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Remittances, Growth and Poverty Reduction in Asia - A Critical Review of the Literature and the New Evidence from Cross-country Panel Data*

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Remittances, Growth and Poverty Reduction in Asia - A Critical Review of the Literature and the New Evidence from Cross-country Panel Data

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Abstract

This study provides a critical review of the role of international remittances and migration in promoting growth and reducing poverty and inequality in developing countries in Asia and the Pacific. It also uses cross-country panel data and examines the effect of remittances on economic growth, poverty and inequality after taking into account the endogeneity of remittances. First, it has been found from our econometric results that remittances promote economic growth and reduce poverty - both national and rural - based on the international poverty lines of the US$1.25 or US$2 thresholds, while remittances have no inequality-reducing effect. Second, we have suggested the importance of understanding the underlying factors enabling households to undertake migration and remittances in relation with the underlying structural transformation of the rural economy, such as its shift to the non-farm sector, which typically takes place as village infrastructure develops and educational level of the households improves. Third, we argue that the risk-coping roles of remittances at both macro and micro levels are important in understanding the poverty-reducing mechanisms associated with migration and remittances. Fourth, poor households outside the village networks should be supported by policy measures. This is important particularly because our results suggest that remittances increase inequality in rural areas.

Key Words: Remittances, Migration, Growth, Poverty, Inequality, Asia
JEL classification: F22, O10, O15, O53, I30

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Contents

A list of Acronyms

CALABARZON: **Ca**vite, **La**guna, **Ba**tangas, **Ri**z**z**al, and Quez**on** (an administrative region in the Philippines)
GMM: Generalized method of moments
IFAD: International Fund for Agricultural Development
IV: Instrumental Variable
LAD: Land acquisition and distribution
OCWs: Overseas Contract Workers
PCGDP: Per capita Gross Domestic Product
PSTR: Panel smooth transition regression
RIGA: Rural Income Generating Activities
SGMM: System Generalized method of moments
WDI: World Development Indicators

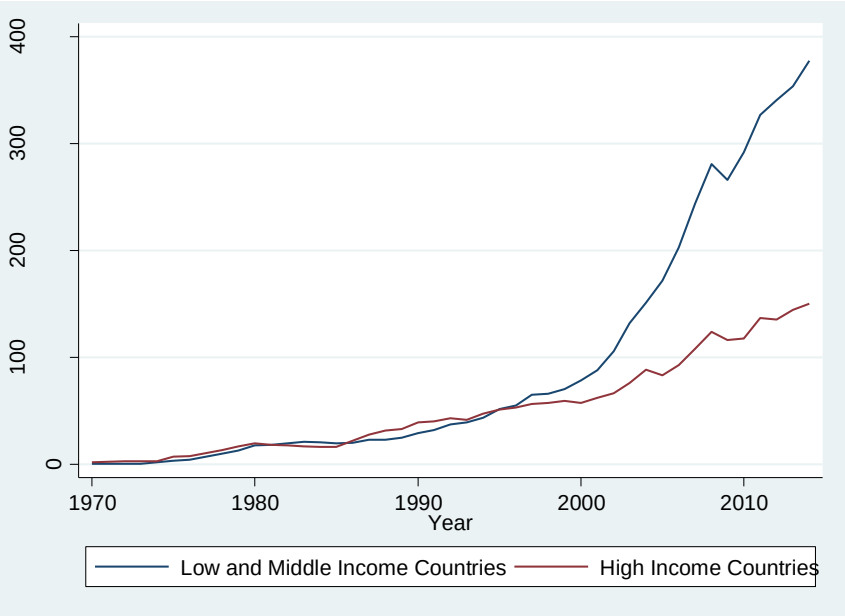
I. Introduction

It is now widely recognised that remittances are important not only for economic growth but also for poverty reduction. In 2009 migrants from developing countries (i.e., low and middle-income countries) sent over US$271 billion to their countries of origin, which decreased from US$284 billion in 2008 (Figure 1). It reached US$423 billion in 2015, which was considerably larger than remittances received by high-income countries, US$150 billion.[1] Remittances have recently played an important role as a stable source of finance at the macro level, while they play a key role in poverty reduction at micro levels, in particular after 2000

[1] It is noted that the remittance figures for developing countries and high income counties cannot be compared in a strict sense. To developing countries, P2P remittances are the bulk of these flows, to support family mainly, whereas to high-income countries, it is rather non-resident employees' savings repatriation (in other words, wealthy expatriates bringing back home their money).

(Imai, Gaiha, Ali, and Kaicker, 2014), while the remittance flows to low and middle income countries increased acceleratedly (Figure 1) and poverty declined in many of these countries.

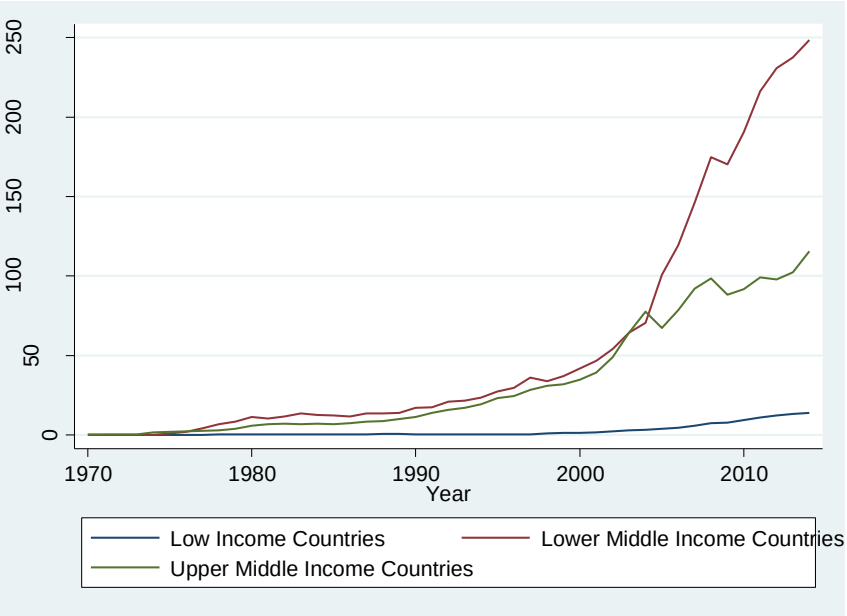
Figure 1 Trends of remittances (received, current US$) by income class, aggregate levels (only developing countries)



Source: World Development Indicators 2015.

It might be useful to further break down the category of developing world into the groups by country's income classes. As can be seen in Figure 2, lower middle income countries have attracted the highest amount of remittances with a sharp increasing trend, to be followed by upper middle income countries and then by low-income countries.

Figure 2 Trends of Remittances (received, current US$) by income class, aggregate levels

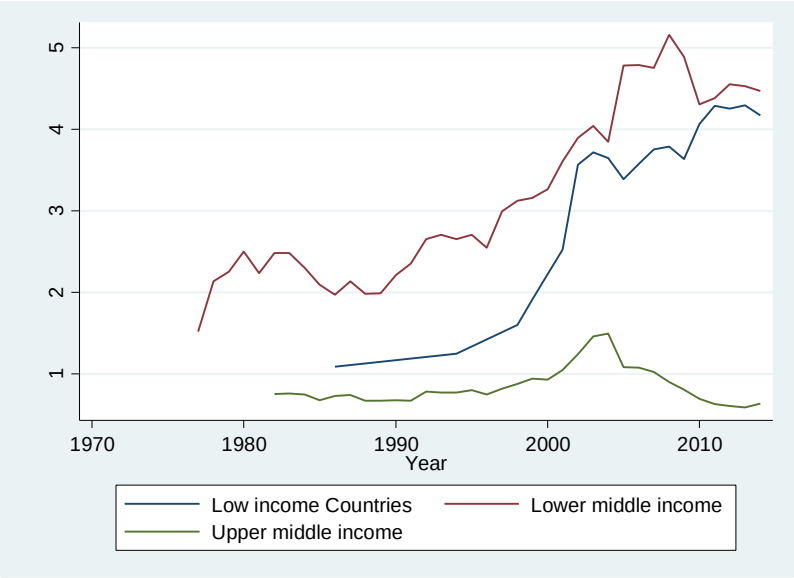


Source: World Development Indicators 2015.

However, once we derive the shares of remittances in GDP, we find that the macro remittance inflow has non-negligible shares (above 4% after 2010) in low income and lower-middle income countries, while there is some degree of heterogeneity as smaller countries tend to have higher shares (e.g. Nepal, 32.2%, Philippines, 10.3%, Sri Lanka, 8.5% in 2015, based on WDI 2015). It is interesting to find that the share of remittances in GDP of upper middle income countries has decreased in recent years. We can safely conclude that the remittance inflow at the macro level has played an important role for lower middle income countries – in terms of its volume and share in GDP- and for low income countries in terms of its share.[2] This will justify our study that aims to examine the relationships among remittances, growth and poverty reduction in Asia and the Pacific drawing upon a critical review of the literature and econometric analyses based on cross-country panel data.

Figure 3 The share of remittances in GDP by income class, aggregate levels

[2] We will further investigate the trends of remittances for each country in the section III.



Source: World Development Indicators 2015.

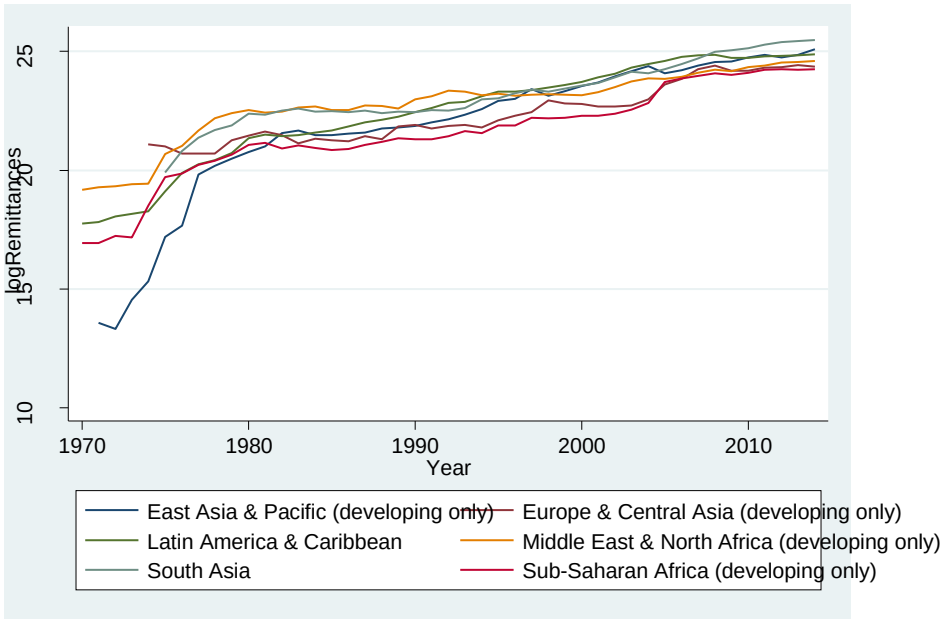
The objective of this draft - following the above observation that remittances have increased in low-income and lower-middle income countries in recent years - is twofold. First, we will provide a critical review of the recent literature on the role of remittances and international migration[3] in promoting economic growth and reducing poverty – in particular rural poverty. In the review, we pay a particular attention to the mechanisms whereby remittances reduce poverty at micro levels, for instance, how the income structure or the behaviour of recipients is changed as a result of migration and remittances.[4] Second, we will review the macro statistics of remittances and migration drawing upon the cross-country panel data and carry out the econometric analyses where we estimate economic growth and various poverty measures, including rural poverty measures.

[3] It is evident that domestic migration (as well as remittances from migrants in urban areas to those who are left out) affects growth and poverty in a complex manner, but this draft mainly focuses on the role of international migration and remittances. The role of the domestic migration has been discussed by Imai, Gaiha and Garbero (2014).

[4] An alternative approach to assess the impact of remittances on rural poverty would be to evaluate their vulnerability to financial shocks and resilience and estimate the role of remittances in reducing vulnerability in line with IFAD and the World Bank (2015). However, as remittances are endogenous to the measure of vulnerability and it has been recommended that the vulnerability should be estimated by exogenous variables, such as household or community characteristics (e.g. Mina and Imai, 2016).

As can be seen in Figure 1, remittances received in developing countries[5] have steadily increased in the period 1970-2014 across different regions. This reflects (i) the increased financial openness influencing developing countries over the years (Baltagi et al., 2009), (ii) a large share of remittances in the total financial inflows in some countries, such as Tajikistan and Kyrgyzstan (IFAD and the World Bank, 2015, p.19), (iii) increased net migrants (migrant outflows minus inflows) (IFAD and the World Bank, 2013) and (iv) the increased financial networks through microfinance institutes, post offices and mobile operators (*ibid.*, 2013). Because the logarithm of remittances in real terms (amount in US$) has been taken, the slope shows the growth rate of remittances.[6]

Figure 4 Trends of log Remittances (received, current US$) at Regional Levels (only developing countries)



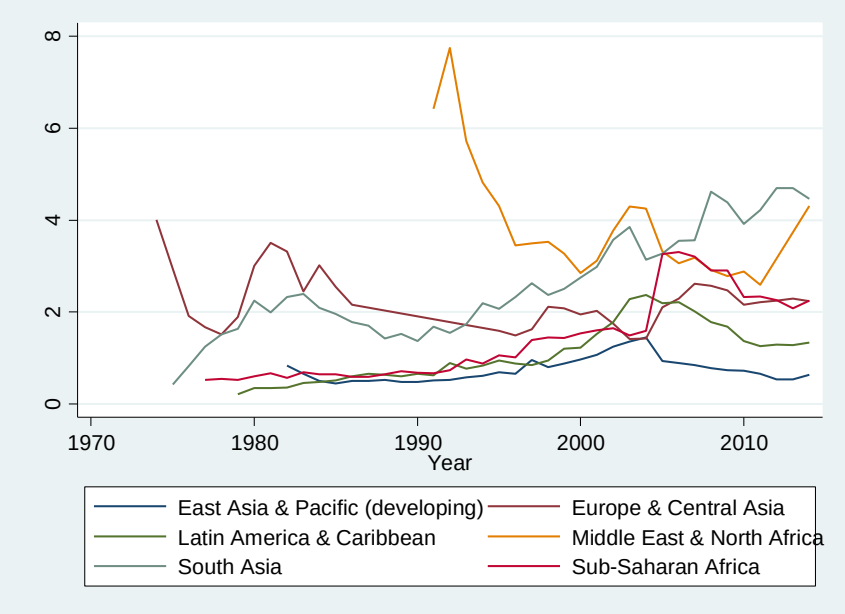
Source: World Development Indicator 2016.

[5] Remittances comprise personal transfers and compensation of employees.
[6] The trends of remittances and migration of each country will be reviewed later.

As Figure 4 indicates, the East Asia & the Pacific region has seen the fastest growth over the years with a very fast growth in the 1970s. South Asia and East Europe & Central Asia have seen an increase in remittances over the years.

On the contrary, Figure 5 shows that the share of remittances in GDP (derived as an unadjusted average of countries in the region) does not show increasing trends across regions. For instance, the share of remittances has been more or less stable over the years in East Asia and the Pacific (including South East Asia) and in East Europe and Central Asia. In the former, the share of remittances has been at around 1% of GDP and in the latter the share has been at around 2%. The share of remittances in GDP has increased from around 1% of GDP to 4% in South Asia. However, this does not reflect the heterogeneity across different countries. It is noted that a few countries are characterized by the high share of remittances in GDP is (e.g. Nepal, 32.2%, Philippines, 10.3%, Sri Lanka, 8.5% in 2015).

Figure 5 Trends of the share of Remittances in GDP at Regional Levels (only developing countries)

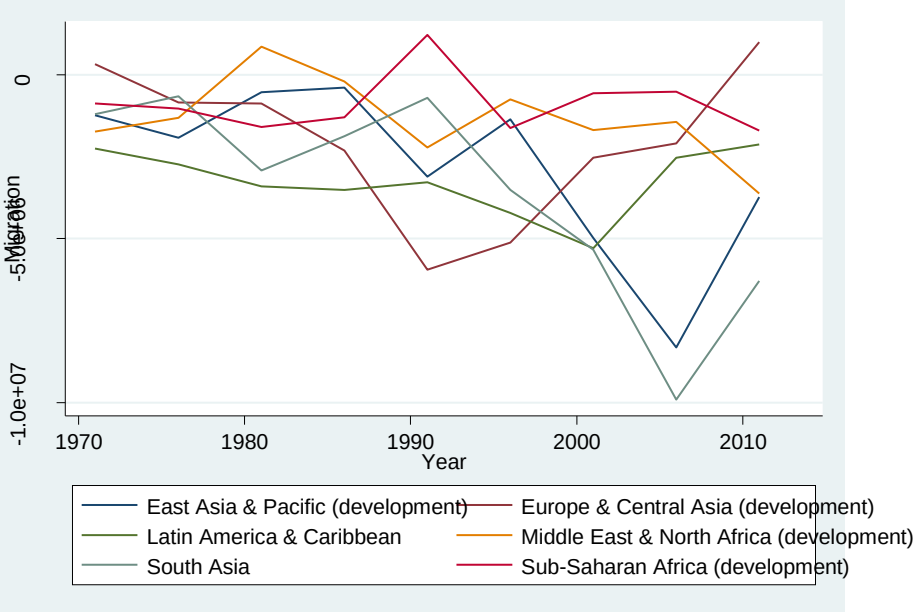


Source: World Development Indicator 2015.

The trends of net international migration (defined as the total number of immigrants less the annual number of emigrants, including both citizens) are summarised in Figure 6. They were fluctuating and have not seen any clear increasing or decreasing trends over the years.

However, the figure of net migrants has decreased over the years in the East Asia & Pacific, while it has decreased since 1990 in South Asia. It is not easy to confirm the trends as the data are available only once in five years (based on WDI 2015). As the total volume of remittances has increased, the net migration has decreased since 1990 in these regions, possibly as a result of the increase in emigration. Continuous increase in emigration tends to increase the stock of migrants abroad, which will have a positive effect on remittances over the years. It is noted that IFAD and the World Bank (2013) have shown that migrant outflows exceeded migrant inflows in many Asian countries.

Figure 6 Trends of the share of remittances in GDP at Regional Levels (only developing countries)



Source: World Development Indicator 2015.

The rest of the draft is organised as follows. Section II provides a critical review of the empirical literature on remittances and migration. In doing so a particular focus will be placed on the role of remittances in promoting economic growth and poverty reduction from different angles, including their role in stabilising economic growth and the effect of remittances on the income structure of recipient households or the aggregate economy. Section III uses the cross-country panel data to review the trends of remittances and migration at country levels. It then provides econometric results on the relationship between remittances (as well as migration) on economic growth or poverty by taking account of the endogeneity of remittances. The section IV concludes with some policy implications for the countries in Asia and the Pacific.

II. The Review of Literature

The Role of Remittances to promote growth and stabilise the economy

There is a large literature that analyses the effect of international remittances on economic growth. As discussed by Barajas, Gapen, Chami, Montiel, and Fullenkamp (2009), part of remittance inflows will be used to finance directly physical and human capital investment, such as education. If the firms or the households face credit constraints, the remittances may be useful to ease them and the access to the remittances would also improve the credit worthiness of the firms of the households which enables them to borrow more and leads to lower capital costs. Imai, Gaiha, Ali, and Kaicker (2014) used the panel data for 24 Asia and Pacific countries and confirmed that remittances have been beneficial to economic growth after taking into account the endogeneity of remittances in their econometric models. The present study will extend this study by updating the data and econometric models (e.g. the use of System GMM) as we will see later.

Other empirical works have reached a similar conclusion that remittances will promote growth. For instance, Pradhan, Upadhyay, and Upadhyaya (2008) examined the effect of workers' remittances on economic growth using panel data from 1980–2004 for 39 developing countries and confirmed a positive impact on growth. Using the data for more than 100 countries in 1975–2002 and taking into account the endogeneity of remittances and financial development by System GMM, Giuliano and Ruiz-Arranz (2009) investigated the relationship between remittances and growth and the interaction of remittances with the financial development in the recipient country. They found that remittances have promoted growth in less financially developed countries.[7]

Remittances would also make the economy less volatile (Barajas et al., 2009). Chami, Hakura, and Montiel (2012) have provided evidence that remittance flows have contributed to the reduction of the volatility of GDP growth in recipient countries after controlling for other determinants of growth volatility and the reverse causality. However, the evidence on the existence of threshold effects suggests that the stability-enhancing effects of remittances appear to be achieved rather quickly, so whatever benefits may be associated with very large remittance flows, enhanced macroeconomic stability may not loom large among them, suggesting the importance of strengthening macroeconomic resilience through other means in recipient countries (ibid., p.17). As the last section shows, low and lower-middle income countries tend to be dependent on remittances. While this is likely to enhance and stabilise growth, the macro policies of these countries should pay attention to (i) longer-term macro effects of remittance flows and (ii) possible complementary measures to further stabilise the economy in the middle to the long run.

Other empirical studies that have shown the negative relationship between remittances and growth volatility include Bugamelli and Paterno (2008), Combes and Ebeke (2010), Bettin,

[7] Kelegama's (2011) review on the relationship between remittances and development in South Asia is broadly in line with these conclusions.

Presbitero, and Spatafora (2015) and Jidoud (2015). Bugamelli and Paterno (2008) used the cross-country panel for 60 emerging economies and showed that remittances help reduce output growth volatility. Using the dynamic panel model applied to the cross-country panel, Combes and Ebeke (2010) have shown that recipient countries exhibit on average lower consumption instability where remittances served as a hedge against various types of macroeconomic instability: natural disaster, agricultural shocks, systemic banking crisis, and exchange rate instability. However, the stabilising effect is weakened when the private credit ratio exceeds 20% of GDP and when the remittance ratio is above 6% of GDP. This may be because above the thresholds private credit or remittance inflows themselves tend to be more fluctuating and weaken the stabilising roles of remittances. Most of the studies which are reviewed here are based on the cross-country panel data (typically WDI), but the conclusion has been confirmed by Bettin, Presbitero, and Spatafora (2015) who used a rich panel dataset on bilateral remittances from 103 Italian provinces to 79 developing countries over the period 2005–2011. They concluded that remittances contributed significantly to macroeconomic stability in recipient countries. The stabilising effect is stronger where the migrant communities have a larger share of newly arrived migrants who tend to have closer relationships with foreign countries.

Using a different approach, Jidoud (2015) investigated the mechanisms through which remittances affect macroeconomic volatility using a general equilibrium framework and showed that the stabilization impact of remittances (i) depends on the size of the negative effect on labour supply induced by remittances and (ii) is larger in the country with an underdeveloped financial sector (where remittances can play a more important role by inducing financial sector development by providing a greater access to financial markets to their recipients). This underscores the need for recipient countries to further promote financial development so as to channel remittances through the financial system and help the

poor have greater access to credit. Ahamada and Coulibaly (2011) indeed showed, based on the panel data and the panel smooth transition regression (PSTR) approach[8] that the impact of remittances on GDP growth volatility is nonlinear, changing over time and across countries in function of financial development, and that a high level of financial development helps remittances have a stabilizing role.

To examine further the stabilising role of remittances, Chami, Cosimano, and Gapen, (2006) assess how remittances influence the incentives and decisions of economic agents, while investigating how these decisions impact the recipient economy at large. Using a theoretical framework drawing upon the literature of business cycle and public finance, they found that remittances may increase the macroeconomic risk through higher business cycle volatility, while they increase consumption and have the ability to smooth household consumption against income shocks (Chami et al., 2006).[9] [10] The presence of remittances also changes the underlying relationship between labour and output, thereby changing the functioning of government policy instruments. If the set of policy instruments is not sufficiently varied, this may result in an increased reliance on the inflation tax (ibid). It has been suggested by these authors that governments should examine a wider variety of policy instruments when the countries rely on a large amount of remittance inflows. Chami et al. (2008) provide detailed theoretical and empirical examinations on the relationship between remittances and macro stability and conclude that (i) remittances should not be taxed directly,

[8] The model is developed by González, Tersvirta, and van Dijk (2005) and allows regression coefficients that vary across different countries and over time, by assuming that the (heterogeneous) coefficients are continuous functions of an observable variable through a bounded function of this variable and fluctuate between two (or more) "extreme regimes" as an extension of Hansen (1999).

[9] The permanent income hypothesis suggests that, if the remittances are perceived by temporary income by the recipient households, they are more likely to be saved and helps them smooth consumption (McKenzie and Sasin, 2007, p.6).

[10] Using the Vietnamese household data in 2004, Niimi and Reilly (2011) found that women show more reliable remittance behaviour than men, suggesting that the contribution of female migrants to the well-being and risk-coping ability of their household at the origin is potentially larger. However, the gender dimensions of remittance behaviour are under-researched and this conclusion should not be generalised as in other countries, such as India, male migrants are dominant.

as taxation of remittances will cause a decline in remittance activity[11] or increase the transaction costs of remittances, undermining their poverty-reducing potentials; and (ii) any loosening of the government budget constraint as a result of positive remittance flows must be used to channel remittances into activities that promote long-run economic development, while preserving their poverty-reducing effects in the short run. It should be noted, however, that remittances are private flows normally to support families and cannot be easily controlled by governments. If the government can help potential recipients of remittances use the money for investment purposes, for instance, through the easier access of the poorest to livestock (Bandiera, et al., 2016), this may promote growth and reduce poverty at the same time.

Even if policymakers recognise the importance of public policies to maximise the poverty-reducing potential of remittances, these policies may not be well implemented without the country's institutional settings. Ajide, Raheem, and Adeniyi (2015) examined how institutional settings will affect the relationship between output growth and volatility by applying the dynamic panel data model (System GMM) to 71 recipient countries. Their findings include: (i) the growth volatility reduction potential of remittances was found to be more pronounced in the presence of well-functioning institutions and (ii) the interaction of remittances with six institutional quality measures showed that growth volatility reduced considerably with better institutions. However, it should be noted that remittances themselves may have an adverse effect on the macro institutional quality, the point of which is not addressed by Ajide et al. (2015). By addressing issues of endogeneity and robustness, Abdih, Chami, Dagher, and Montiel (2012) found a negative and statistically significant effect of remittance inflows on institutional quality (e.g. control of corruption, government Effectiveness, and rule of law). That is, if the country tries to increase the total inflows of

[11] However, Chami et al. (2008) did not take into account a possible increase in informal remittances due to the taxation, which may involve additional costs and risks for senders and receivers.

remittances by improving the institutional qualities, the increased remittances may have a risk of undermining the institutional qualities. As the relationship among remittances, finance, monetary and fiscal policies, and institutions is likely to be complex, the recipient country would need to pay a further careful attention to not only policies but also their setups (e.g. control of corruption) in the face of a surge of remittance inflows. Our overview of the data in Section I suggests that this point is likely to be more relevant to lower-middle income countries.

A surge of remittances, while benefiting the macro economy by stabilising the economic growth, may have an adverse effect in a different way. Using the two-sector dynamic general equilibrium model for the small economy and adapt it to El Salvador, Acosta, Lartey, and Mandelman (2009) showed an illuminating case for the Dutch disease where an increase in remittances leads to a decline in labour supply and to an increase in production costs of the non-tradable sector which is relatively labour intensive. In their model, this will, in turn, raise the prices of the non-tradable sector and appreciate the exchange rates, while the non-tradable sector expands and the tradable sector shrinks. In a similar vein, Amuedo-Dorantes, and Pozo (2004) argued that remittances may appreciate the real exchange rate in the receiving economies and may reduce the competitiveness of exported goods in the international economy. The authors found that doubling remittances results in real exchange rate appreciation of about 22% in the panel of 13 Latin American and Caribbean nations.

The Role of remittances to reduce Poverty and Inequality

Even if the country receives more inflows of remittances and this promotes and stabilises the economic growth of the country, there is no guarantee that this will lead to the reduction in poverty and inequality. It is important in analysing the effects of remittances on poverty to consider the *direct* effect of remittances on poverty (e.g. households under the poverty

threshold have access to remittances and get out of poverty) as well as its *indirect* effect on poverty through the economic growth (e.g. remittances facilitate capital acquisitions and lowers the cost of capital and increases output and then poor people will benefit from the increased outputs indirectly[12]). Using the panel data for Asian countries, Imai, Gaiha, Ali, and Kaicker (2014) decomposed the poverty-reducing effect of remittances into direct and indirect effects and showed that the remittances contributed to poverty reduction monthly through their direct effects rather than through indirect effects, the result of which is robust to two measures of international poverty, the cut-off points of $1.25 per capita/day and $2 per capita/day. As reviewed by Imai et al (2014), Vargas Silva, Jha, and Sugiyarto (2009) examined the impact of remittances on poverty and economic growth in Asia using annual data. Their econometric results imply that while the impact of remittances on growth is positive, the impact on poverty is negative in Asia.

There have been some studies to examine the relationship between remittances and poverty or inequality using the household survey data. Adams (1991) found that international remittances reduced the number of poor households by 9.8 per cent in rural Egypt, but had a negative impact on the income distribution, because the rich households in the top 20 percentile group disproportionately benefited from remittance inflows. Taylor, Mora, Adams, and Lopez-Feldman (2005) found that in Mexico international remittances increase rural income inequalities while they reduce rural poverty because of the relatively larger benefits from remittance inflows for the relatively poor. Using the village-level microdata from Burkina Faso and the method of Gini decomposition, WouTerSe (2010) found that a marginal increase in remittances from intra-African migration reduces inequality, whereas a marginal increase in remittances from the more costly and risky intercontinental migration has the

[12] Indirect effects include a positive effect of remittances reception on financial inclusion of households. For instance, access to remittance services may serve as an alternative to formal credit to the poor, by helping them cover basic expenditures, cope with risks or channel a complementary source of income that can be transformed into savings (IFAD and the World Bank, 2015).

opposite effect because the costs incurred to finance these two types of migration are different and thus only better-off households were able to invest in international migration. Brown, Connell, and Jimenez-Soto (2014) used household data from Fiji and Tonga and demonstrated that where formal social protection systems are largely absent, migration and remittances can perform a similar function informally, contributing significantly to poverty alleviation and wealth creation, while the impacts on Gini coefficients were unclear.

The relevance of remittances in rural household income structure

Covarrubias, Davis, Bakouan, and Di Giuseppe (2012) – in a background paper for the World Development Report 2013 - present the results of a descriptive analysis of income generating activities of 19 countries based on the Rural Income Generating Activities (RIGA) database. The RIGA database has produced the analysis using the rural sample of Living Standards Surveys.

Table 1 Share of Income Generating Activities in Total Income (Means of Shares)- based on RIGA data

Country/ Year	Per Capita GDP 2005 USD	(1) Agriculture-Crops	(2) Agriculture - Livestock	(3) Agricultural wage employment	(4) Non-farm wage employment	(5) Non-farm self-employment	(6) Transfers from the government	(7) Other	(1) + (2) + (3) Agricultural total	(4) + (5) + (6) + (7) Non-Agricultural Total	(1) + (2) On-Farm Total	(4) + (5) Non-farm total	(6) + (7) Transfers & Other	(3) + (4) + (5) + (6) + (7) Off-farm Total
Nepal 2003	919	18.6%	16.0%	11.5%	23.7%	11.2%	**16.4%**	2.7%	46.0%	**54.0%**	34.6%	**34.9%**	19.1%	65.4%
Bangladesh 2005	1 165	14.7%	7.2%	12.5%	28.8%	17.2%	**7.4%**	12.1%	34.5%	**65.5%**	22.0%	**46.0%**	19.5%	78.0%
Tajikistan 2007	1 674	46.5%	5.0%	5.3%	26.0%	7.7%	**8.7%**	0.7%	56.9%	**43.1%**	51.6%	**33.7%**	9.4%	48.4%
Vietnam 2002	1 784	32.2%	4.5%	5.5%	23.7%	20.9%	**10.7%**	2.4%	42.2%	**57.8%**	36.7%	**44.6%**	13.1%	63.3%
Pakistan 2001	1 843	11.8%	10.5%	6.8%	38.4%	14.2%	**13.7%**	4.7%	29.1%	**70.9%**	22.3%	**52.6%**	18.4%	77.7%
Indonesia 2000	2 623	13.9%	1.4%	6.7%	31.6%	20.3%	**22.7%**	3.5%	22.0%	**78.0%**	15.3%	**51.9%**	26.1%	84.7%

Source: Based on Covarrubias, Davis, Bakouan, and Di Giuseppe (2012, Table 3 on p.5) based on RIGA data.

Table 2 Participation in Income Generating Activities (share of households undertaking each activity) –based on RIGA data

Country/ Year	Per Capita GDP 2005 USD	(1) Agriculture-Crops	(2) Agriculture - Livestock	(3) Agricultural wage employment	(4) Non-farm wage employment	(5) Non-farm self-employment	(6) Transfers from the government	(7) Other	(1) + (2) + (3) Agricultural total	(4) + (5) + (6) + (7) Non-Agricultural Total	(1) + (2) On-Farm Total	(4) + (5) Non-farm total	(6) + (7) Transfers & Other	(3) + (4) + (5) + (6) + (7) Off-farm Total
Nepal 2003	919	88.2%	79.9%	34.8%	38.7%	23.7%	**37.3%**	28.4%	93.0%	**83.7%**	91.3%	**54.3%**	54.4%	91.7%
Bangladesh 2005	1 165	74.8%	63.9%	22.8%	43.3%	27.4%	**37.3%**	57.5%	75.2%	**91.9%**	71.2%	**64.0%**	72.9%	96.5%
Tajikistan 2007	1 674	89.8%	58.1%	21.3%	49.9%	16.4%	**45.6%**	2.7%	90.8%	**81.6%**	90.7%	**61.4%**	47.4%	88.6%
Vietnam 2002	1 784	78.7%	67.5%	11.2%	38.7%	40.1%	**83.4%**	25.3%	78.8%	**95.7%**	83.1%	**64.4%**	86.5%	96.4%
Pakistan 2001	1 843	40.1%	49.8%	15.1%	56.0%	21.5%	**31.5%**	14.7%	56.4%	**83.6%**	52.4%	**67.2%**	40.4%	88.5%
Indonesia 2000	2 623	33.8%	6.8%	13.4%	44.8%	36.6%	**85.5%**	15.9%	42.1%	**94.2%**	34.4%	**66.5%**	87.2%	95.0%

Source: Based on Covarrubias, Davis, Bakouan, and Di Giuseppe (2012, Table 2 on p.4) based on RIGA data.

Covarrubias et al. (2012) broke down the household income into several categories to analyse the income structure of rural households in selected developing countries for which RIGA data are available. We highlight only Asian countries in Table 1 and Table 2. RIGA data will show that (i) the share of households which have positive values in transfers - the sum of remittances and other transfers, such as transfers from the government (the column (6) of Table 2) and the average share of 'transfers' (the column (6) of Table 1) appear to increase as per capita GDP of the country increases (if Nepal – with a high share of 'transfers' is dropped from the sample in case of the latter), and (ii) both non-agricultural and non-farm ncome, as well as the share of households participating in the activities related to the non-agricultural/non-farm sector, tend to increase as per capita GDP increases. Using RIGA data for 19 developing countries including those outside Asia, Covarrubias et al. (2012) conclude:

> *Despite high levels of participation across GDP levels, the shares of income originating from on-farm and agricultural activities drop with increasing PCGDP. Conversely, nonfarm, off-farm and non-agricultural income are generally positively related to the level of development, driven largely by a greater share of income from nonfarm wage employment. Moreover, a greater share of income is derived from transfers among wealthier countries than poorer countries. This last trend could be due to greater resources in the government (translated into more public transfers) or greater extended-family wealth (resulting in greater remittances income).* (Covarrubias et al., 2012, p.3)

An important implication is that the change of the effects of household remittances is likely to be closely associated with the income structure of recipient households at micro levels. However, Covarrubias et al. (2012) only present the overall pattern of income sources and no causal inference should be made between remittances and the income structure of recipient households based on their statistical analyses. One possible extension is to carry out econometric estimations where, for instance, a measure of diversification of household income sources is estimated by the remittances which are instrumented by appropriate instruments in order to infer any causality from the RIGA data. This is a useful exercise as most of the empirical literature on remittances relies on cross-country panel data and the studies based on micro-level household survey data are relatively scarce.

Tables 1 and 2 imply that as the country progresses, the income structure of the household is more diversified, but this change is likely to be associated with a more fundamental transformation of the rural economy, such as, modernisation of rural infrastructure, expansion of rural non-farm sector, dynamic interactions between rural and urban sectors as well as rural and foreign sectors, for instance, through the expansion of supermarkets or direct contacting of multi-national corporations with rural farmers, creating high value chains (Imai, Gaiha, and Bresciani, 2016; Reardon and Timmer, 2014).[13] Ramos, Estudillo, Sawada, and Otsuka (2012) have analysed in detail patterns and causes underlying the transformation of the rural economy in the Philippines in 1988-2006. As can be seen in Table 3, as the household income increased, the income structure gradually changed with higher shares in non-farm sector income and remittances both at national levels (the upper panel of Table 3) and in progressive towns (the lower panel of Table 3). That is, the overall pattern of the changes of income structure we observed from the cross-country analyses for a limited number of Asian countries in Table 1 can be confirmed in the time-series analysis for the Philippines.

Table 3 Sources of real per capita income of rural households, the Philippines and its progressive towns, 1988–2006

Income Sources	1988	1997	2000	2006
Philippines (US$ PPP)	578	857	826	943
Farm (%)	45	39	35	32
Nonfarm (%)	41	46	48	46
Formal salary work (%)	28	33	35	32
Informal work (%)	13	13	13	14
Manufacturing (%)	2	2	2	1
Trade, transportation and communication (%)	10	10	10	11
Others (%)	1	1	1	1
Remittances (%)	14	15	17	22
Domestic (%)	8	9	9	12
International (%)	***6***	***6***	***8***	***10***
Total (%)	100	100	100	100
Central Luzon, CALABARZON,1 Western Visayas and Central Visayas (US$ PPP)	286	974	941	1026

[13] Reardon and Timmer (2014) argue that agricultural transformation is characterised by (i) urbanization, (ii) growth of the rural non-farm economy, (iii) dietary diversification, (iv) a revolution in supply chains and retailing; and (v) transformation of the agricultural sector. See Imai, Gaiha, and Bresciani (2016) for further discussions about rural transformation.

Farm (%)	38	32	26	26
Nonfarm (%)	45	50	54	50
Formal salary work (%)	32	39	40	35
Informal work (%)	13	11	14	14
Manufacturing (%)	2	1	2	1
Trade, transportation and commuication (%)	9	9	10	12
Others (%)	2	1	1	1
Remittances (%)	17	18	20	24
Domestic (%)	9	10	10	12
International (%)	**8**	**8**	**9**	**12**
Total (%)	100	100	100	100

Note: 1CALABARZON refers to the provinces of Cavite, Laguna, Batangas and Quezon.
Source: Ramos et al. (2012, Table 2 on p.1633). Emphasis has been added by the authors.

Using the province data of the Philippines and applying Instrumental Variable (IV, where infrastructure variables are treated as endogenous), Ramos, Estudillo, Sawada, and Otsuka (2012) found that the infrastructure, such as electricity and roads, and secondary and tertiary education are important factors for the economic transformation of the rural economy, such as an increase in non-farm income.[14] In the Online appendix, Ramos, Estudillo, Sawada, and Otsuka estimated the determinants of international and domestic remittances using IV where access to electricity or proportion of paved local road is instrumented by the number of islands at the province level and a few other variables, such as population density.

Table 4. Determinants of remittances at the provincial level in the Philippines, 1988–2006 (Second-stage of the IV regression)

	International Remittances		**Domestic Remittances**	
	1988-97	2000-6	1988-97	2000-6
Access to electricity (an endogenous variable, Instrumented)	1.02 [0.39]	**6.02***** **[3.03]**	-0.13 [-0.12]	**2.49*** **[1.83]**
Proportion of paved local road	-2.24	-2.3	0.47	1.5

[14] The results of Ramos, Estudillo, Sawada, and Otsuka (2012) should be interpreted cautiously because (i) exclusion restrictions are not statistically validated in their main cases where farm or nonfarm income (and its sub-component) is estimated by IV, that is, there is a possibility that their instruments, such as, the number of islands or population density, are correlated with the error terms in the equation for subcomponent of income (p.7 and p.9 of the Online Appendix) and (ii) F test statistics of excluded instruments are low (less than 10) in 6 out of 8 cases, suggesting the weak instrument problem. On the former, there is a possibility that geographic isolations (by having many islands) or the less concentration of the people would serve as disincentive effects for the farmers to undertake non-farm activities (p.7 and p9). In the case of remittances, tests for over-identification support the validity of instruments in 7 out of 8 cases. However, the geographical conditions may be important determinants of the indirect costs of remittances (e.g. how easily the recipients can do bank transactions).

(an endogenous variable, instrumented)	[-0.42]	[-1.33]	[0.22]	[1.44]
Proportion of paved national road	0.55	-0.15	-0.14	0.13
	[0.78]	[-0.31]	[-0.46]	[0.45]
National road density	0.71	-1.08	0.5	1.64
	[0.15]	[-0.61]	[0.26]	[1.57]
Local road density	1.02	0.09	0.47	0.06
	[1.25]	[0.33]	[1.43]	[0.42]
Proportion of the labour force:				
Female	0.24	2.3	**2.05*** **	0.99
	[0.19]	[1.21]	**[3.24]**	[1.15]
Between 15 and 25 years old	2.83	1.8	0.44	**2.04***
	[1.21]	[0.77]	[0.37]	**[2.04]**
Between 26 and 35 years old	-3.01	0.57	-1.25	-2.04
	[-1.03]	[0.21]	[-0.92]	[-0.16]
Between 36 and 45 years old	-3.57	0.05	-0.62	-1.62
	[-1.45]	[0.02]	[-0.44]	[-1.23]
Between 46 and 59 years old	-1.24	3.23	0.51	70.89
	[0.35]	[0.91]	[0.28]	[70.56]
With primary schooling	71.89	-3.52	**2.21****	**3.78****
	[1.05]	[-1.15]	**[2.42]**	**[2.48]**
With secondary schooling	2.68	-1.32	**3.85*****	**2.78***
	[1.04]	[-0.40]	**[3.36]**	**[1.66]**
With tertiary schooling	0.27	5.83	**3.77****	2.71
	[0.06]	[-1.18]	**[2.03]**	[0.89]
Proportion of irrigated area	0.2	-0.22	0.12	-0.26
	[0.62]	[-0.62]	[0.85]	[-1.43]
Land acquisition and distribution (LAD)	0.11	-0.52	0.05	-0.07
	[0.18]	[-0.87]	[0.15]	[-0.22]
Farmland to labour ratio	-0.02	**-0.03***	0.003	-0.14
	[-0.09]	**[-1.66]**	[0.03]	[-1.40]
Distance	0.005	-0	-0	0
	[1.48]	[1.48]	[-0.54]	[-0.12]
Road*distance	-0	0.002	0.002	0
	[-0.57]	[0.44]	[0.58]	[-0.21]
Luzon*distance	**-0.004****	-0	0	0
	[-1.99]	[-0.25]	[-0.31]	[0.00]
Visayas*distance	0	0.003	0.002	0.003*
	[0.01]	[0.98]	[1.32]	[1.85]
Constant	2.87	1.73	0.23	1.04
	[1.01]	[0.48]	[0.16]	[0.65]
Number of observations	244	186	248	186
R-squared	0.56	0.57	0.59	0.62

***significant at 1 per cent significance level, **significant at 5 per cent, *significant at 5 per cent.
Source: Ramos et al. (2012, Table A4, Online Appendix). Emphasis has been added by the authors.

Table 4 suggests that infrastructure, such as access to electricity, which is treated as endogenous, is an important determinant of international and domestic remittances in 2000-2006. Because the infrastructure is an important determinant of non-farm income, it is inferred that, as the rural economy undergoes transformation, the overall access to

remittances will improve. Interestingly, the household with more female members tends to receive a larger amount of remittance in 1998-1997, the result consistent with Niimi and Reilly (2011). Contrary to our intuitions, the coefficient estimates for variables on education of recipients are positive and significant for domestic remittances, and not for international remittances. Because the unit of the regressions is a province, the neglect of the intra-province variations may explain this counter-intuitive result. Using the different data (the Survey of Households and Children of Overseas Workers in 1999-2000), Semyonov and Gorodzeisky (2005) showed that education (schooling years) of recipients is positively and significantly associated with remittances sent from overseas workers to the households in the Philippines, the results of which are deemed more reasonable.

'Distance' (proximity to urban centres affects the sources of household income) interacted by a dummy variable for the island of Luzon is negative and significant for the international remittances in 1998-1997. This implies that in Luzon the geographical location of the household – aggregated at the province level – was an important determinant for the international remittances. Overall, the results for remittances are similar to those for non-farm income in Ramos, Estudillo, Sawada, and Otsuka (2012).

Contrary to the results in Table 4, McKay and Deshingkar (2014) used the secondary data from household surveys for six countries in Africa and Asia (Nigeria, Rwanda, South Africa, Uganda, Bangladesh and Vietnam) and found that (i) domestic remittances are more likely to be received by poorer households, while international remittances tend to be received by richer households and that (ii) if a poor household does receive international remittances, these will have a substantial poverty reduction impact for that household, but few poor households benefit from such remittances. The latter result implies that the poverty-reducing effect of international remittances can be statistically significant using the micro-level data, but it may not be significant at the aggregate level.

Migration and Remittances: Incentives, Costs and Dynamics

In discussing the role of remittances and migration in economic outcomes of the recipient households, it is important to consider the underlying determinants of migration. This is not necessarily easy as each household has a different incentive and costs for migration and remittances and they are normally unobservable to researchers. Empirically, the panel data will allow a researcher to model unobservable characteristics specific to each household, but incentives and costs for migration cannot be convincingly disaggregated in the normal data settings.

A short review article entitled 'The new economics of labor migration' published in *American Economic Review* almost three decades ago (Stark and Bloom, 1985) is still insightful into the theoretical and empirical research on migration. Stark and Bloom pointed out that a person who is more relatively deprived can be expected to have a stronger incentive to migrate than a person who is less relatively deprived and emphasized the importance of empirically modelling the income incentive and the direct and indirect costs – including physical and psychological costs due to the migration - when modelling migration. In terms of empirical modelling, however, no suggestions were made by Stark and Bloom, (1985) on how researchers will discern between migrant's incentives and transaction costs, while they argue that it is important to include the wages of the locations before and after migration to capture the incentives for migration. In this context, Stark and Taylor (1991) found using the data from Mexico that, if the absolute income is controlled for, relatively deprived households are more likely to be engaged in international migration than are households more favourably situated in their village's income distribution. As far as we are aware, no studies have convincingly distinguished incentives and transaction costs for migration because such data are not easily available.

Even though people in rural areas migrate to foreign countries or urban areas, they do not necessarily send money to the household members left out in the rural areas. Lucas and Stark (1985) theoretically modelled the motivations behind the remittances and empirically applied the model to the data from Botswana. Lucas and Stark argued (1985) that altruism alone does not appear to be a sufficient explanation of the motivations to remit.[15] Other motivations include (i) risk-spreading that allows household members left out in the rural areas to take greater risk – which was evidenced partly by the positive statistical association between the degree of drought and the amount of remittance in Botswana; and (ii) investment in education of youngsters who will migrate to town to reap returns and remit to repay the family's outlay.

Taylor, Rozelle, and De Brauw (2003) investigated a complex relationship between migration, remittances and crop and self-employed income using the household data in China. They found that (i) the loss of labour in rural areas to migration has a negative effect on household cropping income in source areas, although it does not negatively affect crop yields, and that (ii) the remittances sent home by migrants partially compensate for this loss due to migration directly and stimulate crop production indirectly. That is, remittances will ease constraints on production in the imperfect credit market. Taylor et al. (2003) concluded that participating in migration at the household level increases household per capita income, for those left behind, by between 16% and 43%, which is substantial.

In a similar context, Taylor and Wyatt (1996) used the data of Mexico and empirically showed that remittances stimulate farm income by relaxing the credit and risk constraints on household-farm production. Here they argue that the distribution of remittances across different income groups and the initial distribution of constraints on production will shape the income distribution over time. Because the shadow value of remittances is higher at the relatively poorer households, the remittances have an income-equalising effect in the long run

[15] Admittedly, this is not a recent work, but their theoretical modelling can provide rich empirical implications in understanding the motivations behind remittances behaviour.

once the indirect effect (e.g. of loosening constraints on investing in income-producing assets) is taken into account.

In terms of policy implications of these analyses, policymakers should lower both direct and indirect costs of remittances and migration. Proven measures include the introduction of the banking via mobile phones or online banking systems[16], or the reduction of transaction costs (e.g. by reducing fees or relevant taxes related to international and domestic remittances; reducing risk-related and transportation costs; introducing more ATMs and other cash-out access points through mobile agents in village centres or innovative mechanisms to reach the last mile). Second, policymakers aiming to promote rural transformation (e.g. supporting the rural non-farm sector or the rural infrastructure) should be aware that development of the non-farm sector and increase in remittances and/or migration occur at the same time. Starting the new business or shops in rural areas would not only require the initial investment, but also create the needs for more frequent financial flows. Measures for facilitating financial transactions, including remittances (e.g. by lowering remittance fees) would be useful to enhance both non-farm business and remittances behaviour at the same time. Third, there might be some households who do not have access to remittances or migration at all, particularly if they are outside the village networks. Policies supporting these poor households are equally important as those facilitating remittances and/or migration. These policies should focus on rural infrastructure and new communication networks.

III. The Review of Cross-country Data and Econometric Analyses

In the last section we have reviewed cross-country studies as well as country-level studies to investigate the role of remittances in promoting and stabilising economic growth as well as in

[16] See IFAD and World Bank (2013, 2015) for a much broader recommendation related to payment systems and market competition as well as financial inclusion opportunities. These issues are important, but beyond the scope of this paper.

reducing poverty and inequality. This section first reviews the country-level data of remittances and migration data. It then carries out econometric analyses to provide an insight into the effect of remittances on economic growth, poverty or inequality after taking account of the endogeneity of remittances.

The Review of Trends of Remittances and Migrations at Country Levels

Figures 7A-7B show the trends of remittances as a share of GDP for South Asia and East Asia and the Pacific. The selection of the countries and years is based on the availability of the relevant data in World Development Indicators 2015. Figure 7A indicates that the share of remittances in GDP gradually increases over the years in most of the South Asian countries except Pakistan which has experienced a decline of the share in 1980-2000 and Nepal with a sharp increase of the share in 2000-2014.

Figure 7A. Remittances, received (% of GDP), South Asia

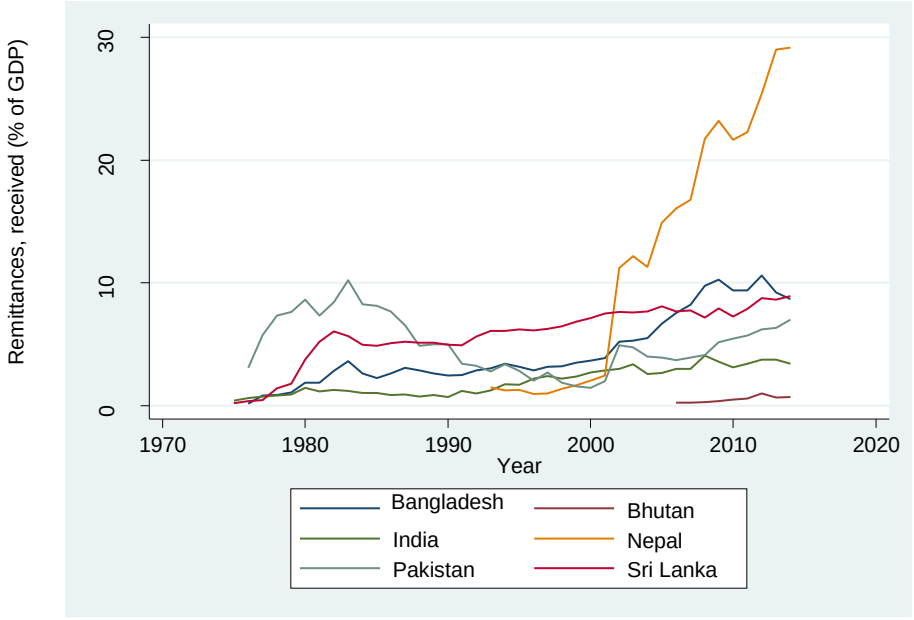
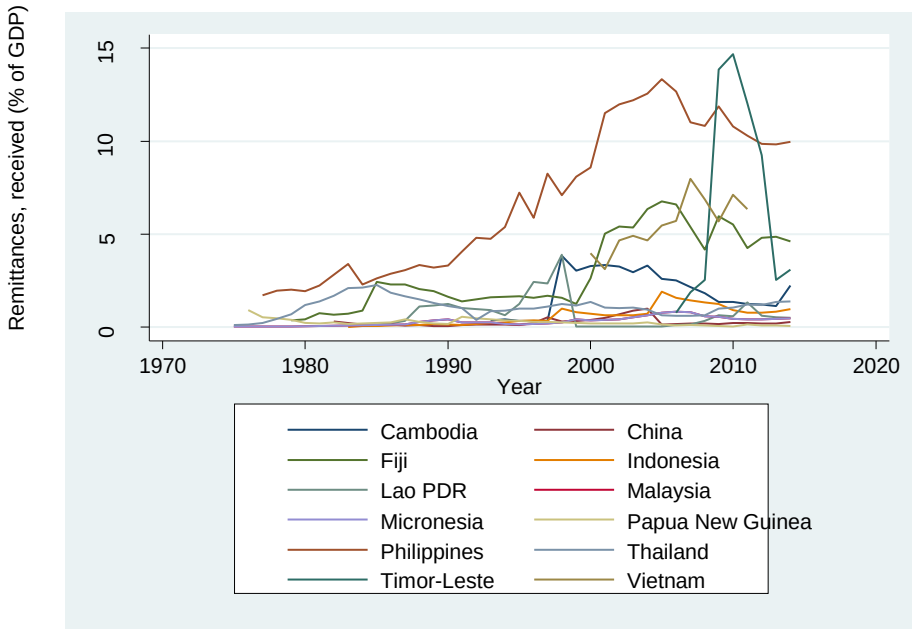


Figure 7B shows that in East and South-East Asia there are no common trends - either increasing or decreasing – across the countries. We found in Table 3 that the share of remittances in GDP has increased in 1988-2006, which is consistent with the trend of the

remittances in the Philippines,[17] but it decreased in 2006-2014. Though we need to avoid making a definite conclusion, but it is interesting to find that in 2007-2008, the period where many Asian countries were influenced by the global financial crisis, the share of remittances in GDP *decreased* in the Philippines, while it *increased* in the Vietnam. The former could be due to the decline of employment or the wage of Overseas Contract Workers (OCWs) in case of the Philippines[18], while the latter (the Vietnamese case) may be due to that fact that remittances played a risk-insurance role, to insure against the loss of income of family members left out in rural areas. It can also be found that in 1997-1998, the period of Asian financial crisis, the Philippines, Cambodia and Lao PDR experienced an increase in the share of remittances in GDP which suggests that remittances might have played a risk-insurance role. These observations, however, should not be generalised as there are some countries (e.g. Thailand) where the trend of the remittances was more or less stable in these crisis periods.

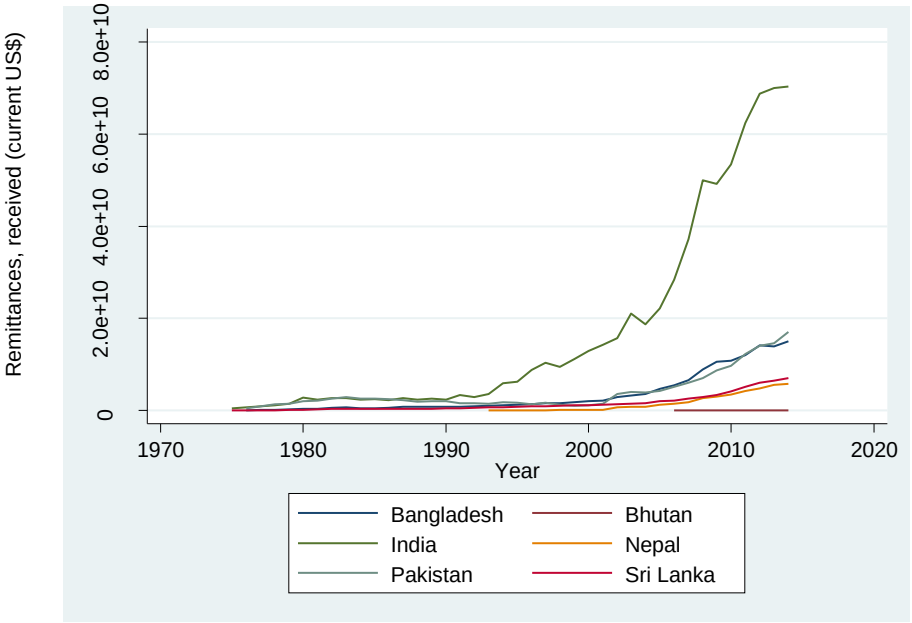
Figure 7B. Remittances, received (% of GDP), East Asia and the Pacific



[17] The difference of the absolute value of percentages (e.g. 22% in 2006 in Table 4 versus 13% in 2006 in Figure 1B) is likely to be due to the difference of definitions of remittances.
[18] It is noted that migration from the Philippines to EU and US were likely to be negatively influenced by financial crisis.

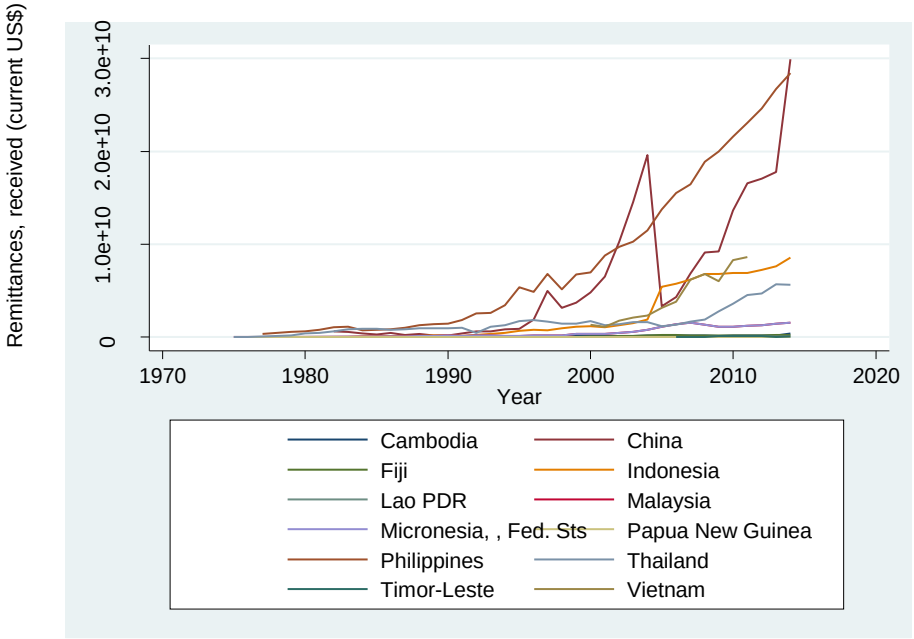
Figures 8A and 8B present the trends of the absolute amount of remittances for each region. In Figure 8A, we find that, reflecting the stable economic growth over the years and the gradually increasing trend of the share of remittances in GDP, the absolute amount of remittances have increased over the years, except Bhutan. It is noted that remittances have increased very sharply in India.

Figure 8A. Remittances, received (current US$), South Asia



In Figure 8B we can observe that the Philippines and China are the two major countries with the largest and most increasing volume of international remittances. Indonesia, Vietnam, Thailand have also had a relatively large amount of remittances from abroad and it has been increasing in recent years. It is not easily to see the trends due to the scaling, but the other countries have also had a marginally increasing trend of the amount of remittances.

Figure 8B. Remittances, received (current US$), East Asia and the Pacific



Figures 9A and 9B present the trends of the absolute amount of outgoing remittances for each region. In Figure 9A, we find that the absolute amount of outgoing remittances has an increasing trend for India and for Sri Lanka. However, it is difficult to find a common trend among the countries in East and South-East Asia and the Pacific in Figure 9B. We can argue that Micronesia, Indonesia, Lao PDR and China have seen an increasing trend of outward remittances.

Figure 9A. Remittances, received (current US$), South Asia

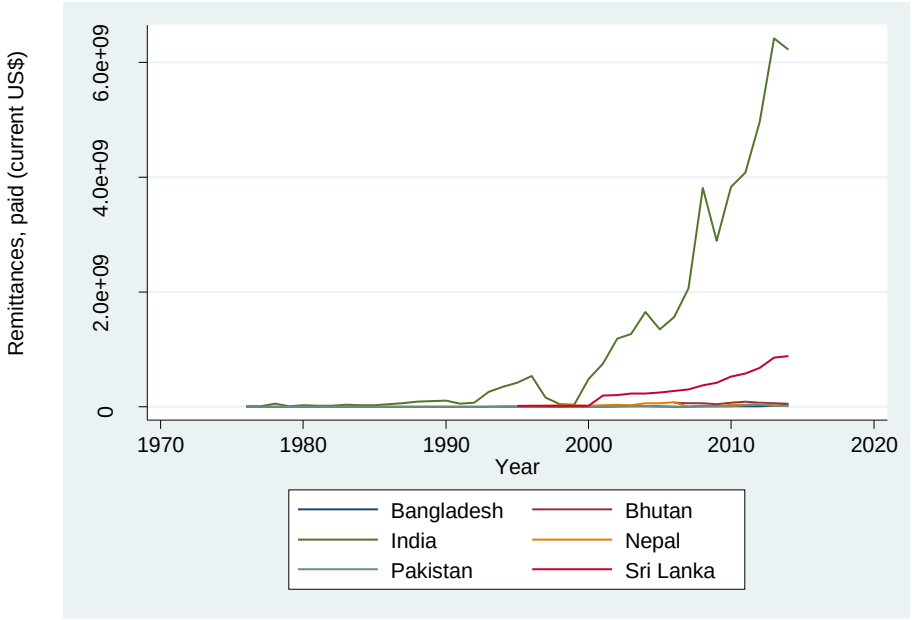
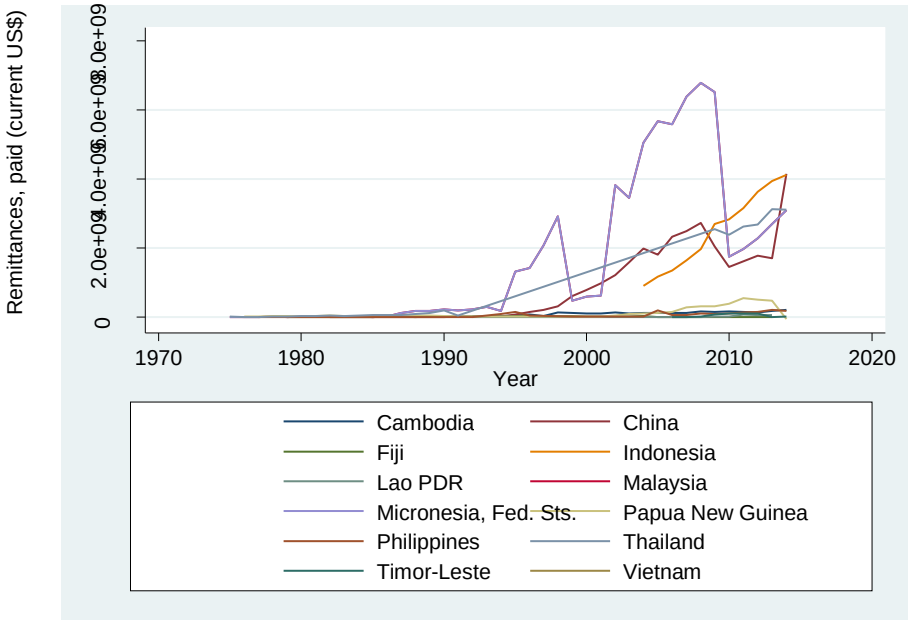


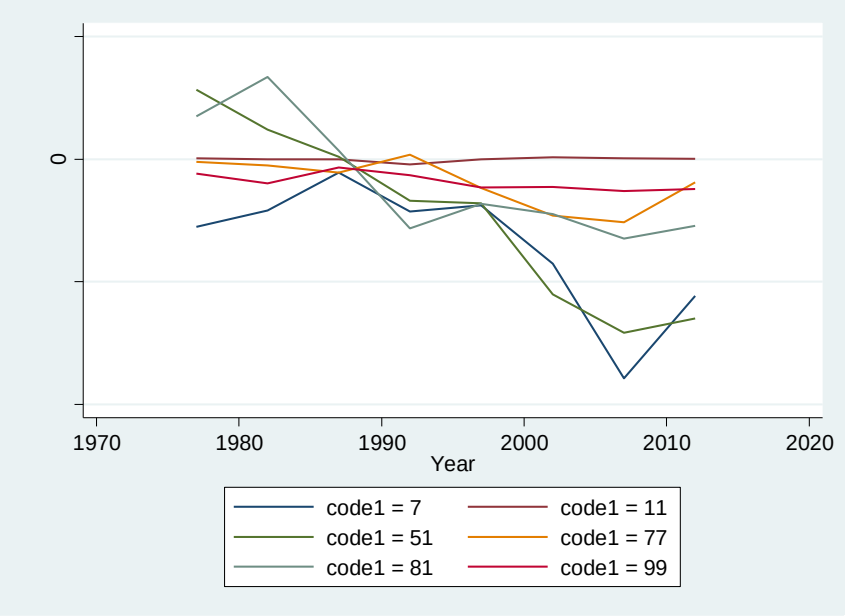
Figure 9B. Remittances, paid (current US$), East Asia and the Pacific



Consistent with an overall trend of inward remittances, net immigration (the total number of immigrants *minus* emigrants during the period) has had an overall decreasing trend across many Asian countries because the number of emigrants generally exceeded the number of immigrants in a number of countries. The trends are shown in Figures 10A and 10B for South Asia and East &d South-East Asia. The countries where the net immigration has declined

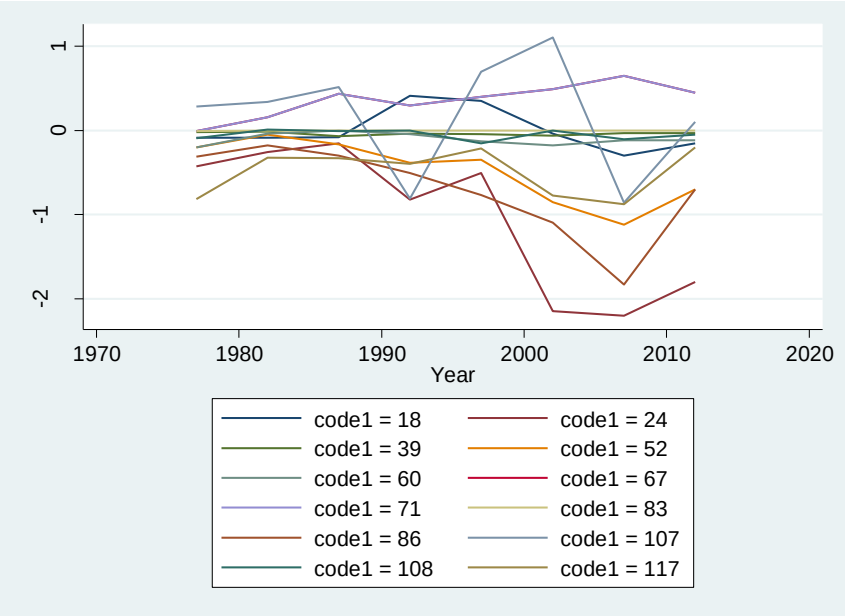
since the late 1970s include India, Bangladesh, Pakistan, China, Philippines, and Indonesia. In these countries, there have been more emigrants than immigrants over the years. Other countries have had a relatively stable trend. These trends are broadly consistent with the increasing trend of inward remittances over the years in these countries.

Figure 10A. Net immigration, South Asia



Notes: Code1: 7-Bangladesh; 11- Bhutan; 51-India; 77- Nepal; 81-Pakistan; 99- Sri Lanka
Net migration is the net total of migrants during the period.

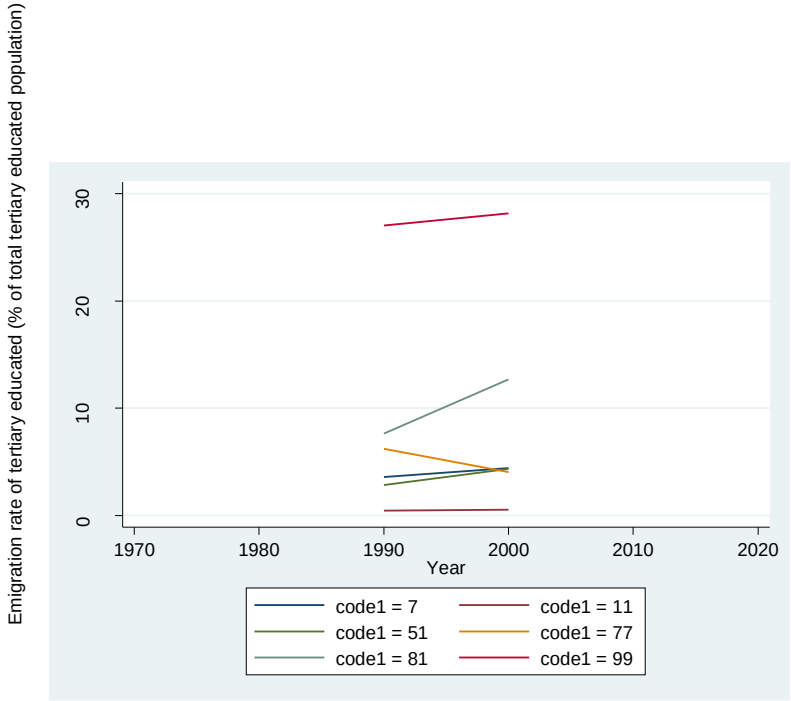
Figure 10B. Net immigration, South Asia, East Asia and the Pacific



Notes: Code1: 18 – Cambodia; 24- China; 39- Fiji; 52-Indonesia; 60- Lao PDR; 67- Malaysia; 71- Micronesia, Fed. Sts.; 83- Papua New Guinea; 86- Philippines; 107- Thailand; 108- Timor-Leste; 117- Vietnam

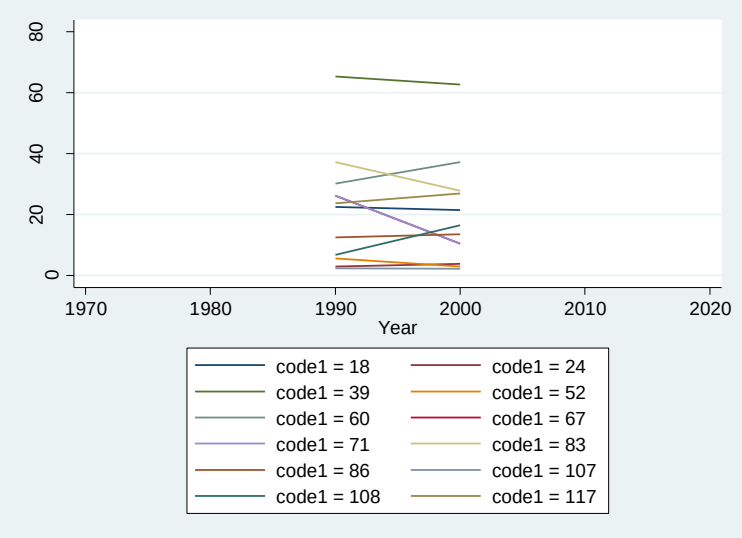
In Figures 11A and 11B, the trends of emigration rate of tertiary educated based on the two years, 1990 and 2000, are summarised. The data are limited and it is better to avoid making any conclusion based on them. Given the data limitations, the countries with a clearly increasing trend of emigration rate of tertiary educated include Pakistan, Lao PDR, Bangladesh, and India. Other countries did not experience a significant change in the emigration rate of tertiary educated.

Figure 11A. Emigration rate of tertiary educated (% of total tertiary educated population), South Asia



Notes: Code1: 7-Bangladesh; 11- Bhutan; 51-India; 77- Nepal; 81-Pakistan; 99- Sri Lanka

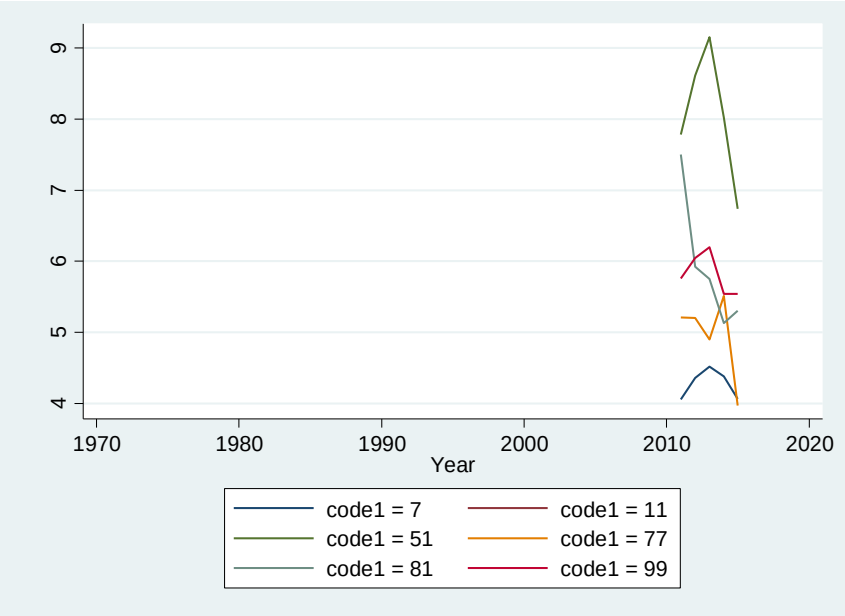
Figure 11B. Emigration rate of tertiary educated (% of total tertiary educated population), East Asia and the Pacific



Notes: Code1: 18 – Cambodia; 24- China; 39- Fiji; 52-Indonesia; 60- Lao PDR; 67- Malaysia; 71- Micronesia, Fed. Sts.; 83- Papua New Guinea; 86- Philippines; 107- Thailand; 108- Timor-Leste; 117- Vietnam

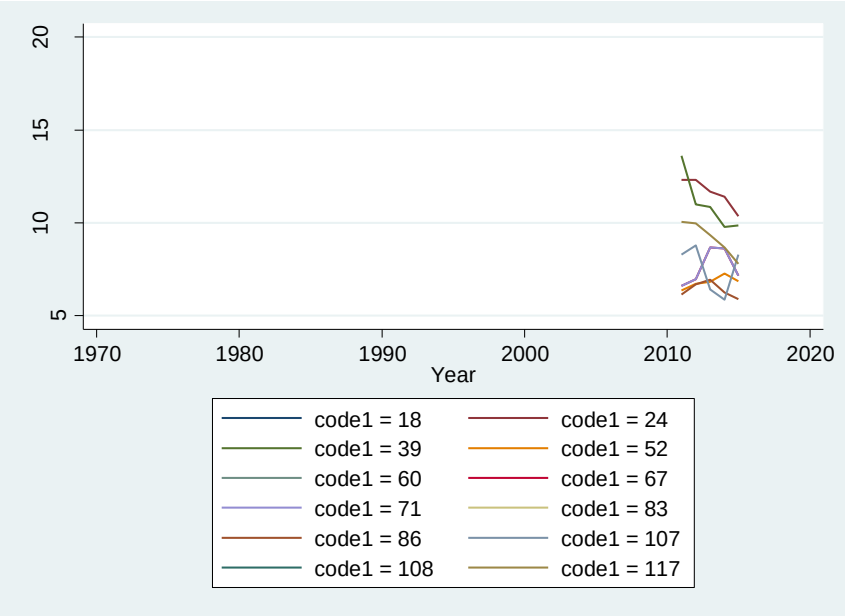
In Figures 12A and 12B, the trend of the average transaction cost of remittances based on a limited number of data points in 2010-2014. Here the long definition of the average transaction cost of remittances is 'the average of the total transaction cost in percentage for sending the local currency equivalent of US$200 charged by each single remittance service provider'. Given the data limitations, we can observe that the average transaction costs have declined over the years with some fluctuations across Asian countries. This might be partly associated with the increase of the amount of outward remittance flow in Figures 8A and 8B.

Figure 12A. Average transaction cost of remittances (%), South Asia



Notes: Code1: 7-Bangladesh; 11- Bhutan; 51-India; 77- Nepal; 81-Pakistan; 99- Sri Lanka

Figure 12B. Average transaction cost of remittances (%), East Asia and the Pacific



Notes: Code1: 18 – Cambodia; 24- China; 39- Fiji; 52-Indonesia; 60- Lao PDR; 67- Malaysia; 71- Micronesia, Fed. Sts.; 83- Papua New Guinea; 86- Philippines; 107- Thailand; 108- Timor-Leste; 117- Vietnam

The Econometric Modelling on the Effects of Remittances and Migration on Growth, Poverty and Inequality

In this subsection we will estimate the effects of remittances - as well as migration in one specification – on economic growth, poverty or inequality. We update the cross-country data using World Development Indicator 2015 and extend the specifications used by Imai, Gaiha, Ali, and Kaicker (2014). Our sample is dictated by data availability and consists of 21 Asia and Pacific economies over the period 1980 to 2014.[19] The definition and sources of the variables are given in Appendix 2. Unless stated otherwise, the data are drawn from World Development Indicators 2015. Based on the existing literature on remittances and growth, such as Chami, Fullenkamp, and Jahjah (2005) and Imai, Gaiha, Ali, and Kaicker (2014), our baseline specification takes the following form:

$$\Delta \boldsymbol{log}\ \boldsymbol{y}_{it} = \alpha + \boldsymbol{X'}_{it}\beta + \gamma \boldsymbol{LREM}_{it} + \eta_i + \varepsilon_{it} \qquad (1)$$

where for country *i* at time (denoting year) *t*, $\Delta \log y_{it}$ denotes the rate of growth of real per capita GDP, $LREM_{it}$ is the logarithm of remittances expressed as a percentage of GDP, η_i is unobserved country-specific effect and ε_{it} is the idiosyncratic error term. The vector $\boldsymbol{X'}_{it}$ contains the lag of real per capita GDP, financial sector development, inflation, investment, and the intensity of the conflict.

Given that $\boldsymbol{LREM}_{\boldsymbol{it}}$ may be endogenous, we have used two different models to address this issue. First, we have estimated the panel IV (or 2SLS) using the fixed-effects estimator (FE-2SLS), the random-effects estimator (RE-2SLS), and the first-difference estimator (FD-2SLS).[20] In the first stage of 2SLS, we use the two instruments, (i) logarithm of the absolute latitude of the country interacted by the time trend and (ii) ethnic fractionalization index multiplied by the time trend. It is assumed that the geographical locations (proxied by the absolute latitude) or the country's ethnic profiles would determine the direct or the indirect

[19] We have restricted the sample to the period after 2003 and have obtained broadly similar results.
[20] An improvement has been made over Imai, Gaiha, Ali, and Kaicker (2014) who used only FE-2SLS as we estimate RE-2SLS, FD-2SLS and System GMM to address the endogeneity of remittances.

costs of remittances. If the country's latitude is higher, the distance to developed countries will be closer and the transaction costs for international migration or remittances will be smaller and the amount of the remittances is larger. That is, the expected sign of the coefficient estimate is positive. It is also noted that in developing countries the network plays an important role for remittances and the country with a smaller value of ethnic fractionalization will have a higher value of remittances. That is, the expected coefficient estimate is negative. These are expressed as a vector, Z_{it} in the equation (2).[21]

(1st Stage) $\boldsymbol{LREM}_{it} = a + \boldsymbol{X'}_{it}b + Z_{it}c + \mu_i + e_{it}$ (2)

(2nd Stage) $\Delta \boldsymbol{log\ y}_{it} = \alpha + \boldsymbol{X'}_{it}\beta + \gamma LREM_{it} + \eta_i + \varepsilon_{it}$ (1)'

It should be noted here that these are not necessarily ideal instruments because we cannot deny the possibilities that – even after controlling for the country-fixed effects, the degree of locations and ethnic fractionalization may influence the productivity and then GDP per capita growth. However, the data restrictions do not allow us to construct a better instrument. At least, the statistical tests (e.g. over-identification test) validate the instruments at least statistically. Furthermore, FD-2SLS, that is, taking the first difference, would further mitigate the problem of endogeneity. These are estimated by the equations (1)' and (2)'.

(First Stage) $\Delta \boldsymbol{LREM_{it}} = a' + \Delta \boldsymbol{X'}_{it}b' + \Delta \boldsymbol{Z_{it}}c' + \Delta\mu_i + \Delta e_{it}$ (2)'

(Second Stage)

$\Delta\Delta \boldsymbol{log\ y}_{it} = \alpha' + \Delta \boldsymbol{X'}_{it}\beta' + \gamma' \Delta LREM_{it} + \Delta\eta_i + \Delta\varepsilon_{it}$ (1)''

Given the limitations, we estimate the dynamic panel using System GMM (Blundell and Bond, 1998; Blundell, Bond, and Windmeijer, 2000) with Windmeijer's (2005) finite sample correction for the variance given that our observations are small.

[21] Imai et al. (2014) used the income gap between each remittance receiving country and the US as an instrument, but this has been criticised in the literature as the income gap can be directly related to the dependent variable in the second stage, such as the economic growth. That is, use of the income gap is not much different from the income level of the country concerned.

$$\Delta \boldsymbol{log}\ \boldsymbol{y}_{it} = \sum_{j=1}^{P} \alpha_j\, \Delta \boldsymbol{log}\ \boldsymbol{y}_{it-j} + \boldsymbol{X'}_{it}\beta + \gamma LREM_{it} + \eta_i + \varepsilon_{it} \quad (3)$$

Here while we include lagged dependent variables ($\Delta \boldsymbol{log}\ \boldsymbol{y}_{it-j}$), we treat $LREM_{it}$ as endogenous by using its own lagged variables as instruments.

Next, we repeat the same estimations for the migration. However, as the number of observations is limited for the migration data, we will not estimate FD-2SLS or System GMM.

Furthermore, we estimate the effect of remittances on poverty or inequality by taking into account the endogeneity of remittances. This is based on the two-stage estimation described as follows.

[First Stage]

$$\boldsymbol{LREM}_{it} = \sum_{j=1}^{P} a'_j\, \boldsymbol{LREM}_{it-j} + \boldsymbol{X'}_{it}b' + \boldsymbol{Z}_{it}c' + \eta'_i + \varepsilon'_{it} \quad (4)\ ^{22}$$

Here $\boldsymbol{Z}_{it}$ stands for (i) logarithm of absolute latitude of the country interacted by the time trend and (ii) ethnic fractionalization index multiplied by the time trend.

[Second Stage]

$$\boldsymbol{POV}_{it} = \alpha' + \boldsymbol{X'}_{it}\beta' + \gamma' \widehat{\boldsymbol{LREM}}_{it} + \delta' \widehat{\varepsilon'_{it}} + \mu'_i + e'_{it} \quad (5)$$

Here in both equations (4) and (5), exogenous variables include trade openness, the labour force with secondary education, and the lagged value of GDP per capita. The definition of poverty includes poverty headcount ratio or poverty gap at the national level based on the international poverty thresholds, US$1.25 or US$2.00 and poverty headcount ratio, poverty gap or poverty gap squared for rural areas based on the international poverty thresholds, US$1.25 or US$2.00. Here $\widehat{\boldsymbol{LREM}}_{it}$ is the predicted value of the logarithm of remittances

[22] The same notations for coefficients or error terms are repeated for notational convenience, but each case is estimated separately without any constraint for coefficients being equal, stated otherwise. The same caveat is applied to other equations.

based on the equation (4). $\widehat{\varepsilon'_{it}}$ is the predicted value of the error term in the equation (4). In estimating the equation (5), the standard errors are adjusted by bootstrapping. We will then replace poverty by the Gini coefficient at the national level, or in the rural or urban areas.

The Econometric Results

The results for the equations (1)-(5) are presented in Tables 5-9. To save the space, we will mainly report the coefficient estimates associated with remittances or migration.

Table 5 presents the results where the GDP per capita growth rate is estimated by remittances and other covariates. The first two columns show the results of fixed and random effects models. Here the fixed-effect model is favoured by the result of the Hausman specification test. In the column (1) the logarithm of remittances is positive and significant with a coefficient estimate 0.007. This implies that the 10% increase in remittances on average is associated with 0.07% increase in GDP per capita growth rate, other things being equal. Other coefficient estimates are broadly intuitive.

Table 5 Effect of Remittances on Economic Growth (Dep. Var. GDP per capita growth)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Case 1 FE	Case 2 RE	Case 3 FE-2SLS	Case 4 RE-2SLS	Case 5 FD-2SLS	Case 6 Dynamic SGMM
GDP per capita (-1)	-	-	-	-	-	-0.0534
						(0.0355)
Log GDP per capita(-1)	**-0.0731*** **	**-0.0108*** **	**-0.0424***	0.0119	**-0.826*** **	-0.0115
	(0.0220)	**(0.00376)**	**(0.0229)**	(0.00758)	**(0.0664)**	(0.0106)
Log inflation	**-0.00402*** **	**-0.00380*** **	**0.00739***	0.00194	-0.00011	-0.00121
	(0.00142)	**(0.00119)**	**(0.00399)**	(0.00296)	(0.00281)	(0.00171)
log Financial Development	-0.00362	-0.00393	**-0.0666*** **	**-0.0332*** **	**-0.148*** **	**-0.0212** **
	(0.00762)	(0.00581)	**(0.0165)**	**(0.00904)**	**(0.0535)**	**(0.00948)**
Log Remittance	**0.00687***	**0.00455***	**0.0874*** **	**0.0392*** **	**0.130***	**0.0150*** **
	(0.00340)	**(0.00253)**	**(0.0241)**	**(0.00830)**	**(0.0700)**	**(0.00463)**
Conflict Intensity	-0.00037	-0.00467	-0.0086	-0.0157	0.001	-0.0129***
	(0.00358)	(0.00325)	(0.00991)	(0.00958)	(0.00911)	(0.00380)
log Investment	**0.0664*** **	**0.0587*** **	**0.103*** **	**0.0910*** **	**0.145*** **	**0.0760*** **
	(0.0136)	**(0.0136)**	**(0.0301)**	**(0.0208)**	**(0.0497)**	**(0.0181)**
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.301	-0.0616		-0.227***	0.0349***	-0.0375
	(0.130)	(0.0406)		(0.0770)	(0.00671)	(0.0733)
R-squared	0.64		-0.385		0.242	
Hausman	Chi2(26)=55.35					

P-value=0.0007
In favour of FE

First Stage	First Stage (Dep. Var. log (remittances) or Dlog (remittances)		
log GDP per capita	**-0.5145***	**-0.7550*****	**-0.6447*****
L1.	**(0.2947)**	**(0.0907)**	**(0.2506)**
log Inflation	-0.0120	-0.0428	0.0127
	(0.0339)	(0.0328)	(0.0139)
log Financial Development	0.1146	**0.3904*****	-0.0018
	(0.1212)	**(0.0901)**	(0.1635)
Conflict Intensity	**-0.1948*****	**0.2040***	0.0389
	(0.0712)	**(0.1130)**	(0.0472)
log Investment	-0.1275	**-0.5718****	-0.1980
	(0.1956)	**(0.2343)**	(0.1470)
Absolute Latitude X Time trend	**0.3396*****	**0.1543*****	**0.4042*****
	(0.0593)	**(0.0220)**	**(0.1259)**
Ethnic Fractionalization X Time Trend	**0.0102***	**-0.0276*****	**0.0412***
	(0.0057)	**(0.0055)**	**(0.0223)**
Constant	-	4.9224	0.0402
	-	(0.8813)	(0.0378)
R-squared	0.362	-	-
F test	F(2,519)		F(2,515)
Test of excluded instruments:	17.49		5.6
Prob>F	0.0000		0.0039
Hansen J statistic (overidentification test of all instruments)			
	0.882		0.0055
P-val	0.3475		0.8151

Robust standard errors in parentheses. Statistical significant coefficients are shown in bold.
*** p<0.01, ** p<0.05, * p<0.1

In the columns (3), (4) and (5) the logarithm of remittance is treated as endogenous in the models based on FE-2SLS, RE-2SLS and FD-2SLS. First, the instruments are statistically significant, implying that the geographical characteristics and the country's ethnic fractionalization influence the transaction costs of remittances and thus their amount. F test of excluded instrument is significant and greater than 10 (the commonly-used threshold value with one endogenous variable) for FE-2SLS and significant with the F statistic being 5.6 for FD-2SLS. Therefore, some doubt may be cast against the latter in the strength of instruments. However, p-values for over-identification tests are 0.3475 and 0.8151, implying that exclusion restrictions are likely to be valid in both cases. We find in these cases that the remittances are positive and significant in the second stage irrespective of the specifications. If we take the case of FE-2SLS, the result suggests that the 10% increase in the remittances share (from the current share of remittances in GDP, e.g., 10% share to 11%) on average is

associated with the 0.874% increase in GDP per capita growth rate, other things being equal. The positive and significant effect of remittances on GDP per capita growth is also confirmed in the final column of Table 5 where the dynamic panel model is estimated by System GMM.

However, once we replace the remittances by the net immigration (the number of immigrants minus the number of emigrants), the coefficient estimate is not significant in FE, RE or RE-2SLS as can be seen in Table 6. Only in the column (3) based on FE-2SLS where the net immigration is treated as endogenous, the coefficient estimate is negative and significant, consistent with the results in Table 5. That is, the increase in emigrants (net of immigrants) is positively associated with the increase in GDP growth. F test statistic of excluded instruments is 7.67 and though it is statistically significant, the strength of instrument may not be good enough as it is smaller than the commonly-used threshold of 10. Over-identification test for instruments suggests that exclusion restrictions are likely to be valid. Hence with some caveat, we find some evidence that out-migration (net of immigration) tends to promote the economic growth.

Table 6 Effect of Migration on Economic Growth (Dep. Var. GDP per capita growth)

VARIABLES	(1) Case 1 FE	(2) Case 2 RE	(3) Case 3 FE-2SLS	(4) Case 4 RE-2SLS
Log GDP per capita(-1)	**-0.0449***	**-0.0126*****	**-0.0252****	-0.011
	(0.0242)	**(0.00423)**	**(0.0120)**	(0.00751)
log Inflation	**-0.00674****	**-0.00730****	**-0.0249*****	**-0.0231*****
	(0.00311)	**(0.00357)**	**(0.00659)**	**(0.00426)**
log Financial Development	**0.0232***	**0.0178***	**0.0283*****	**0.0200*****
	(0.0122)	**(0.00923)**	**(0.0101)**	**(0.00688)**
Net immigration	-0.00378	-0.000623	**-0.0277***	-0.00564
	(0.00482)	(0.00392)	**(0.0143)**	(0.0132)
Conflict Intensity	-0.00658	-0.00795	**-0.0211***	**-0.0231*****
	(0.00714)	(0.00747)	**(0.0115)**	**(0.00895)**
log Investment	-0.0182	0.0112	-0.0561**	-0.0279
	(0.0276)	(0.0292)	(0.0282)	(0.0172)
Year Dummies	Yes	Yes	Yes	Yes
Constant	0.276	0.0138		0.189***
	(0.166)	(0.0711)		(0.0693)
Observations	183	183	111	111
R-squared	0.308		0.44	
Number of code1	30	30	22	22
Hausman	Chi2=34.61			

P-value=0.0017
In favour of FE

First Stage	First Stage (Dep. Var. log (remittances) or Dlog (remittances)	
log GDP per capita	0.0921	0.0877
L1.	(0.1679)	(0.1023)
log Inflation	-0.0024	-0.0185
	(0.0508)	(0.0489)
log Financial Development	0.0733	-0.0237
	(0.0710)	(0.0781)
Conflict Intensity	-0.0180	-0.1024
	(0.1483)	(0.1059)
log Investment	-0.0948	-0.1412
	(0.1935)	(0.1937)
Absolute Latitude X Time trend	0.0319	0.0338
	(0.0372)	(0.0215)
Ethnic Fractionalization X Time Trend	**0.0379*** **	**0.0347*** **
	(0.0097)	**(0.0052)**
Constant	-	-0.0129
		(0.8329)
Observations	111	111
R-squared	-	-
F test	F(2,82)	
Test of excluded instruments:	7.67	
Prob>F	0.0009	
Hansen J statistic (overidentification test of all instruments)		
	2.25	
P-val	0.1336	

Robust standard errors in parentheses. Statistical significant coefficients are shown in bold.
*** p<0.01, ** p<0.05, * p<0.1

In Table 7 the effect of remittances on poverty at the national level (based on the international poverty lines) is estimated where the remittances are treated as endogenous. We estimate the poverty headcount ratio and the poverty gap based on the US$1.25 per day poverty line (in the columns (1) and (2)) and those based on the US$2 per day poverty line by the predicted value of remittances. In all cases, remittances are found to be negative and significant. That is, if the share of remittances increases by 10% (e.g. the share of remittances increase from 10% to 11%) the poverty headcount based on US$1.25 a day (US$2.00 a day) decreases 3.97% (4.48%) (in comparison with the initial poverty headcount being set at 100%), other things being equal. On the other hand, if the share of remittances increases by 10%, the poverty gap on US$1.25 a day (US$2.00 a day) tends to decrease 16.7% (29.3%) (in comparison with the

initial poverty gap being set at 100%), other things being equal. It is thus concluded that the remittances have a substantial poverty-reducing effect.

Table 7 Effect of Remittances on National Poverty (based on the international poverty lines)

Second Stage	(1)	(2)	(3)	(4)
	FE	FE	FE	FE
Dep.Var	Poverty HC	Poverty Gap	Poverty HC	Poverty Gap
	US$1.25	US$1.25	US$2.00	US$2.00
VARIABLES	Case 1	Case 2	Case 3	Case 4
P log (Remittance)	**-0.397****	**-1.670*****	**-0.448**	**-2.903****
$(\widehat{\boldsymbol{LREM}}_{it})$	**(0.194)**	**(0.511)**	**(0.296)**	**(1.282)**
openness	0.314	0.393	0.0416	0.803
	(0.369)	(0.345)	(0.521)	(0.866)
Labour Force with Secondary Education	-0.0433	-0.33	0.0116	-0.524
	(0.197)	(0.491)	(0.204)	(1.298)
GDP per capita (-1)	0.813	-0.76	1.355	-2.313
	(1.414)	(5.520)	(1.888)	(12.53)
$\widehat{\varepsilon^{r}_{it}}$	0.00443	**-1.177****	-0.127	-1.899
	(0.459)	**(0.478)**	(0.343)	(1.339)
Constant	-1.218	2.89	1.742	7.249
	(1.905)	(2.340)	(3.044)	(6.217)
Observations	211	200	211	200
R-squared	0.113	0.197	0.14	0.212
First Stage	Dep. Var. log (remittances)			
Dynamic Panel (System GMM)				
Log(Remittance(-1))	**0.826*****	**0.826*****	**0.826*****	**0.826*****
	(0.0397)	**(0.0397)**	**(0.0397)**	**(0.0397)**
openness	-0.00259	-0.00259	-0.00259	-0.00259
	(0.0223)	(0.0223)	(0.0223)	(0.0223)
Labour Force with Secondary Education	0.00442	0.00442	0.00442	0.00442
	(0.0155)	(0.0155)	(0.0155)	(0.0155)
GDP per capita (-1)	-0.216	-0.216	-0.216	-0.216
	(0.207)	(0.207)	(0.207)	(0.207)
Absolute Latitude X Time trend	**0.0283***	**0.0283***	**0.0283***	**0.0283***
	(0.0145)	**(0.0145)**	**(0.0145)**	**(0.0145)**
Ethnic Fractionalization X Time Trend	0.00187	0.00187	0.00187	0.00187
	(0.00364)	(0.00364)	(0.00364)	(0.00364)
Constant	0.04	0.04	0.04	0.04
	(0.166)	(0.166)	(0.166)	(0.166)
Joint siignificance				
Wald chi2(6)	2635.91***			
Arellano-Bond test for zero autocorrelation in first-differenced errors (P-value)				
1	0.0003	0.0003	0.0003	0.0003
2	0.2825	0.2825	0.2825	0.2825
Sargan test of overidentifying restrictions				
chi2(426)=	357.34	357.34	357.34	357.34
P-value	0.9932	0.9932	0.9932	0.9932

Robust standard errors in parentheses. Statistical significant coefficients are shown in bold.
*** p<0.01, ** p<0.05, * p<0.1
Standard errors in the second stage are bootstrapped.

We observe in Table 8 that the effect of the share of remittances on rural poverty (based on the international poverty lines) is negative and significant in all the cases - regardless of the choice of poverty lines or definitions of poverty - after the endogeneity of remittances is taken into account. For instance, Column (1) shows that a 10% increase in the share of remittances in GDP tends to decrease the poverty headcount ration based on the US$1.25 line by 3.06% on average – with the initial poverty level being set at 100%, other things being equal. The amount of reduction in response to the 10% increase in the share of remittances in GDP will be 5.22% for poverty gap (the column (2)) and 7.44% for poverty gap squared ((3)) both of which are based on US$1.25 poverty line. The poverty-reducing effects at the US$2 per day poverty line are getting smaller, though the coefficient estimates are statistically significant (columns (4), (5) and (6)). If the share of remittances in GDP increases by 10%, the poverty headcount (gap; gap squared) based on the US$2 per day will decline by 0.998% (2.62%; 3.46%). It is found that remittances have a substantial poverty-reducing effect not only on national poverty but also on rural poverty. The signs of other coefficient estimates are expected, though the trade openness measure is not statistically significant.

Table 8 Effect of Remittances on Rural Poverty (based on the international poverty lines)

Second Stage	(1)	(2)	(3)	(4)	(5)	(6)
	FE	FE	FE	FE	FE	FE
Dep.Var	Rural Poverty HC	Rural Poverty Gap	Rural Poverty Gap Squared	Rural Poverty HC	Rural Poverty Gap	Rural Poverty Gap Squared
	US$1.25	US$1.25	US$1.25	US$2.00	US$2.00	US$2.00
VARIABLES	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
p log(Remittance)	**-0.306*** **	**-0.522*** **	**-0.744*** **	**-0.0998*** **	**-0.262*** **	**-0.346*** **
$(\widehat{\boldsymbol{LREM}}_{it})$	**(0.0420)**	**(0.102)**	**(0.196)**	**(0.0375)**	**(0.0484)**	**(0.0707)**
Openness	0.148	0.217	0.155	0.0334	0.0792	0.0971
	(0.668)	(1.631)	(3.111)	(0.597)	(0.770)	(1.125)
Labour Force with Secondary Education	**-0.160*** **	**-0.151** **	-0.0574	**-0.0921*** **	**-0.113*** **	**-0.125*** **
	(0.0257)	**(0.0628)**	(0.120)	**(0.0230)**	**(0.0297)**	**(0.0433)**
L.GDP per capita growth	**-5.219*** **	**-6.215*** **	**-3.960*** **	**-2.473*** **	**-3.516*** **	**-3.970*** **
	(0.0640)	**(0.156)**	**(0.298)**	**(0.0572)**	**(0.0738)**	**(0.108)**
$\widehat{\varepsilon'_{it}}$	**0.929*** **	**0.950*** **	**0.740** **	**0.197*** **	**0.250*** **	**0.314*** **
	(0.0709)	**(0.173)**	**(0.331)**	**(0.0634)**	**(0.0818)**	**(0.120)**
Constant	2.324	0.76	0.204	3.623	2.344	1.504
	(4.446)	(10.78)	(20.53)	(3.966)	(5.111)	(7.459)
Observations	75	73	69	78	78	77
R-squared	0.402	0.453	0.353	0.393	0.487	0.456
First Stage	Dep. Var. log (remittances)					
Dynamic Panel (System GMM)						
Log(Remittance(-1))	**0.826*** **	**0.826*** **	**0.826*** **	**0.826*** **	**0.826*** **	**0.826*** **
	(0.0397)	**(0.0397)**	**(0.0397)**	**(0.0397)**	**(0.0397)**	**(0.0397)**
Openness	-0.00259	-0.00259	-0.00259	-0.00259	-0.00259	-0.00259
	(0.0223)	(0.0223)	(0.0223)	(0.0223)	(0.0223)	(0.0223)
Labour Force with Secondary Education	0.00442	0.00442	0.00442	0.00442	0.00442	0.00442
	(0.0155)	(0.0155)	(0.0155)	(0.0155)	(0.0155)	(0.0155)
L.GDP per capita growth	-0.216	-0.216	-0.216	-0.216	-0.216	-0.216
	(0.207)	(0.207)	(0.207)	(0.207)	(0.207)	(0.207)
Absolute Latitude X Time trend	**0.0283***	**0.0283***	**0.0283***	**0.0283***	**0.0283***	**0.0283***
	(0.0145)	**(0.0145)**	**(0.0145)**	**(0.0145)**	**(0.0145)**	**(0.0145)**
Ethnic Fractionalization X Time Trend	0.00187	0.00187	0.00187	0.00187	0.00187	0.00187
	(0.00364)	(0.00364)	(0.00364)	(0.00364)	(0.00364)	(0.00364)
Constant	0.04	0.04	0.04	0.04	0.04	0.04
	(0.166)	(0.166)	(0.166)	(0.166)	(0.166)	(0.166)
Joint siignificance						
Wald chi2(6)	2635.91***					
Arellano-Bond test for zero autocorrelation in first-differenced errors (P-value)						
1	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
2	0.2825	0.2825	0.2825	0.2825	0.2825	0.2825
Sargan test of overidentifying restrictions						
chi2(426)=	357.34	357.34	357.34	357.34	357.34	357.34
P-value	0.9932	0.9932	0.9932	0.9932	0.9932	0.9932

Robust standard errors in parentheses. Statistical significant coefficients are shown in bold. *** p<0.01, ** p<0.05, * p<0.1. Standard errors in the second stage are bootstrapped.

While the remittances have a substantial and statistically significant poverty-reducing effect for both rural and urban poverty, our results suggest that they do not have any inequality-reducing effect. Column (1) of Table 9 shows that the predicted value of remittances ($\widehat{\boldsymbol{LREM}}_{it}$) is not statistically significant. However, $\widehat{\boldsymbol{LREM}}_{it}$ is significant in Columns (2) and (3), implying that the 10% increase in the share of remittances in GDP (e.g. from 10% to 11%) is associated with 0.399% increase in rural Gini or 0.466% in urban Gini. Given that remittances have increased sharply in recent years and they are expected to increase, the accumulated effect of inequality increase may be large. This is likely to be due to the fact that the remittances benefit disproportionally the relatively rich households. Our findings are in line with Adams's (1991) in rural Egypt and Taylor, Mora, Adams, Lopez-Feldman's (2005) in rural Mexico and McKay and Deshingkar (2014) on the cross-country evidence. However, our results are not consistent with Taylor and Wyatt's (1996, p.910) result on Mexico where the remittances were found to marginally decrease Gini. More research based on the household datasets is necessary to investigate the relation between remittances and inequality.

Table 9 Effect of Remittances on Inequality (National Gini, Rural Gini and Urban Gini)

Second Stage	(1)	(2)	(3)
	FE	FE	FE
Dep.Var	National Gini	Rural Gini	Urban Gini
	Case 1	Case 2	Case 3
VARIABLES			
p log(Remittance)	0.0232	**0.0399*** **	**0.0446*** **
$(\widehat{\boldsymbol{LREM}}_{it})$	(0.0183)	**(0.00579)**	**(0.0125)**
Openness	0.00961	0.0313	-0.00273
	(0.0123)	(0.0922)	(0.199)
Labour Force with Secondary Education	-0.0079	**-0.0178*** **	**-0.0152** **
	(0.0107)	**(0.00355)**	**(0.00766)**
.GDP per capita growth (-1)	-0.0195	**-0.234*** **	**-0.223*** **

	(0.0648)	(0.00883)	(0.0191)
$\widehat{\varepsilon^{I}_{it}}$	**0.0461*** **	**0.0164***	0.00951
	(0.00975)	**(0.00979)**	(0.0211)
Constant	3.470***	3.298***	3.596***
	(0.0939)	(0.610)	(1.297)
Observations	215	78	76
R-squared	0.136	0.15	0.165
First Stage: Dynamic Panel Dep. (System GMM) Var. log (remittances)			
Log Remittance (-1)	**0.826*** **	**0.826*** **	**0.826*** **
	(0.0397)	**(0.0397)**	**(0.0397)**
Openness	-0.00259	-0.00259	-0.00259
	(0.0223)	(0.0223)	(0.0223)
Labour Force with Secondary Education	0.00442	0.00442	0.00442
	(0.0155)	(0.0155)	(0.0155)
.GDP per capita growth (-1)	-0.216	-0.216	-0.216
	(0.207)	(0.207)	(0.207)
Absolute Latitude X Time trend	**0.0283***	**0.0283***	**0.0283***
	(0.0145)	**(0.0145)**	**(0.0145)**
Ethnic Fractionalization X Time Trend	0.00187	0.00187	0.00187
	(0.00364)	(0.00364)	(0.00364)
Constant	0.04	0.04	0.04
	(0.166)	(0.166)	(0.166)
Joint siignificance			
Wald chi2(6)	2635.91***		
Arellano-Bond test for zero autocorrelation in first-differenced errors (P-value)			
1	0.0003	0.0003	0.0003
2	0.2825	0.2825	0.2825
Sargan test of overidentifying restrictions			
chi2(426)=	357.34	357.34	357.34
P-value	0.9932	0.9932	0.9932

*** p<0.01, ** p<0.05, * p<0.1. Standard errors in the second stage are bootstrapped.
Robust standard errors in parentheses. Statistical significant coefficients are shown in bold.

IV. Concluding Observations

In this study, we have first reviewed the literature on remittances with respect to their effect on economic growth, its stability and poverty. Some micro studies on remittances have been reviewed to understand better what the underlying mechanisms are whereby people in developing countries migrate and remit with a focus on the income structure of households, their incentives and costs. We then use the cross-country panel data and econometrically examine the effects of remittances and migration on economic growth, poverty and inequality

after taking into account the endogeneity of remittances. Our conclusions are summarised into the following three points.

First, it is found from our econometric results that remittances will promote economic growth and reduce poverty - both national poverty and rural poverty based on the international poverty lines for the US$1.25 or US$2 thresholds after taking into account the endogeneity of remittances. Consistent with this result, net migration (the number of immigrants minus the number of emigrants) which is treated as endogenous tends to be negatively associated with economic growth given that the remittances are likely to be positively associated with the number of emigrants. However, we have found that the remittances have no inequality-reducing effect. Rather, they will significantly increase rural Gini and urban Gini, the results which are contradictory to Taylor and Wyatt's (1996) result on Mexico. As discussed by Taylor and Wyatt, in order to analyse the effect of remittances on income distribution, it is necessary to consider (i) the distributions of the amount of remittances across different income groups, (ii) the distributions of the sizes of potential benefits/incentives of remittances across different income groups and (iii) the costs and risk associated with migration and remittances. That is, the distributional effect of remittances will have to be investigated in the long run. Our use of rural poverty (based on the international poverty lines) and rural or urban Gini for the cross-country study nevertheless is a departure from the existing literature, such as, Imai, Gaiha, Ali, and Kaicker (2014) who used only poverty data at the national level. Our econometric results are broadly consistent with the existing literature on remittances and migration in developing countries. In our review, many studies have based on the cross-country panel data have shown that (i) remittances tend to promote economic growth, (ii) remittances tend to stabilise economic growth (ii) remittances tend to reduce poverty.

Second, we need to understand the underlying factors, or motivations, behind the migration or remittance behaviour. For instances, our detailed review of the micro-study in the Philippines (Ramos, Estudillo, Sawada, and Otsuka, 2012) has suggested that (i) the development of infrastructure as well as a geographical location (e.g. the distance to town centres) is key to the increase in remittances and (ii) the remittances tend to increase when the rural economy undergoes the structural transformation, such as, development of non-farm rural sector where the infrastructure, such as electricity access, or improvement of education of the residents is deemed important (ibid., 2012). These are broadly consistent with our statistical summary of the cross-country data where the lower-middle income countries - many of which have experienced the structural transformation in rural areas (Imai, Gaiha, and Bresciani, 2016) - have typically experienced a surge of inward remittances.

Third, it has also been suggested that the risk-coping role of remittances – at the macro level to stabilise the economic growth and at the micro level where households can ease the credit constraints and manage to smooth consumption. The role of networks is important as the kinship or castes in the South Asian context will affect how easily poor households will migrate to urban areas or abroad (e.g. Munshi and Rosenzweig, 2016). In this context, remittances will serve as a risk insurance role. Hence, it is important to consider any effect of the networks available to households in estimating the determinants of remittances. As suggested by Taylor, Rozelle, and De Brauw (2003), the remittances will allow household members left out in the rural area to take some risk and stimulate crop yielding. This will serve as insurance for the migrants' future income when they come back to the home village after the temporary migration. The research on remittances or migration and risk-insurance or risk-coping mechanisms is still scarce and should be an important research topic in the future.

It is important, however, to consider the fact that the very poor households cannot afford undertaking migration or remittance behaviour because they cannot afford the cost of

migration (e.g. travel), or they may be outside the network which facilitates migration or remittances. The experimental study (e.g. the randomised controlled trials) is difficult to conduct to evaluate the effect of migration on poverty as the opportunity for migration cannot be easily randomised experimentally, and so the large national household datasets should be used to carry out rigorous examinations of the poverty-reducing effect of migration or remittances at household levels.

The study will offer a few useful policy implications. First, given that the remittances have increased sharply in recent years and have a substantial share in GDP in many Asian countries, the government should monitor the trend of remittances along with other financial inflows and consider the possible macroeconomic consequences in the future. For instance, the recession of developed countries may result in the reduced amount of international remittances at the macro level and this may increase the fluctuation of the economic growth in the future. On the other hand, as the surge of the remittances may have a risk of the real exchange rate appreciation and of weakening the competitiveness of exported goods in the international economy, the aggregate remittances should be used as one of the macro-level financial indicators.

Second, policymakers should lower the transaction costs of remittances (the reduction of which have been confirmed by our data) as well as those of migration. The latter includes not only physical costs but also the costs associated with any legal restrictions on domestic and international to migration. The former may include the introduction of the banking via mobile phones or online banking systems, the reduction of fees or relevant taxes related to international and domestic remittances, or the introduction of more ATMs or other equivalent systems in the village centres. These measures are not only important for promoting economic growth and reducing poverty at the macro level but also helpful for providing the agricultural households in rural areas with more options to cope with risk.

Third, it is important for policymakers to support the process of rural transformation, e.g., providing village infrastructure and communication networks, and promoting education because these measures will eventually facilitate households' remittance behaviour.

Finally, as migration or remittances are unlikely to benefit all the households in the rural economy, it is important for the government to provide enough policy support for those who do not have access to the opportunity for migration or remittances (e.g. the poor households in backward castes, ethnic minorities, and/or living in remote areas).

References

Abdih, Y., Chami, R., Dagher, J. and Montiel, P. (2012). Remittances and institutions: Are remittances a curse? *World Development*, 40(4), pp.657-666.

Acosta, P.A., Lartey, E.K. and Mandelman, F.S. (2009). Remittances and the Dutch disease. *Journal of International Economics*, 79(1), 102-116.

Adams, R.H. (1991). The effects of international remittances on poverty, inequality and development in rural Egypt. IFPRI Research Report 86. International Food Policy Research Institute, Washington, DC.

Ahamada, I. and Coulibaly, D. (2011). How does financial development influence the impact of remittances on growth volatility?, *Economic modelling*, 28(6), pp.2748-2760.

Amuedo-Dorantes, C. and Pozo, S. (2004). Workers' remittances and the real exchange rate: a paradox of gifts. *World Development*, 32(8), 1407-1417.

Ajide, K.B., Raheem, I.D. and Adeniyi, O. (2015). Output growth volatility, remittances and institutions. *International Journal of Development Issues*, 14(3), pp.190-203.

Baltagi, B.H., Demetriades, P.O. and Law, S.H. (2009). Financial development and openness: Evidence from panel data. *Journal of Development Economics*, 89(2), pp.285-296.

Labor Markets and Poverty in Village Economies¤

Bandiera, O., Burgess, R., Das, N, Gulesci, S., Rasul, I., Sulaiman, M. (2016). Labor Markets and Poverty in Village Economies, *Quarterly Journal of Economics*, forthcoming.

Barajas, A., Gapen, M. T., Chami, R., Montiel, P., & Fullenkamp, C. (2009). Do workers' remittances promote economic growth? *IMF Staff Paper*, 52(1), 55–82.

Beck , T., A. Demirguc-Kunt, and R. Levine (2009), 'Financial institutions and markets across countries and over time - data and analysis', Policy Research Working Paper Series 4943 (Washington DC: The World Bank).

Bettin, G., Presbitero, A. F. and Spatafora, N. L. (2015). Remittances and vulnerability in developing countries. *The World Bank Economic Review*, p.lhv053.

Blundell, R., and S. Bond (1998). Initial conditions and moment restrictions in dynamic panel data models., *Journal of Econometrics* 87: 115-143.

Blundell, R., S. Bond, and F. Windmeijer, F. (2000), 'Estimation in dynamic panel data models: Improving on the performance of the standard GMM estimator', in Baltagi, B. ed., *Nonstationary Panels, Panel Cointegration, and Dynamic Panels. Advances in Econometrics* Volume 15 (Amsterdam: JAI Press, Elsevier Science).

Bugamelli, M. and Paternò, F. (2011). Output growth volatility and remittances. *Economica*, 78(311), pp.480-500.

Brown, R.P., Connell, J. and Jimenez-Soto, E.V. (2014). Migrants' remittances, poverty and social protection in the South Pacific: Fiji and Tonga. *Population, Space and Place*, *20*(5), pp.434-454.

Chami, R.; A. Barajas; T. Cosimano; C. Fullenkamp; M. Gapen and P. Montiel (2008). "Macroeconomic Consequences of Remittances", *IMF Occasional Paper* No 259, (Washington: International Monetary Fund).

Chami, R., T.F. Cosimano, and M.Gapen, (2006), "Beware of Emigrants Bearing Gifts: Optimal Fiscal and Monetary Policy in the Presence of Remittances," IMF Working Paper 06/61 (Washington: International Monetary Fund).

Chami, R., Fullenkamp, C., Jahjah, S., (2003). Are migrant remittance flows a source of capital for development? IMF Working Paper. International Monetary Fund, Washington, DC (August).

Chami, R., Hakura, D. S., Montiel, P. J. (2012). Do Worker Remittances Reduce Output Volatility in Developing Countries? *Journal of Globalization and Development* 3 (1), 1-23.

Covarrubias, K., Davis, B., Bakouan, A. and Di Giuseppe, S., 2012. Household Income Generation Strategies. Background paper for the WDR 2013.

Combes, J. L. and Ebeke, C. (2011). Remittances and household consumption instability in developing countries. *World Development*, 39(7), pp.1076-1089.

González, A., Teräsvirta, T. and Dijk, D.V. (2005). Panel smooth transition regression models (No. 604). SSE/EFI Working Paper Series in Economics and Finance.

Giuliano, P., & Ruiz-Arranz, M. (2009). Remittances, financial development and growth. *Journal of Development Economics*, 90(1), 144–152.

Hansen, B.E., (1999). Threshold effects in non-dynamic panels: Estimation, testing, and inference. *Journal of econometrics*, 93(2), pp.345-368.

IFAD and the World Bank (2013). *Sending Money Home to Asia: Trends and opportunities in the world's largest remittance marketplace*, IFAD, Rome.

IFAD and the World Bank (2015). *The use of remittances and financial inclusion: A report by the International Fund for Agricultural Development and the World Bank Group to the G20 Global Partnership for Financial Inclusion*, IFAD, Rome.

Imai, K.S., Gaiha, R., and Bresciani, F. (2016). 'Dynamics of Transformation in Rural Asia and the Pacific: Policy and Operational Implications', Draft, IFAD.

Imai, K.S., Gaiha, R., Ali, A. and Kaicker, N., (2014). Remittances, growth and poverty: New evidence from Asian countries. *Journal of Policy Modeling*, 36(3), pp.524-538.

Imai, K.S., Gaiha, R. and Garbero, A., (2014). Poverty Reduction during the Rural-Urban Transformation: Rural Development is still more important than Urbanisation?. Brooks World Poverty Institute Working Paper.

Jihoud,A. (2015). Remittances and Macroeconomic Volatility in African Countries. IMF Working paper, WP/15/49.

Kelegama, S. (2011). *Migration, Remittances and Development in South Asia,* Institute of Policy Studies of Sri Lanka (IPS), Colombo, Sri Lanka.

Lucas, R.E. and Stark, O. (1985). Motivations to remit: Evidence from Botswana. *The Journal of Political Economy*, pp.901-918.

McKay, A. and Deshingkar, P. (2014). Internal Remittances and Poverty: Further Evidence from Africa and Asia. Migrating out of Poverty Research Programme Consortium's Working Paper, 12.

McKenzie, D. and Sasin, M.J. (2007). Migration, remittances, poverty, and human capital: conceptual and empirical challenges. World Bank Policy Research Working Paper, (4272).

Munshi, K. and Rosenzweig, M. (2016). Networks and misallocation: Insurance, migration, and the rural-urban wage gap. *The American Economic Review*, 106(1), pp.46-98.

Niimi, Y. and Reilly, B. (2011). Gender differences in remittance behavior: Evidence from Vietnam. *The Singapore Economic Review*, 56(2), 215-237.

Pradhan, G., Upadhyay, M., & Upadhyaya, K. (2008). Remittances and economic growth in developing countries. *The European Journal of Development Research*, 20(3), 497–506.

Ramos, C.G., Estudillo, J., Sawada, Y. and Otsuka, K. (2012). Transformation of the rural economy in the Philippines, 1988–2006. *The Journal of Development Studies*, 48(11), pp.1629-1648.

Reardon T and Timmer CP. (2014). Five Inter-Linked Transformations in the Asian Agrifood Economy: Food Security Implications. *Global Food Security* 3(2): 108-117.

Semyonov, M. and Gorodzeisky, A. (2005). Labor Migration, Remittances and Household Income: A Comparison between Filipino and Filipina Overseas Workers1. *International Migration Review*, 39(1), 45-68.

Stark, O. and Bloom, D. E. (1985) The new economics of labor migration. *The American Economic Review*, 75(2), pp.173-178.

Stark, O. and Taylor, J.E. (1991) Migration incentives, migration types: The role of relative deprivation. *The Economic Journal*, 101(408), pp.1163-1178.

Taylor, J.E., Mora, J., Adams, R. and Lopez-Feldman, A. (2005) Remittances, inequality and poverty: evidence from rural Mexico. ARE Working Papers 05-003. University of California, Davis, Department of Agricultural and Resource Economics, Davis, CA.

Taylor, J.E., Rozelle, S. and De Brauw, A. (2003). Migration and incomes in source communities: A new economics of migration perspective from China. *Economic Development and Cultural Change*, 52(1), pp.75-101.

Taylor, J.E. and Wyatt, T.J. (1996). The shadow value of migrant remittances, income and inequality in a household‐farm economy. *The Journal of Development Studies*, 32(6), pp.899-912.

Vargas Silva, C., Jha, S., & Sugiyarto, G. (2009). Remittances in Asia: Implications for the Fight against Poverty and thePursuit of Economic Growth, ADB Economics Working Paper Series No. 182. Manila: Asian Development Bank.

Windmeijer, F. (2005). 'A finite sample correction for the variance of linear efficient two-step GMM estimators'. *Journal of Econometrics*, 126: 25-51.

World Bank (2009). Migration and Development Brief 11. World Bank, Washington D.C. http://library.aua.am/files/2011/06/ATTEBP6Z.pdf.

World Bank (2016). *World Development Indicators 2015*, http://data.worldbank.org/data-catalog/world-development-indicators.

WouTerSe, F., 2010. Remittances, poverty, inequality and welfare: Evidence from the Central Plateau of Burkina Faso. *The Journal of Development Studies*, 46(4), pp.771-789.

Appendix 1: Descriptive Statistics and Definitions of Variables

Variables	Definitions of Variables and Data Sources in squared brackets.	Obs	Mean	Std. Dev.	Min	Max
Log (Remittances)	log (Remittances, received (% of GDP) [WDI 2015].	882	0.2689615	1.679814	-7.673314	3.903869
Net Immigration	Net migration is the net total of migrants during the perio	324	-.182445	.5692244	-3.570954	2.118323
GDP per capita growth	Real GDP Growth Rate (2005 PPP, US$) [WDI 2015].	1,648	0.032527	0.0846911	-0.3736391	1.256495
log GDP per capita	log real GDP per capita (2005 PPP, US$) [WDI 2015].	1,448	6.914186	1.096407	4.281169	9.535043
log Inflation	log of inflation measured by CPI (annual %) [WDI 2015].	1,651	1.579604	2.199332	-13.36887	8.112167
log Financial Development	Captured by deposit money bank assets / (deposit money + central) bank assets [Beck and Demirgüç-Kunt, 2009] expressed in log-form, updated version in 2013, http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:20696167~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html.	1,440	3.157944	0.7902612	-0.5845596	5.110294
Absolute Latitude X Time trend	Log of absolute value of latitude multiplied by time trend [WDI 2016].	1,211	0.3468181	0.1845544	0.0555556	0.6555555
Ethnic Fractionalization X Time Trend	Ethnic fractionalization Index multiplied by time trend [Quality of Government dataset].	1,151	-1.146982	0.6382936	-3.091495	-0.3077025
Conflict Intensity	Intensity of conflict (Internal armed conflicts [UCDP/PRIO Conflict Database].	2,440	0.172541	0.4732969	0	2
Log Investment	Gross capital formation (% of GDP) [WDI, 2015] expressed in log-form.	1,630	3.149867	0.3247958	1.547072	4.090516
Openness	Exports plus imports (% of GDP) [WDI, 2015] expressed in log-form.	2,184	3.573144	3.126785	0	7.145985
Labour Force with Secondary Education	The share of labour force with secondary education.	2,184	0.6101827	1.572984	0	5.384495
povertyhc125	Poverty headcount ratio based on US$1.25 per day, 2005 PPP [WDI, 2015].	347	0.2895066	2.723209	-4.60517	4.431055
povertyg125	Poverty gap ratio based on US$1.25 per day, 2005 PPP [WDI, 2015].	327	4.043402	6.950575	0	39.26
povertyhc200	Poverty headcount ratio based on US$2.00 per day, 2005 PPP [WDI, 2015].	347	1.699737	2.517087	-4.60517	4.583027
povertyg200	Poverty headcount gap based on US$2.00 per day, 2005 PPP [WDI, 2015].	327	9.882015	13.9548	0	59.27
epov_h_rur	Poverty headcount ratio in rural area based on US$1.25 per day, 2005 PPP [SKD, IFAD, 2015].	105	2.31634	2.047917	-4.60517	4.424847
epov_gap_rur	Poverty gap ratio in rural area based on US$1.25 per day, 2005 PPP [SKD, IFAD, 2015].	103	0.9847825	2.042092	-4.60517	4.053523
epov_gap2_rur	Poverty gap squared in rural area based on US$1.25 per day, 2005 PPP [SKD, IFAD, 2015].	97	0.2660669	1.71577	-4.60517	3.81903
mpov_h_rur	Poverty headcount ratio in rural area based on US$2.00 per day, 2005 PPP [SKD, IFAD, 2015].	110	3.215607	1.657771	-1.660731	4.53303
mpov_gap_rur	Poverty gap ratio in rural area based on US$2.00 per day, 2005 PPP [SKD, IFAD, 2015].	110	2.021771	1.978429	-4.60517	4.234541
mpov_gap2_rur	Poverty gap squared in rural area based on US$2.00 per day, 2005 PPP [SKD, IFAD, 2015].	108	1.266505	2.005066	-3.912023	4.043402
gini	Gini coefficient at the national level [WDI, 2015].	683	3.481273	0.1600894	2.965273	4.112512
gini_rur	Gini coefficient in rural areas [WDI, 2015].	110	3.472021	0.1668328	3.171784	4.158258
gini_urb	Gini coefficient in urban areas [WDI, 2015].	107	3.569651	0.1582924	3.202746	4.272491

Note: We include the countries in South Asia (Bangladesh; Bhutan; India; Nepal; Pakistan; Sri Lanka), East Asia and the Pacific (Cambodia; China; Fiji; Indonesia; Lao PDR; Malaysia; Micronesia, Fed. Sts.; Papua New Guinea; Philippines; Thailand; Timor-Leste; Vietnam) and Central Asia (Kazakhstan; Tajikistan; Turkmenistan). The selection of the countries is guided by the availability of data in WDI 2015.