decision. In contrast, using a large set of national representative survey data, Hu (2012) examines the impact of rural-urban migration and remittances on the secondary school attendance of left behind children in China. Findings show that there may be a negative effect on the school attendance in rural areas due to the absence of adult household members, although it emphasizes that remittances can reimburse the loss to some extent. The effects are more prominent especially for girls and also for the children of poor households due to the disadvantaged positions of girls in rural China and for the liquidity constraints of poor rural households respectively.

The recent study of Ziesemer (2012) views the positive total effects of remittances on the growth rates of per capita GDP, literacy and the level of investment. It also reports that the effects of net migration has negative impact on literacy and the level of investment but have had a positive relationship with growth. On the other hand, Alcaraz et al. (2012) study the impacts of remittances on school attendance and child labor to the recipients of Mexican households and report a negative shock on remittance receipt during 2008-2009 United States' recessions. They find a significant reduction of school attendance and a significant increase in child labor due to the negative shock of remittances. In another empirical investigation of Migration, human capital and growth, Maria and Lazarova (2012) study the impact of skill emigration on growth and human capital formation in some developing countries and find the statistically significant impact of migration on human capital formation both on its level and composition. They report the mixed blessings about its effects on productivity growth as they find both the winners and losers among the developing countries and express that it may depend on the advancement of technological sophistication to each individual developing county.

Human capital can play a significant role in promoting the long-run sustained growth (Romer, 1990). Mankiw et al. (1992) explore that human capital can be an ordinary factor and may be unable to bring into being endogenous growth but report a strong relationship between enrolment rates and per capita GDP growth. Despite the fact, subsequently Benhabib and Spiegel (1994), Bils and Klenow (2000) and Pritchett (2001) strongly argue that human capital development has a forceful contribution to economic growth. Cohen and Soto (2007) show the constructive impact of human capital accumulation on economic growth as they find the significant positive coefficients for average years of schooling. From the above mentioned facts and figures of human capital it is clear that human capital development can be one of the important drivers of economic growth and we are interested to assess the impact of remittances on human capital development assuming that remittances have had a long term positive impact on economic growth.

Education and training can have a large number of benefits beyond the economic growth, such as lower infant mortality, lower maternal mortality, good health and nutrition etc. This is because all kinds of education are helpful to increase the cognitive skills of human being for

further implications. Nonetheless, the impacts of education as well as schooling on economic growth can vary extensively across countries due to main three reasons (Pritchett, 2001): i) the weak institutional or governance structures may have a negative effect on human capital accumulation and that can lower the growth of the economy in general; ii) if the supply of educated manpower expands tremendously while the demand remains the same, the marginal returns to education may possibly be lowered; iii) lower educational quality has slower development or even no improvements of human capital and consequently that may have negative effects to the economic growth. Here, one point can be considered as opportunity that the extra supply of educated and skilled manpower of developing countries can migrate to the developed economies and may work as potential human capital and may send their income as remittances to build up their local and regional economies. In this way remittances can assist to a country's long term growth and development process.

From the literature review, it is clear that a lot of research reports the different developmental impacts of remittances but a very few studies analyze the effects of remittances to the developing countries on human capital at macro level. It is still an ongoing debate whether remittances may help to the long term growth through financial and human capital development or disrupt the long run growth due to the substitution of labors and creating the 'Dutch disease'[3] effects. We also think along with other researchers and development think-tanks in this line that it is important to come to a consensus about the flow of remittances and long run economic growth as the volume of remittances to developing countries have increased massively during the last decade. Workers' remittances are the second largest financial flow to the developing countries, whereas, foreign direct investment is considered as the largest flow, which may not sustain in the long run due to the changing geo-political characteristics of the countries. Hence, our major concern is confined to find out and exploring the relationship between remittances and human capital development. A global level comparative study based on country specific data sets is lacking, which is very essential to evaluate the concepts of the relationship of remittances and human capital in a broader perspective.

II. METHODOLOGY

2.1 Empirical model

We apply the generalized least square (GLS) model to analyze the effects of remittances of international migrants on the changes in human capital. The model of changes in human capital is a function of incoming remittances of recipient's countries and a set of control variables. Hence, the econometric representation is as follows:

$$HC_{it} - HC_{i,t-5} = \alpha_i + \beta_1 R_{i,t-k} + \beta_2 X_{i,t-5} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where *i* indicates the country, *t* denotes the time period and k indicates the lag; HC refers to the accumulation of human capital; R serves as remittances to the developing countries; X

[3] Deindustrialization of an economy due to a result of the discovery of natural resources that has occurred in Holland and raised the value of Dutch currency

captures the set of control variables; α_i is the unobserved country specific fixed effect and ε_{it} denotes the error term; HC_{it} - $HC_{i,t-5}$ represents the changes in human capital between 5 years. Therefore, the variable in the left hand side of the model is changes in human capital between 5 years ($HC_{it} - HC_{i,t-5}$) as our data on educational attainment is on five years average. We are interested to test the β_1, whether the coefficient of remittances on the changes in human capital is statistically significant or not.

Human capital is first proxied by the educational attainment that is measured as the overall average years of schooling over 25-age population. Besides, we use the gross enrolment and attendant at primary, secondary and tertiary level of education. Remittance to the developing countries is proxied by the proportion of remittances to GDP. In the model, we use the 10 years lag of remittances for the primary and secondary enrollment as well as for the average years of schooling whereas we use the 5 years lag of that for the tertiary enrollment. This is because we assume that the 25 over population have received the benefit from the remittances at primary and secondary level at least the 10 years before and at tertiary level at least the 5 years back. We also assume that 25+ people with average years of schooling have received the remittance benefit on an average 10 years before. For that reason k = 10 for the average years of schooling, primary and secondary enrollment and k = 5 for the tertiary enrollment. Moreover, the model is represented as the random-effects GLS (Generalized Least Square) regression model and it is tested and indicated by the Breusch and Pagan Lagrangian multiplier test for the random effects (Baum, 2006, pp: 229).

The regression model includes a number of control variables. First, we add per capita GDP as a measure of the level of economic development. This is because sending kids to school or participation of boys and girls in higher education can particularly depend on the economic and financial ability of an individual as well as his or her households' income (Amuedo-Dorantes and Pozo, 2010) and that may directly be captured by the per capita income level. We also add the per capita GDP growth as a control because human capital accumulation more specifically the school enrollment rates have had a strong relation with per capita GDP growth (Mankiw et al., 1992; Pritchett, 2001; Cohen and Soto, 2007).

The openness in current and capital account have had positive effects on financial development (Chinn and Ito, 2002). Trade openness can lead to the increased human capital through investment in education reducing credit and liquidity constraints. Trade openness in our model is expressed as the proportion of exports plus imports of goods and services to GDP. Leff (1969) argues from the cross country analysis that higher aggregate savings rate can play a significant role to the improved level of per capita income. Similarly, increased gross domestic savings may promote the long run productive investment like education and health. This is because the financial sector of a country can be more capable to invest in productive sectors and to meet up the credit demands to the private sectors due to a large domestic savings. From that point of view, we include the share of gross domestic savings to GDP as a control.

Using a cross country analysis Agell et al. (1997) report the shifting (from negative to positive) relationship between public expenditure and growth to the OECD countries. Though

their findings are highly criticized by Folster and Henrekson (1999) and they strongly argue that there can be a negative relationship between government expenditure and growth. However, government spending on education may have a higher impact on poverty reduction and increased productivity growth (Fan et al., 2000) and the increased educational attainment can be an important determinant of economic growth and development. Consequently, we incorporate the government expenditure as a share of GDP as a control to the model.

Helliwell (1994) finds relatively a less significant positive effect of democracy on education. Afterwards Lake and Baum (2001), Feng (2003), Baum and Lake (2003) and Brown and Hunter (2004) report and strongly argue that democracy have had a significant positive effect on human capital accumulation. Democracy can have a positive relationship with human capital development because democratically elected government may well try to invest more on public education and more specifically on primary education (Stasavage, 2005) and similarly education can progressively foresee the democracy as well (Bobba and Coviello, 2006). Recently Klomp and de Haan (2012) also find positive relationship between democracy and human capital. Therefore, we add political development representing the level of democracy proxies by the Polity2[4] variable as a control in our model.

In addition, we include some demographic variables to the model as control such as working population, defined as the proportion of total population between 15 to 64 years; rural population, expressed as the share of total population; and the annual population growth. In relation to the dependent variables, we use the lag of 5 years for all the controls. Variables related to trade openness, credit to GDP and per capita GDP are specified with natural log. Complete lists of countries that are included in the model are represented in Table A1 in Appendices.

2.2 Data sources

A dataset is developed including up to 110 countries between 1960 and 2010 with the help of World Development Indicators (WDI) of the World Bank (2012), the Barro and Lee (2010) dataset on educational attainment and the Polity IV (Instrumental Variables) score dataset on democratic development. Our dataset is an unbalanced panel. The proportion of total population in primary, secondary and tertiary enrollment and attendant along with the average years of schooling data are taken from the Barro and Lee series. Data related to the remittances, per capita GDP, trade openness, government spending to GDP, gross domestic savings to GDP, population between 15 to 64 years, rural population, population growth, credit to GDP, per capita GDP growth are all collected from the WDI. Data on political development representing the level of democracy is obtained from the Polity IV score panel developed by Marshall and Jaggers (2010). The sources of data in details are also represented in Table A2 in Appendices.

[4] Political development representing more specifically the extent of democratic situation

III. RESULTS AND DISCUSSIONS

3.1 Global changes in human capital

Table 1 reports the estimation of equation (1) to the changes in average years of schooling as well as the changes in the share of total population at primary, secondary and tertiary education assuming that remittances is exogenous and sufficiently well measured. We control for the factors listed in the methodology in all regression. The model represents that remittances of international migrants have a positive and significant effect on the changes in average years of schooling to the developing countries around the world. It is apparent from the model that if remittances to GDP increase by a one percentage point then the changes in

Table 1: Estimated effects of remittances on human capital development

	Average years of schooling	Primary education	Secondary education	Tertiary education
Working population	-0.015	-0.068	-0.123	0.017
	(0.005)***	(0.072)	(0.064)**	(0.028)
Trade openness	0.079	-0.444	0.136	-0.320
	(0.038)**	(0.480)	(0.436)	(0.208)
Credit to GDP	0.037	-0.041	0.295	-0.181
	(0.028)	(0.350)	(0.316)	(0.147)
Rural population	-0.001	-0.015	0.014	-0.004
	(0.001)	(0.016)	(0.015)	(0.007)
Population growth	0.003	0.487	-.361	-0.015
	(0.021)	(0.271)**	(0.239)	(0.106)
Per capita GDP growth	0.004	-0.015	-0.011	-0.014
	(0.006)	(0.075)	(0.066)	(0.025)
Government spending to GDP	0.003	-0.027	0.045	0.013
	(0.003)	(0.042)	(0.038)	(0.017)
Per capita GDP	0.0160	-0.969	-0.012	0.402
	(0.028)	(0.362)	(0.328)	(0.150)***
Gross domestic savings to GDP	0.007	0.019	0.062	0.011
	(0.002)***	(0.026)	(0.023)***	(0.011)
Polity2	0.005	0.103	0.018	-0.007
	(0.003)**	(0.042)***	(0.037)	(.016)
Remittances to GDP	**0.007**	**-0.009**	**0.058**	**0.017**
	(0.002)***	(0.037)	(0.033)**	(0.017)
Constant	1.294	12.395	7.989	-1.086
	(0.417)***	(5.216)***	(4.67)**	(2.122)
No. of observations	477	477	477	477
Number of ID (countries)	110	110	110	110
R-squared	0.104	0.273	0.05	0.145
Wald X^2 test	43.82***	128.11***	13.53	52.67***

Note: Standard error in parentheses. ***, ** and * represent the level significance respectively at 1%, 5% and 10%.

average years of schooling within 5 years can increase by a 0.007 percentage point. From that sense if the remittance growth continues to an increasing trend then after a certain period let's say after 50 years there may be a significant increase to the global average years of schooling and we may consider it as an important contribution of remittances to the improvement of education.

Our model reports the insignificant effects of remittances to the changes in primary education. It may be due to almost free and/or low cost of education at primary level compared to the secondary and tertiary education all over the world. Moreover, it may occur for the increased educational spending of governments and international organisations. The majority of governments of developing and low-income countries provide huge amount of subsidies for increased enrollment at primary level of education. This is because it is one of the important conditions of the foreign and external funding agency and development organizations for the developing economy. More fact is that apart from the primary level, our model again reports the positive and significant effects of remittances on the changes in gross enrollment at secondary level of education. Though, in secondary level there are also opportunity costs to go to school instead of working in many developing countries. This is because remittances can increase the financial power of a family and may have therefore more resources to spend on secondary education. It reports that if the proportion of remittances to GDP increase by a one percentage point then it can bring about a 0.058 percentage point increase to the changes in secondary enrollment in every five years (Table 1). Our finding is supported by the argument of Lopez-Cordova (2005) and Amuedo-Dorantes and Pozo (2010) related to the significant effects of remittances to the secondary school education. Moreover, the model reports the insignificant effects of remittances to the changes in tertiary enrollment and attendant. It may be due to the fact that majority of the students at tertiary level be able to earn some money by doing a part time job but it may depend on the employment opportunities in the developing countries.

Table 1 also shows that working age population may have negative effects to the changes in average years of schooling as well as in secondary education. It reports the significant positive effect of trade openness to the changes in average years of schooling. Population growth may have positive effects to the changes in primary enrollment rate. Our model also reports the highly significant positive effects of per capita GDP to the changes in higher level of education in the developing countries around the world. According to the expectation, the share of gross domestic savings to GDP has highly significant positive effects to the changes in average years of schooling as well as in the secondary level of education though it shows insignificant effects to primary and tertiary level. Democratic development may be able to bring positive contribution on the changes in average years of schooling as well as in the primary education since the relevant coefficients are positive and significant in our model.

3.2 Regional changes in human capital

We analyze the data separately for six different regions to have a concern about the effects of remittances to the advancement of education in different developing regions and are represented in Table 2. Remittances have significant positive effects on the changes in tertiary

enrollment in South Asia. It shows that a one percentage point increase in remittances to GDP can increase the changes in tertiary enrollment by around a 0.438 percentage point in each five years. One thing is clearly different that the model at global level represents the insignificant effect of remittances at tertiary level of education whereas at regional level the model for South Asia reports the significant positive impact of that. The coefficient of tertiary education in South Asia indicates that remittances have a large effect on the changes in tertiary education in that region. It may be due to the high cost of tertiary education and a lack of part time employment opportunities to the tertiary level students in that region. Therefore, remittances can help to increase the tertiary enrollment rate in South Asia.

Table 2. Estimated effects of remittances on human capital development in different regions

	Average years of Schooling	Primary education	Secondary education	Tertiary education
South Asia	**0.041**	**-0.651**	**0.254**	**0.438**
	(0.069)	(0.810)	(0.566)	(0.253)**
No. of observations	18	18	18	18
Number of ID (countries)	4	4	4	4
R-squared	0.690	0.867	0.771	0.884
Rest of the Asia	**-0.075**	**0.496**	**-0.841**	**0.045**
	(.056)	(1.053)	(0.928)	(0.154)
No. of observations	41	41	41	41
Number of ID (countries)	11	11	11	11
R-squared	0.327	0.261	0.122	0.500
Sub-Saharan Africa	**0.003**	**-0.010**	**0.009**	**0.001**
	(0.004)	(.044)	(0.040)	(.008)
No. of observations	122	122	122	122
Number of ID (countries)	66	66	66	66
R-squared	0.234	0.2245	0.154	0.136
Middle East and North Africa	**-0.001**	**-0.397**	**0.047**	**0.093**
	(0.009)	(0.091)***	(.095)	(0.044)**
No. of observations	37	37	37	37
Number of ID (countries)	8	8	8	8
R-squared	0.765	0.777	0.611	0.7968
Latin America and Caribbean	**0.034**	**-0.032**	**0.096**	**0.105**
	(0.015)***	(0.175)	(0.161)	(0.073)
No. of observations	91	91	91	91
Number of ID (countries)	20	20	20	20
R-squared	0.201	0.380	0.264	0.156
OECD countries	**0.026**	**0.151**	**-0.094**	**0.116**
	(0.032)	(0.411)	(0.390)	(.203)
No. of observations	148	148	148	148
Number of ID (countries)	38	38	38	38
R-squared	0.162	0.177	0.112	0.106

Note: Standard error in parentheses. ***, ** and * represent the level significance respectively at 1%, 5% and 10%.

Our model doesn't report any significant effect of remittances for each of the three levels of education and even for average years of schooling in the rest of the Asian countries. Small number of observations may be the possible reasons for it. It also shows the insignificant coefficients to the average schooling years together with all three levels of education in Sub-Saharan Africa. It may be due to less government involvement, higher incidence of poverty and lower financial development of Sub-Saharan economy (Adams and Page, 2005). The people of Sub-Saharan Africa may first prioritize to meet-up their other basic necessities like food and clothing instead of education using the remittances. We present some robustness test for this matter in our next part of discussions.

Our model finds the insignificant impact of remittances to all three levels of education along with average years of schooling for OECD countries. It may be because the countries of this region receive very little amount of remittances and/or even remittance inflows are nil for many OECD countries. It is true that high income OECD countries like the USA, UK, France, Germany, Netherlands, Belgium, Australia etc. are the major sources of remittances for the developing countries. Therefore, remittances do not have any significant contribution to the improvement of education in the OECD countries. It shows that remittances to GDP may have a positive effect (0.093) on the changes in tertiary education to the Middle East and North African region though it has a highly significant larger negative effect (-0.397) on the changes in primary education compared to the effects in tertiary education (Table 2). This is because the countries in Middle East like United Arab Emirates, Saudi Arabia, Kuwait, Qatar, and Oman etc. are also an important source of remittances to the developing countries. Remittances can contribute a lot to the advancement in changing the average schooling years in Latin America and the Caribbean region as the coefficient of remittances characterize extremely significant positive effect for it. According to the estimation, if remittances to GDP in Latin America and the Caribbean increase by a one percentage point then there is a possibility to increase the changes in average years of schooling by around a 0.034 percentage point in every five years in that region.

4.3 Remittances, gender and human capital

We also analyze the data for males and females to report separately the remittance effects on males and females' education. The model represents the positive and significant effects of remittances to average schooling years and secondary education both for males and females. It shows that a one percentage point increase in remittances to GDP may increase the changes in secondary enrollment and attendant by around a 0.056 percentage point for female and by around a 0.061 percentage point for male in each five years (Table 3). Our estimation supports the Bansak and Chezum (2009) that remittances may have large effect for male compared to female at secondary level. Again, a one percentage point increase in remittances to GDP may increase the changes in average years of schooling for female by a 0.008 and for male by a 0.007 percentage point in each five years (Table 3).

Table 3. Estimated effects of remittances on human capital development in response to gender, democracy and financial development.

	Average Schooling years	Primary education	Secondary education	Tertiary education
Gender				
Female	**0.008**	**-0.007**	**0.056**	**0.005**
	(0.002)***	(0.039)	(0.035)*	(0.015)
No. of observations	477	477	477	586
Number of ID (countries)	110	110	110	116
R-squared	0.101	0.381	0.091	0.327
Male	**0.007**	**0.005**	**0.061**	**-0.003**
	(.003)***	(0.039)	(0.036)*	(0.017)
No. of observations	477	477	477	586
Number of ID (countries)	110	110	110	116
R-squared	0.113	0.315	0.057	0.129
Level of financial development				
High financial development	**0.018**	**-0.068**	**0.198**	**0.014**
	(0.008)**	(0.106)	(.091)**	(0.037)
No. of observations	305	305	305	365
Number of ID (countries)	86	86	86	91
R-squared	0.118	0.208	0.069	0.127
Low financial development	**-0.002**	**0.018**	**-0.018**	**0.024**
	(0.003)	(0.041)	(0.041)	(.020)
No. of observations	172	172	172	221
Number of ID (countries)	58	58	58	69
R-squared	0.214	0.292	0.060	0.180
Level of democracy				
Democracy	**0.004**	**-0.052**	**0.057**	**0.003**
	(.004)	(0.051)	(.047)	(0.028)
No. of observations	310	310	310	362
Number of ID (countries)	85	85	85	88
R-squared	0.070	0.166	0.084	0.095
No or low level of democracy	**0.004**	**0.055**	**0.009**	**0.008**
	(0.003)	(0.050)	(0.044)	(0.021)
No. of observations	157	157	157	211
Number of ID (countries)	52	52	52	65
R-squared	0.367	0.342	0.149	0.313

Note: Standard error in parentheses. ***, ** and * represent the level significance respectively at 1%, 5% and 10%.

This finding suggests that the effects of remittances in the developing countries may possibly be higher for females' education than that of males to increase the average schooling years. There may be two possible reasons behind it. First, the majority of the low income households

in developing countries prefer first to send their male kids to school at primary level rather than females due to lack of financial resources. Second, they also prioritize more for males' education than females at secondary and tertiary level due to higher cost of education. Hence, remittances can support more to increase females' average schooling years compared to males overcoming the resource constraints and through investing the remittances for their education.

4.4 Remittances, financial development and human capital

We find the significant positive effects of remittances on the changes in average years of schooling and secondary education in the developing countries with high financial development. On the other hand, our model does not find any significant effects of remittances to all three levels of education in the developing countries with low financial development (Table 3). It may be due to that in low financially developed economy priority of spending the remittances in most cases not in the education sector. Giuliana and Ruiz-Arranz (2009) argue that remittances have had positive effects on economic growth, consequently on developing human capital more-specifically for the low financially developed economy. Hence, the financial institutes of these countries should provide sufficient loan (or subsidies) for the advancement of education if they become capable enough to meet up the credit demand of the private sectors.

3.5 Remittances, democracy and human capital

We examine the model to know about the remittance effects on the changes in education regarding the level of democracy of the remittance recipients' developing countries. Our estimation finds insignificant effects of remittances to each three level of education together with average years of schooling in response to both democracy and lower level of that (Table 3). Hence, our findings do not provide the evidence that the level of democracy may have the connection to the remittances and the investment in education, though, democracy may have an indirect link with human capital (Brown and Hunter, 2004; Stasavage, 2005; Bobba and Coviello, 2006; Klomp and de Haan, 2012).

IV. CONCLUSION

Remittances are becoming more stable, reliable and an emerging source of fund for the developing countries apart from the financial hardship and the downward spiral of the world economy (World Bank. 2011a). Researchers, development experts and policy makers have already recognized the different development potentials of remittances but the impact of remittances on global and regional human capital development remains unexplored. We analyze the effects of remittances on the changes in average years of schooling as well as changes in primary, secondary and tertiary enrollment and attendance. We find that remittances have a positive effect on the changes in average years of schooling and secondary education in the developing countries around the world. At regional levels, remittances can contribute to the changes in tertiary enrollment in South Asia, and Middle East and North Africa. Moreover, it may work as a catalyst to increase the average schooling years in Latin America and the Caribbean. Remittances can contribute more to the changes in females'

average schooling years compared to males. It can also contribute to the changes in secondary education and average years of schooling in the developing countries with high financial development. Finally, it can be concluded that the increasing trend of remittances to the developing countries may be helpful to increase the changes in average years of schooling and secondary enrollment rate in the developing countries.

Our study can contribute to the literature resource by investigating this issue, exploring the effects of remittances more specifically to the advancement of education. In addition, such kind of studies can be demanded more and more for making suitable policy guidelines for sustainable economic development to the developing countries overcoming the ongoing long-term financial crisis around the world. We think it is the first research in a large scale for the cross-county analysis in understanding the effects of remittances on human capital development. From that sense, it may have a few shortcomings. We use only the officially recorded flow for the remittance data and that is the underestimation of the original inflows as it avoids the informal flows. Household level data can be more suitable for better understanding its effect on human capital. We do not use the GMM dynamic framework model of Arellano and Bond (1991) due to the lack of more dynamic data of human capital as we use five years average data in all levels of education and for average years of schooling. We consider that our data in the dependent variables are not so much dynamic and hence the further research can review the current findings along with more dynamic and new sets of data overcoming the above-mentioned shortcomings.

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Appendices

Table A1. A complete list of countries included in the model

Countries (110)			
Albania	Finland	Malawi	South Africa
Algeria	France	Malaysia	Spain
Argentina	Gabon	Mali	Sri Lanka
Australia	Gambia	Mauritania	Sudan
Austria	Germany	Mexico	Sweden
Belgium	Ghana	Mongolia	Switzerland
Benin	Greece	Morocco	Syria
Bolivia	Guatemala	Namibia	Tajikistan
Botswana	Guyana	Nepal	Thailand
Brazil	Haiti	Netherlands	Togo
Bulgaria	Honduras	New Zealand	Trinidad Tobago
Burundi	Hungary	Nicaragua	Tunisia
Cambodia	India	Niger	Turkey
Cameroon	Indonesia	Pakistan	Uganda
Central African Republic	Iran	Panama	Ukraine
Chile	Ireland	Papua New Guinea	United Kingdom
China	Israel	Paraguay	Tanzania
Colombia	Italy	Peru	Uruguay
Congo	Jamaica	Philippines	USA
Costa Rica	Japan	Poland	Venezuela
Croatia	Jordan	Portugal	Vietnam
Cyprus	Kazakhstan	Republic of Korea	Zambia
Czech Republic	Kenya	Romania	Zimbabwe
Denmark	Kyrgyzstan	Russian Federation	
Dominican Republic	Latvia	Rwanda	
Ecuador	Lesotho	Senegal	
Egypt	Liberia	Sierra Leone	
El Salvador	Libya	Slovakia	
Fiji	Lithuania	Slovenia	

Table A2. Definition of variables and sources of data

Variables	Definition	Sources
Average schooling years	The average years of schooling over 25 age population	Barro and Lee (2010)
Primary education	The proportion of total population in primary enrolment and attendant	Barro and Lee (2010)
Secondary education	The percentage of total population in secondary school enrolment and attendant	Barro and Lee (2010)
Tertiary education	The proportion of total population in tertiary or higher level of schooling	Barro and Lee (2010)
GDP per capita	Per capita GDP in constant US $ 2000	World Bank (2012)
Trade openness	The percentage of exports plus imports of goods and services to GDP	World Bank (2012)
Government spending	The general government expenditure expressed as a percentage of GDP	World Bank (2012)
Gross domestic savings	Proportion of gross domestic savings to GDP	World Bank (2012)
Polity2	Political development representing more specifically the extent of democratic situation.	Marshall and Jaggers (2010)
Remittances	Worker remittances + employee compensation + migrants' transfers as a proportion of GDP	World Bank (2012)
Working population	Proportion of total population between 15 to 64 years	World Bank (2012)
Rural population	The share of rural counterparts to total population (%)	World Bank (2012)
Population growth	Population growth (annual %)	World Bank (2012)
Per capita GDP growth	Per capita GDP growth (annual %)	World Bank (2012)
Credit to GDP	The share of credit to GDP (%)	World Bank (2012)