

DOMESTIC MACROECONOMIC CONDITIONS AND INFLOW OF WORKERS' REMITTANCES IN LABOUR-SENDING ASIAN COUNTRIES

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ABSTRACT

Simple theoretical consideration suggests that the flows of workers' remittances ought to be partly driven by domestic macroeconomic indicators. However, empirical research seeking to support this claim has produced mixed results. In this paper, using a Pooled Mean Group (PMG) estimator on panel data from 15 labour-sending Asian countries during the period of 1984-2010, further evidence is produced on the effects of domestic macroeconomic factors on inflows of workers' remittances. In particular, factors such as interest rate differential between migrant home and destination country, exchange rate depreciation, and financial sector development favourably induce remittance flows from migrant workers abroad. Conversely, workers' remittances respond negatively to domestic political and/or economic instability.

Keywords: Migrant Workers; Remittances; Macroeconomic Factors; Financial Development; Asian Countries.

1. INTRODUCTION

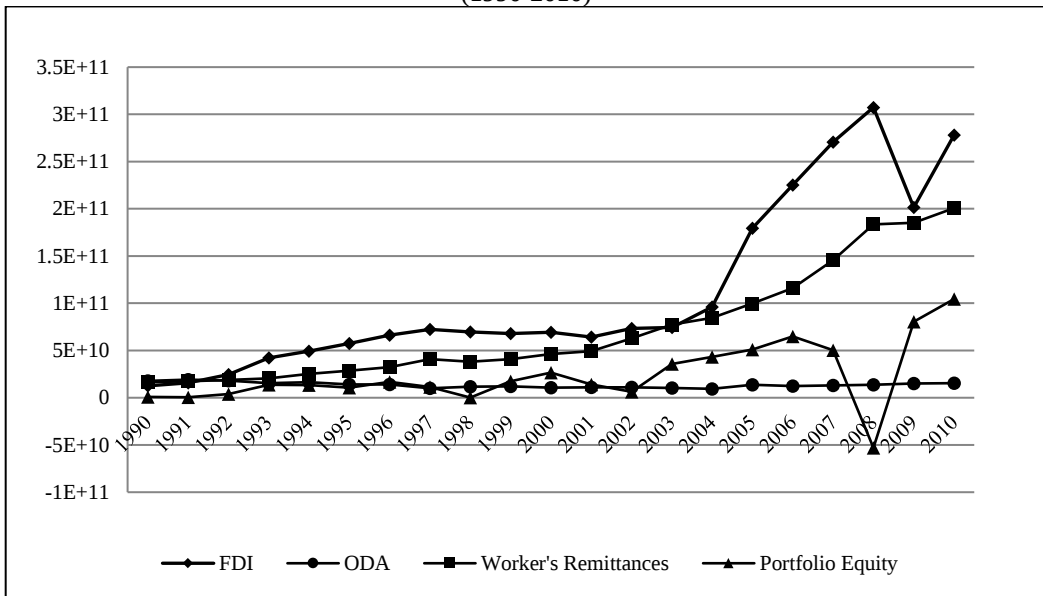
The ongoing surge in the stock of immigrant workers in developed countries has generated huge inflows of workers' remittances to developing countries who export their labour. Workers' remittances alone constituted one-third of the total private capital flows into developing countries. This form of capital flows has remained resilient as a major source of foreign exchange and a stimulant for macroeconomic stability and economic growth in migrants' source countries (Ratha 2003).

In 2016, official remittances received by developing countries were estimated at \$429 billion (World Bank 2017). This represents an almost sixfold increase in nominal terms since the year 2000 and is more than thrice as large a total as the level of official development assistance (ODA) to developing countries over the same period. Moreover, this form of capital flows to developing countries is believed to be under-estimated, because many transfers take place through unofficial channels (Canuto and Ratha 2011).

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In spite of the persistent increase in the flows of workers' remittances and its potential relevance in providing foreign exchange for economic growth and development, surprisingly little empirical evidence has been established of the domestic macroeconomic factors responsible for such inflows in the countries of migrants' origin particularly in Asia. The fundamental question is this: What causes different migrants' source countries to receive different levels of remittances? Do differences in the expected rate of returns on investment and financial assets between migrants' home and destination countries and absolute variations in the domestic exchange rate matter? What are the effects of such factors like level of financial sector development and political and/or economic uncertainty on remittance inflows in labour-exporting countries?

Figure 1: Workers' Remittances and Other Capital Flows to Labour-Sending Asian Countries (1990-2010)



Source: Author's estimation using data from World development indicators

Although some studies have previously attempted to answer these questions empirically, their findings turned out to be counter-intuitive. For instance, in a pioneering work, using data for Greece, Turkey, and Yugoslavia, Swamy (1981) reported that inflows of migrants' remittances are not influenced significantly by the economic benefits provided by countries of migrant origin but rather by fluctuations in the level of economic activities in migrant destination countries. In other words, macroeconomic incentives in terms of high interest rates and undervalued exchange rates tailored by migrants' source countries do not appeal to migrants' workers when they decide what portion of their savings abroad should be remitted back home. Swamy's outcome had later gained support in a number of different studies (for a systematic review, see Gupta [2006] for inflows of remittances to India, Lianos [1997] for remittance flows to Greece from Belgium and Sweden, and Straubhaar [1986] for the case of Turkish migrant remittances).

These findings have brought into question the effectiveness of various macroeconomic and financial policies designed and believed to be capable of attracting large inflows of migrants' remittances in

order to maximize their benefits in labour exporting countries (e.g. see Chandavarkar 1980 and O'Neill 2001). These counter-intuitive results were attributed to the possible correlation among the exogenous macroeconomic variables considered (Elbadawi, de Rezenda Rocha and Mundial 1992) and the omission of important variables; e.g. financial sector development (Kemegue et al. 2011). The recorded flows of workers' remittances are likely to increase with the rise in the access and quality of financial services delivery which promote competitive formal remitting channels and reduce the remitting cost (Freund and Spatafora 2008).

This paper, contributes to the existing literature by providing further evidence for the role of domestic macroeconomic factors in driving remittance flows into labour-sending Asian countries. In particular, the paper reconfirm that factors such as interest rate differential between migrant home and destination country, exchange rate depreciation, and financial sector development favourably induce remittance flows from overseas migrant workers. Conversely, workers' remittances respond negatively to domestic economic and/or political instability.

Data from labour-sending Asian countries become appropriate for understanding remittance behaviour in the face of domestic macroeconomic variables for several reasons. First, as a precondition for workers' remittances, international migration from the Asian regions to the developed countries has increased over the past decades. It is estimated that Asian countries produced 59 million international emigrants or 1/3 of all emigrants from developing countries. In 2010, countries such as India, China, Bangladesh, Pakistan, the Philippines and Turkey appeared among the top-ten emigration developing countries with high-income countries of organisation for economic co-operation and development (OECD) and high-income non OECD countries identified as their main destinations (Canuto and Ratha 2011)¹.

Consequently, Asia accounts for more than 63 percent of all remittance flows to developing countries (International Fund for Agricultural Development 2013). The officially recorded remittance inflows to the labour-sending Asian countries were estimated to reach \$286 billion in 2013. Countries such as India, China, the Philippines, Pakistan, Bangladesh, Lebanon and Sri Lanka (to mention but a few) depend significantly on workers' remittances as a source of foreign reserves and a stimulant for macroeconomic stability. Moreover, these countries were among the top remittance recipients in 2013, with India being the foremost, receiving remittances to the tune of \$70 billion².

Figure 1 above depicts the pro-cyclical nature of inflows of workers' remittances to some labour-sending Asian countries. The flows of workers' remittances to the countries have grown over the past years except for two periods: 1998 and 2008 where slight declines were observed. The former decrease in the workers' remittances is linked to the Asian financial crisis which began in 1997 and affected investments in some part of the regions while the latter is associated with the recent global financial crisis which hampered employments in many immigrants' destinations. However, inflows of remittances remained resilient and volatile after 2003. This, on the one hand, can be attributed to recovery of labour markets, especially in the United State and economic boom, caused by oil export, in Saudi Arabia, being the largest sources of workers' remittances to the developing countries (Ratha and Sirkeci 2010). On the other hand, it can be ascribed to improved investment climate over the period in most of the remittance-receiving Asian countries.

¹High-income OECD countries host 42.8 percent emigrants while high-income non-OECD countries and other developing countries host 14.1 and 43.1 percent of emigrants respectively.

²Migration and Development Briefs 18; Migration and Development Briefs 20,

Second, in an effort to influence the inflows of workers' remittances, most of these countries have employed various economic incentives and government interventions through policy regulations. For example, in the early 1990s, India devalued its exchange rate and liberalized foreign exchange controls. This to some extent has rendered informal remitting channels less attractive and increased the volume of officially recorded inflows of workers' remittances (Gupta 2006). In Bangladesh, the macroeconomic reforms set in 2002 required foreign exchange in the current account to be free floating. This has interestingly made the controlled market rate lower than the bank rate. In addition, the government also allowed the establishment of new exchange houses, where there is a large concentration of Bangladeshi migrant workers (Siddiqui 2004).

Third, under the liberalized foreign exchange regime in the Philippines, overseas Filipinos and their beneficiaries are allowed to retain their remittances in foreign currency deposit accounts. While the Philippines government requires its migrants workers abroad to remit 80 percent of their salary, it rewards them with tax exemption through Tax Reform Act No. 8424 of 1993 (Gonzaga 2009). Similarly, Korean domestic companies that obtained foreign job contracts under the auspices of government are required to deposit a portion of their workers' salaries into Korean banks. While the various efforts made by these labour-sending countries to attract workers' remittances have in some cases met with little success, they are believed to have partly influenced the amount of workers' remittances received by them. Nevertheless, it is uncommon to find studies that pooled these countries together to measure the efficacy of their financial and macroeconomic incentives in attracting migrant workers' remittances. The balance of this paper is organized as follows. Section 2 outlines the brief literature review on the determinants of workers' remittance flows, Section 3 presents the econometric approach, Section 4 discusses the empirical results, and Section 5 concludes.

2. DETERMINANTS OF WORKERS' REMITTANCE FLOWS

Although a considerable amount of literature has been published on the determinants of workers' remittance flows, the literature seems to be dominated by two major approaches: one focusing on microeconomic factors and the other focusing on macroeconomic variables. However, despite this obvious division, there is virtually no standard theory for workers' remittance determination in the received literature (Lucas and Stark 1985). One notable exception that seems to influence the development of most empirical studies on microeconomic determinants of migrants' remittances is the theory proposed by Lucas and Stark (1985).

The authors distinguished two main motives that influenced remitting behaviour among migrants' workers: the pure altruism- the migrant concern toward his left home family members, and the pure self-interest- the migrant aspiration for inheritance, investment in assets and intention to return home with dignity. Altruism motivates remittances because the utility of the recipient's household members form part of the migrant worker's utility function. Hence, the migrant worker obtains utility from partly financing their consumption through remittances sent. On the other hand, Self-interest motivates remitting behaviour through exchange of remittance income for goods, services and assets that provide utility to the migrant worker. Migrant workers may have investments that need to be tendered while they are abroad; hence they use other family members as their representatives. Migrant workers' remitting behaviour is thought to be altruistic if the amount they remit rise with decrease in the level of income earned by migrants dependent in home countries. On the other hand, remittances

are believed to be self-interest motivated when their inflows rise with the increase in migrants' family income level at home.

However, considering the intricate nature of motives for remitting by migrant workers, and the fact that altruism and self-interest are not necessarily mutually exclusive in explaining migrant remittance inflows, Lucas and Stark (1985) further suggested an alternative theory to describe migrant remitting behaviour called tempered altruism or enlightened self-interest. This views remittances 'as part of an inter-temporal mutually beneficial contractual arrangement between migrant and family'. It is based on the notion that migrant educational investment during pre-migration period are likely to be borne by the immediate family. Therefore as a reward for their sacrifice the family receive remittances. It is also motivated by risk diversification and coinsurance arrangement, in which remittances serve as source of compensation income in the event of adverse economic shocks for example, crop failure and lives stock diseases for the case of family and unemployment for the case of migrant worker.

In another related work by Melkonyan and Grigorian (2012) on remittance behaviour, they established that when migrant workers' remittances are motivated by altruism, self-interest and strategic exchange, the amount of remittance transfers will vary with the degree of cooperation between remitting migrant and remittance-receiving relative. Recent studies have tested the empirical implications of pure altruism, self-interest, insurance, loan repayment and extensions (Azizi 2017; Bouoiyour and Miftah 2015; Amuedo-Dorantes and Pozo 2013; Chiodi et al. 2012; Arun and Ulkun 2011; Cai 2003; Agarwal and Horowitz 2002; Foster and Rosenzweig 2001; Ilahi and Jafarey 1999).

From a macroeconomic perspective, a handful of studies have examined how the macroeconomic factors in migrants' homes and destinations influence the behaviour of remittances. These studies highlighted that, along with the growth of a potential number of migrant workers abroad, macroeconomic variables such as interest rate, exchange rate misalignments, and political and/or economic uncertainty affect the inflows of remittances received by migrants' source countries (Mallick 2017; Sultonov 2013; Castillo-Ponce et al. 2011; Adams 2009; Alper and Neyapti 2006; Aydas et al 2005; El-Sakka and McNabb 1999). These researchers are of the opinion that incentive schemes based on competitive domestic macroeconomic factors, like relative rate of returns on investment, exchange rate depreciation, and political and/or economic stability, spur remittance inflows to labour-sending countries.

However, empirically, some studies failed to establish the significance of these domestic macroeconomic factors in determining workers' remittance inflows to migrant-sending countries. For example, Straubhaar (1986) argued that remittance inflows from Turkish migrant workers are more sensitive to economic situations in foreign countries and domestic political stability rather than economic incentives. Similarly, Gupta (2006) reported that remittance flows to India are neither deterred by political uncertainty nor influenced by risk-return considerations and exchange rate devaluations. In the same line of argument, Lianos (1997) reported that workers' remittance flows to Greece from Belgium and Sweden are insensitive to both interest rate and exchange rate considerations. In North Africa and Europe, Elbadawi, de Rezenda Rocha and Mundial (1992) failed to find any significant effect of the interest rate differential between migrants' home and destination countries on the inflow of official remittances.

In terms of the relevance of the macroeconomic factors of migrant home and destination countries in driving remittance flows, some studies reported that migrants' remittance behaviour is influenced more by the economic conditions in the destination country than economic opportunities in their

home country (Vargas-Silva and Huang 2006). While the flows of workers' remittances to labour-sending countries may differ in response to macroeconomic policies and economic situations prevailing in both migrants' home and destination countries, the deferring findings presented above can be partly attributed to the strength of financial deepening and intermediations in the migrants' source countries. Consequently, the relative rate of returns on investment and exchange rate considerations may not influence remitting behaviour among migrant workers if the quality of financial services provided by financial intermediaries in terms of investment opportunities and competitive remitting channels is not developed and well integrated in the labour-sending countries (Wahba 1991).

3. ECONOMETRIC APPROACHES

Based on pooled cross-country time series data and using a Pooled Mean Group (PMG) estimator, the effects of domestic macroeconomic factors on workers' remittance inflows are examined in some labour-sending Asian countries. The long-run movements of workers' remittances and domestic macroeconomic factors are assumed to be similar across these countries given their income level, migration history, and policies to influence remittance inflows. But short-run fluctuations are expected to vary, reflecting country specific factors.

The pooled mean group estimator, better, allows for this econometric specification when compared to other estimators, e.g. Dynamic Fixed Effect (DFE) and Mean Group (MG) estimators. It overcomes the possible heterogeneity bias often encountered in studies using Dynamic Fixed Effects (DFE) or Generalised Methods of Moments (GMM) estimators by allowing the short-run coefficients and error variances to differ across countries but restricting the long-run coefficients to be identical. Moreover, unlike the Mean Group (MG), estimator which assumes that all slope coefficients across countries are heterogeneous, PMG takes into cognisance that certain parameters maybe the same across countries (Pesaran et al. 1999).

In other words, using the PMG method, we estimated a restricted equation for the effects of domestic macroeconomic factors on workers' remittance inflows based on annual data from 1984 to 2010. A rather similar specification was earlier considered by El-Sakka and McNabb (1999). However, our specification is distinguished by its focus on domestic macroeconomic variables and taking into account the strength of financial sector development and political risk in remittance-receiving countries. We assume that the long-run equation is given as follows³.

$$\mathcal{R}_{it} = \alpha_{0i} + \alpha_{1i}ID_{it} + \alpha_{2i}RW_{it} + \alpha_{3i}INF_{it} + \alpha_{4i}FD_{it} + \alpha_{5i}EXT_{it} + \alpha_{6i}POL_{it} + \mu_{it} \quad (1)$$

$$i = 1, 2, \dots, N, \quad t = 1, 2, \dots, T.$$

Where $\mathcal{R}_{it}$ is the logarithm of per capita workers' remittances, ID_{it} is the interest rate differential between the migrants' homes and the destinations countries, RW_{it} is the logarithm of migrant real wages in the destinations countries, INF_{it} is the logarithm of rate of inflation, FD_{it} is the logarithm of financial sector development, EXT_{it} is the logarithm of bilateral exchange rate between migrant

³Although the equation is estimated using data on aggregate workers' remittances to measure the left hand side variable, it is pertinent to know that the model relates more to workers' remittances sent by overseas migrants for investment purpose. Data limitation does not allow distinguishing workers' remittances for investment and those for consumption. Hence aggregate data on workers' remittances was used.

country of origin and migrant main destination country and POL_{it} is a measure of political risk in the migrant country of origin. α_{oi} and μ_{it} are a country-specific intercept and an error term, respectively.

Workers' remittance per capita ($\mathcal{R}_{it}$) refers to the official workers' remittances and compensation of employees received by migrants' source countries divided by the population in the migrants' home country. The interest rate differential⁴(ID_{it}) is the variation in the relative rate of returns on investment and/or financial assets between the migrants' country of origin and their destinations. If the exchange rate-adjusted return on investment is higher at home than abroad, migrants will prefer to send their savings back home for investment purposes. Therefore, the variable is expected to have a positive effect on the flow of workers' remittances. Migrant real wage⁵(RW_{it}) is the wage available to the migrant workers in the host country, used as a control variable. This variable determines not only the level of economic activities in the migrant destination country and migrant income and savings but also the amount to be remitted back home. The higher the income earned by migrant workers, the higher the potential amount to be remitted to the origin country will be.

The rate of inflation (INF_{it}) is a measure of economic uncertainty in the migrant source countries (Glytsos and Katseli1986). A high rate of inflation in the migrant home country may result in lower inflows of workers' remittances, since it reflects increased risk and uncertainty if workers' remittances are driven by investment motive (Arezki and Brückner 2012). The financial sector development (FD_{it}) is measured by domestic credit to the private sector, which refers to the financial resources provided to the private sector, such as loans, purchase of nonequity securities, trade credits, and other accounts receivable that establish a claim for repayment. The development of the financial sector should ease the process of money transfer by increasing the number of competing formal remitting channels, which reduces the remitting cost and induces migrant workers to shift their savings from their destinations to the countries of origin (Freund and Spatafora 2008).The exchange rate (EXT_{it}) is the nominal rate determined by national authorities, expressed in local currency units relative to the currency in migrants' main destination for each country included in our sample⁶. The depreciation of the domestic exchange rate (defined as an increase in the index) is expected to attract more remittance inflows through a sale effect as domestic goods, services, and assets become significantly cheaper and affordable to migrants earning foreign currency (Ratha and Sirkeci 2010). Moreover, exchange rates appreciation negates the migrants' incentive to remit (Faini 1994). Finally, the political risk index(POL_{it}) is a measure of political instability, socioeconomic condition, internal conflict and investment profile in the remittances receiving countries. An increase in the political risk may undermine remittances inflows for investment purpose.

⁴ Interest rate differential is based on deposit interest rate paid by commercial or similar banks for demand, time, or savings deposits.

⁵ The average real per capita income in two major migrants' destination countries for each migrant-sending country included in our sample is used as a proxy measure for migrant real wage. The destination countries for each migrant-sending country are identified from 2013 estimates of International Migrant Populations by Country of origin and Destination. This is available at <http://www.migrationpolicy.org/programs/data-hub/charts/international-migrant-population-country-origin-and-destination>

⁶The exchange rate between each migrant-sending country and its main destination is derived by using domestic unit price of United States dollar in both countries. For example, to obtain the exchange rate between Indian rupee and United Arab Emirates (UAE) dirham, the direct rupee-dollar rate is multiplied by indirect dirham-dollar rate. The product is a direct rupee-dirham exchange rate which is used as the exchange rate between migrant-sending country (India) and its main destination, UAE.

Therefore, assuming that all of these variables explained above are $I(1)$ and cointegrated⁷ for individual countries, the error term is an $I(0)$ process for all i . Taking the maximum lag equal to (111111) based on Akaike Information Criterion, the ARDL equation can be given as shown below.

$$\begin{aligned} \mathcal{R}_{it} = & \alpha_i + \lambda_i \mathcal{R}_{it-1} + \beta_{10i} ID_{it} + \beta_{11i} ID_{it-1} + \beta_{20i} RW_{it} + \beta_{21i} RW_{it-1} \\ & + \beta_{30i} INF_{it} + \beta_{31i} INF_{it-1} + \beta_{40i} FD_{it} + \beta_{41i} FD_{it-1} + \beta_{50i} EXT_{it} + \\ & + \beta_{51i} EXT_{it-1} + \beta_{60i} POL_{it} + \beta_{61i} POL_{it} + \mu_{it} \end{aligned} \quad (2)$$

The error correction reparametrization is given by

$$\begin{aligned} \Delta \mathcal{R}_{it} = & \phi_i (\mathcal{R}_{it-1} - \alpha_{0i} - \alpha_{1i} ID_{it} - \alpha_{2i} RW_{it} - \alpha_{3i} INF_{it} - \alpha_{4i} FD_{it} - \alpha_{5i} EXT_{it} \\ & - \alpha_{6i} POL_{it}) + \beta_{10i} \Delta ID_{it} + \beta_{20i} \Delta RW_{it} + \beta_{30i} \Delta INF_{it} + \beta_{40i} \Delta FD_{it} \\ & + \beta_{50i} \Delta EXT_{it} + \beta_{60i} \Delta POL_{it} \end{aligned} \quad (3)$$

Where

$$\begin{aligned} \phi_i = & -(1 - \lambda_i); \alpha_{0i} = \frac{\alpha_i}{(1 - \lambda_i)}, \alpha_{1i} = \frac{\beta_{10i} + \beta_{11i}}{(1 - \lambda_i)}, \alpha_{2i} = \frac{\beta_{20i} + \beta_{21i}}{(1 - \lambda_i)}, \alpha_{3i} = \frac{\beta_{30i} + \beta_{31i}}{(1 - \lambda_i)}, \\ \alpha_{4i} = & \frac{\beta_{40i} + \beta_{41i}}{(1 - \lambda_i)}, \alpha_{5i} = \frac{\beta_{50i} + \beta_{51i}}{(1 - \lambda_i)}, \alpha_{6i} = \frac{\beta_{60i} + \beta_{61i}}{(1 - \lambda_i)}. \end{aligned}$$

3.1. Data Source

All of the data for this analysis came from World Development Indicators (WDI) and International Monetary Fund (IMF), except for those of India and Pakistan, whose data for interest rates were obtained from the DataStream. Specifically, data on workers' remittances, financial sector development, exchange rates, interest rates, and real per capita income for major migrants' destination countries (proxy for real wage) were sourced from WDI database. The data on inflation, average consumer prices was obtained from World Economic Outlook (WEO) database, IMF and data for political risk rating were collected from International Country Risk Guide (ICRG) database. The data⁸ are given on an annual basis and mainly cover the period of 1984-2010. The average of these data for each country included in our sample is taken to present a cursory graphical relationship between workers' remittances and each macroeconomic indicators considered in our model specification, as shown below.

The graphs provide some sense of the patterns common in the data. Figure 2a and 2b plot log of workers' remittances against interest rates and log of inflation rates respectively. The figures show that Countries with high inflows of workers' remittances seem to have higher rate of returns on investment compare to their migrants' destination countries and relatively lower inflation rates. Similarly, figure 2c and 2d plot log of financial development and log of exchange rates versus the log of workers' remittances. While figure 2c shows mixed evidence of the connection between workers'

⁷The integration properties of these variables and their cointegration are examined, and the results are included in Appendix A. With the exception of the interest rate differential, all of the variables are integrated of order one; $I(1)$. However, Pedroni and Johansen Fisher Panel Cointegration tests show that these variables have a long-run cointegrating relationship.

⁸ The period is chosen in order to maintain consistency in the data. For some countries in the study, data is inconsistent after the period e.g. Syrian Arab Emirate.

remittances and financial development, figure 2d reveals that countries that experienced depreciation of exchange rates seem to attract high inflows of workers' remittances.

Figure 2e and 2f respectively plot workers' remittances and average migrant real wages at the destination countries and workers' remittances and the level of political risk in the migrant country of origin. The figures respectively depict that worker' remittances increase slightly with a rise in migrant real wages at the destination country and decline with increase in political risk in migrant country of origin. A simple correlation analysis corroborates these relationships – the correlation coefficient between workers' remittances and interest rates, inflation, exchange rates, financial development, real wages and political risk is 0.45, -0.71, 0.069, 0.004, 0.054 and -0.138 respectively.

Figure 2a: Workers' remittances and interest rate differentials

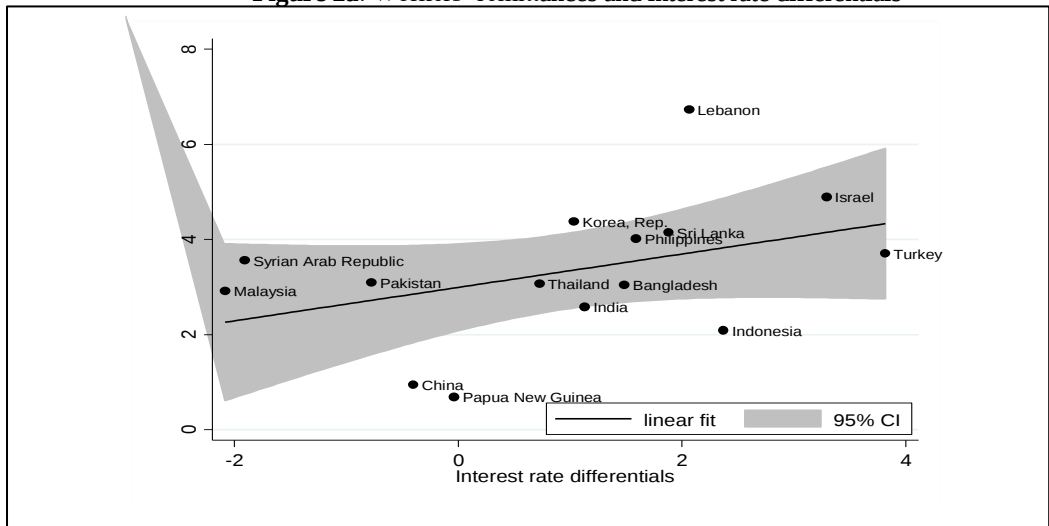


Figure 2b: Workers' remittances and inflation rates

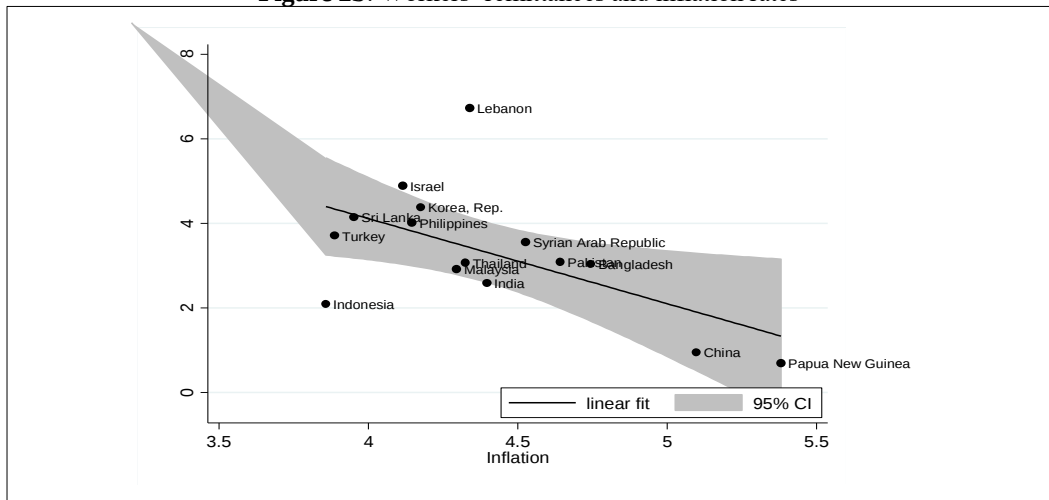


Figure 2c: Workers' remittances and financial development

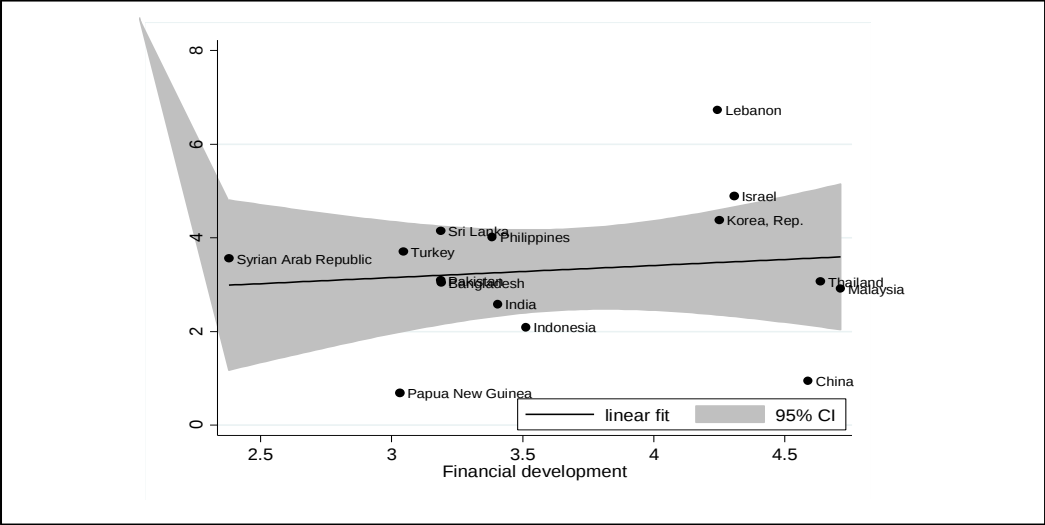


Figure 2d: Workers' remittances and exchange rates

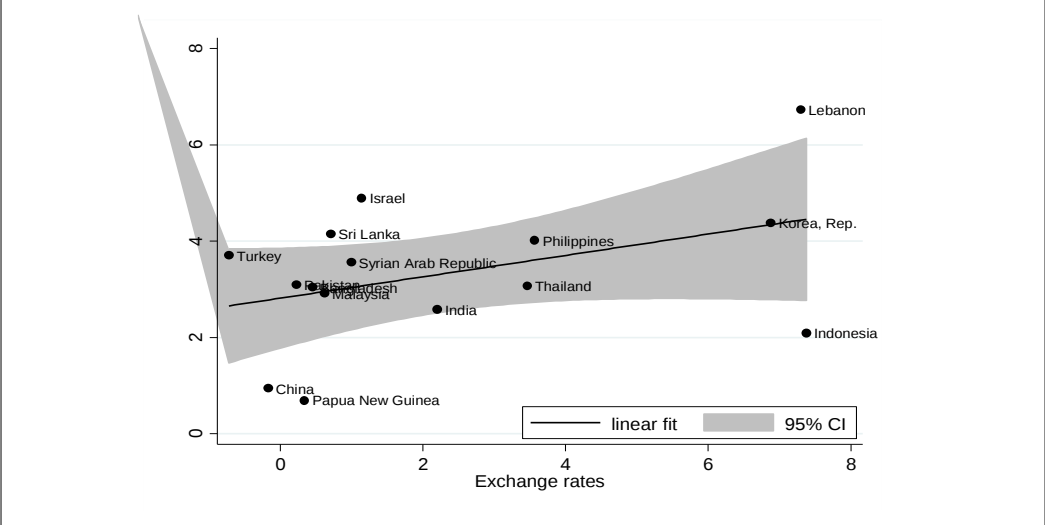
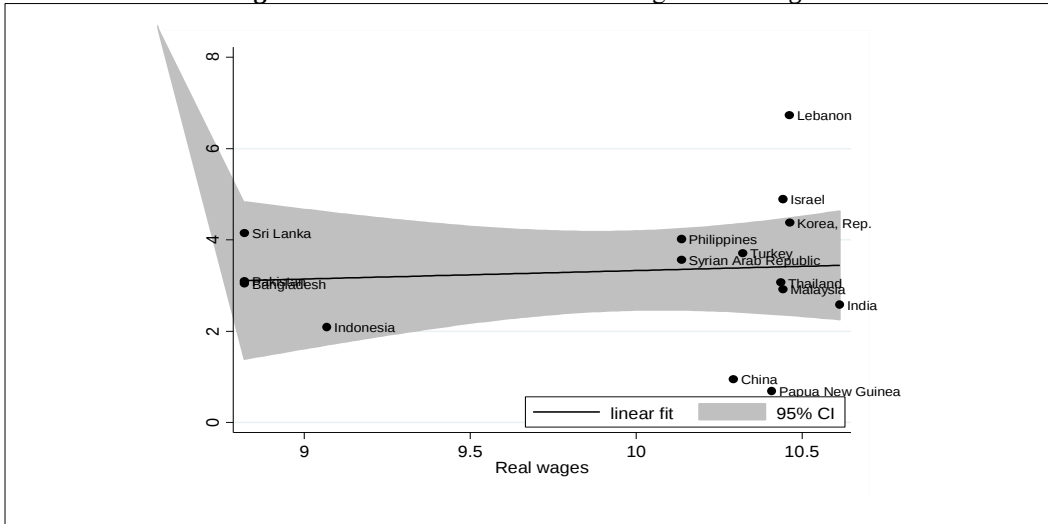
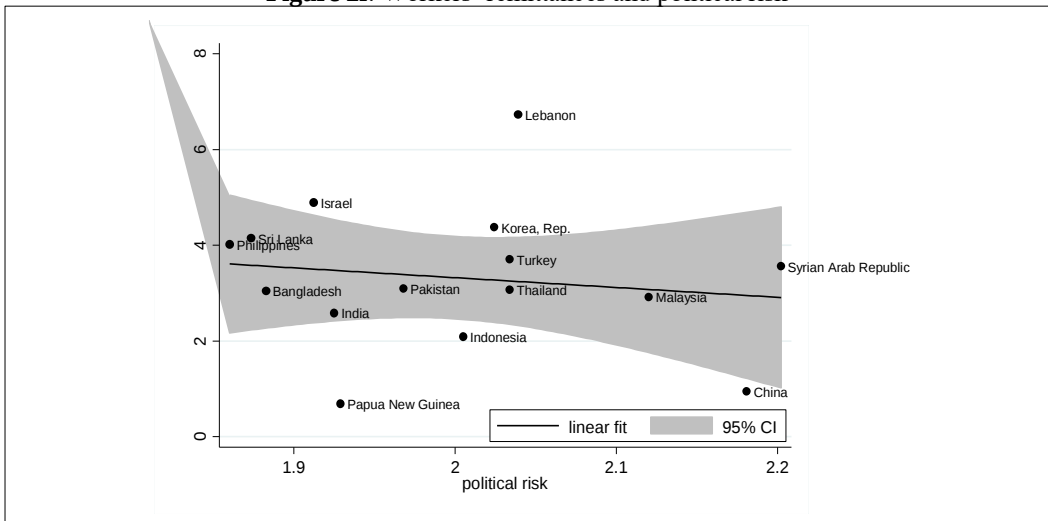


Figure 2e: Workers' remittances and migrant real wages**Figure 2f: Workers' remittances and political risk**

4. ESTIMATION RESULTS

In Table 1, reports of estimates obtained from MG, PMG, and DFE estimators are presented based on our model specification above (Eqn.3). By restricting all of the long-run slope coefficients to be homogeneous but allowing dynamics in the short-run coefficients i.e. using the PMG instead of the MG estimator, produces lower standard errors and significantly mitigates the measured speed of adjustment with the sign of the estimated long-run coefficients as expected. The imposed restriction

of long-run homogeneity of all of the slope coefficients cannot be rejected at the conventional statistical level by the Hausman test statistics.

Table 1: Pooled Mean Group Estimations of Domestic Macroeconomic Factors and Workers' Remittance Inflows. Baseline estimates (Unbalanced panel dependent variable: $\mathcal{R}$) 1984-2010

	MG	PMG	Hausman test	DFE	MG	PMG	Hausman test	DFE
<i>Convergence coefficient</i>	-0.633 (0.083)***	-0.163 (0.075)**		-0.100 (0.027)***	-0.758 (0.071)***	-0.173 (0.081)**		-0.114 (0.029)***
$\mathcal{R}_{it-1}$								
<i>Long-run coefficients</i>								
<i>ID</i>	-0.031 (0.047)	0.033 (0.011)***		-0.054 (0.035)	-0.017 (0.050)	0.031 (0.009)***		-0.016 (0.031)
<i>RW</i>	3.869 (2.792)	1.947 (0.571)***		4.172 (2.278)*	0.315 (3.063)	6.450 (1.154)***		-0.098 (3.501)***
<i>INF</i>	0.217 (0.939)	-0.376 (0.158)**	3.60 (0.731)	0.326 (0.766)	-1.983 (1.028)*	-0.523 (0.171)***	2.83 (0.900)	-0.413 (0.835)
<i>FD</i>	-0.803 (0.784)	1.248 (0.215)***		1.056 (0.886)	-1.757 (1.555)	1.728 (0.267)***		0.648 (0.798)
<i>EXT</i>	1.469 (0.831)*	0.206 (0.155)		-0.774 (0.774)	1.600 (0.688)**	0.404 (0.162)**		-1.259 (0.790)
<i>POL</i>	-0.160 (0.320)	-0.045 (0.161)		0.174 (0.718)	-0.506 (0.285)*	-0.318 (0.193)*		0.062 (0.635)
<i>Short-run coefficients</i>								
ΔID	0.009 (0.015)	0.010 (0.015)		-0.001 (0.002)	0.014 (0.021)	0.011 (0.015)		-0.001 (0.002)
ΔRW	-1.632 (2.724)	-0.157 (1.361)		0.438 (0.767)	0.067 (4.013)	-0.643 (1.286)		0.626 (0.778)
ΔINF	0.275 (0.820)	-1.106 (0.645)*		0.317 (0.378)	1.411 (0.893)	-1.251 (0.602)**		0.295 (0.378)
ΔFD	0.293 (0.450)	-0.371 (0.365)		-0.116 (0.147)	0.822 (0.874)	-0.473 (0.353)		-0.100 (0.147)
ΔEXT	-0.091 (0.595)	-0.517 (0.528)		-0.134 (0.194)	-0.394 (0.502)	-0.543 (0.538)		-0.150 (0.194)
ΔPOL	0.226 (0.163)	0.034 (0.151)		-0.062 (0.097)	0.295 (0.143)**	0.024 (0.124)		-0.052 (0.097)
<i>Time trend</i>	-----	-----		-----	0.208 (0.120)*	-0.092 (0.026)***		0.110 (0.075)
Countries	15	15		15	15	15		15
Observations	399	399		399	399	399		399

Notes: All equations include a constant country-specific term. Standard errors are in parentheses. *Significant at the 10% level; **at the 5% level; ***at the 1% level.

On the other hand, the DFE estimator yields the lowest speed of adjustment, and this can be attributed to the downward bias in the heterogeneous panel. In addition, restricting the slope coefficients to be homogeneous did not affect the sign but the significance of the long-run coefficients.

The results based on the PMG procedure produces the expected results. The coefficients of interest rate differential and exchange rate are positive and statistically significant at 1% and 5% respectively. This suggests that exchange and interest rate considerations affect the behaviour of remittances. Moreover, the magnitude of their effects (the size of the coefficients) in driving remittance inflows varies; exchange rate depreciations seem to exert strong statistical influence in attracting remittances than interest rate differentials. This is consistent with the earlier finding that exchange rate policy plays a more substantial role than interest rate in explaining remittance flows (Faini 1994). The coefficient of financial sector development is positively significant at the conventional level, which

also implies that, by easing transfer of remittances and increasing access to financial services through competitive formal channels with reduced cost, financial development induces remittance flows to labour-sending Asian countries.

Table 2: Pooled Mean Group Estimations of Domestic Macroeconomic Factors and Workers' Remittance Inflows. Estimates with Dummy for Asian Crisis (Unbalanced panel dependent variable: R_t) 1984-2010

	MG	PMG	Hausman test	DFE	MG	PMG	Hausman test	DFE
<i>Convergence coefficient</i>	-0.578 (0.104)***	-0.172 (0.077)**		-0.103 (0.026)***	-0.583 (0.106)***	-0.192 (0.083)**		-0.103 (0.026)***
R_{it-1}								
<i>Long-run coefficients</i>								
<i>ID</i>	-0.042 (0.065)	0.035 (0.010)***		-0.015 (0.033)	2.425 (2.368)	0.028 (0.009)***		-0.017 (0.033)
<i>RW</i>	6.715 (3.020)**	2.745 (0.489)***		3.577 (2.153)*	-16.507 (22.936)	3.590 (0.413)***		3.641 (2.166)*
<i>INF</i>	-0.818 (1.014)	-0.447 (0.136)***		0.208 (0.724)	-8.890 (8.438)	-0.608 (0.124)***		0.219 (0.726)
<i>FD</i>	0.195 (0.507)	0.996 (0.197)***	1.17 (0.992)	1.185 (0.846)	40.544 (40.306)	0.763 (0.163)***	1.20 (0.991)	1.166 (0.848)
<i>EXT</i>	1.081 (1.802)	0.247 (0.132)*		-0.565 (0.726)	48.435 (45.328)	0.401 (0.119)***		-0.578 (0.729)
<i>POL</i>	0.073 (0.510)	-0.112 (0.139)		0.668 (0.690)	-1.728 (1.349)	-0.236 (0.122)*		0.642 (0.695)
<i>Short-run coefficients</i>								
ΔID	-0.019 (0.021)	0.009 (0.015)		0.0001 (0.002)	-0.020 (0.022)	0.008 (0.014)		0.0001 (0.002)
ΔRW	-2.677 (2.140)	-0.262 (1.277)		0.559 (0.747)	-3.279 (2.425)	-0.439 (1.178)		0.526 (0.753)
ΔINF	0.562 (0.757)	-1.043 (0.627)*		0.290 (0.368)	0.261 (0.815)	-0.908 (0.625)		0.298 (0.369)
ΔFD	0.003 (0.287)	-0.336 (0.356)		-0.176 (0.143)	-0.158 (0.311)	-0.338 (0.352)		-0.180 (0.144)
ΔEXT	0.117 (0.340)	-0.533 (0.511)		-0.011 (0.190)	0.095 (0.323)	-0.548 (0.493)		-0.013 (0.369)
ΔPOL	0.196 (0.172)	0.040 (0.141)		-0.078 (0.094)	0.232 (0.191)	0.048 (0.128)		-0.081 (0.095)
<i>Asian Crisis</i>	4.312 (4.364)	0.350 (0.119)***		-4.550 (1.511)***	18.591 (18.145)	0.254 (0.092)***		0.370 (1.007)
1997					-22.852	0.464		-4.521
1998	-----	-----		-----	(22.904)	(0.104)***		(1.512)***
Countries	15	15		15	15	15		15
Observations	399	399		399	399	399		399

Notes: All equations include a constant country-specific term. Standard errors are in parentheses. *Significant at the 10% level; **at the 5% level; ***at the 1% level.

Whereas the real wages at migrants' destinations, which determine migrant income, savings, and the amount to be remitted back home favourably impact on workers' remittance flows to country of origin, the level of economic condition in the migrant country of origin measured by inflation and political risk negate it. The respective size of the coefficients of these variables and their statistical significance highlight their relevance in explaining workers' remittance behaviour. While migrant earnings is the major driver of the amount of remittances sent by migrant workers to the country of origin in our specification, the relative importance of domestic economic and political condition matters, as the result shows that political and economic uncertainty adversely affects remittance decisions by migrant workers. Time trend variable was included, to examine the effect of factors that

may influence remittance flows over time but are not directly observable, e.g. changes in migrant investment preferences and attachment to origin country. The coefficient of the time trend variable is negatively significant which implies that remittance inflows decline over time as migrant attachment and investment preferences in home country dissipated.

In table 2, dummy variable is included for Asian financial crisis which occurred during the period of 1997-1998. Overall, the result of the estimation became significantly more pronounced and the coefficient of the dummy for the Asian crisis is positively significant at 1%. This shows that economic instability due to the crisis had a positive impact on workers' remittance flows to these countries during the period. This may sound counterintuitive, as the crisis may have undermined investment opportunities to which remittance income are channelled in those remittance-receiving countries. However, it is pertinent to note that the depreciations of currencies in the remittance-receiving countries caused by the crisis could have generated more inflows of remittances for investments especially in physical assets (land and housing). Yang (2008) reported that the appreciation of migrant's currency against the Philippines peso during the 1997 Asian financial crisis led to increase in household remittances from overseas.

5. CONCLUSIONS

Using the pooled mean group estimator, the effects of domestic macroeconomic factors in attracting workers' remittance inflows to 15 labour-sending Asian countries are examined. Our results support the simple theoretic consideration that the flow of workers' remittances ought to be influenced by key domestic macroeconomic and financial indicators such as interest rate differential, exchange rate depreciation, financial sector development, and economic and/or political instability. We found that these variables jointly play a crucial role in determining the behaviour of workers' remittance flows to these countries. In particular, along with the earnings of migrants, factors such as interest rate differential between home and destination country, exchange rate depreciation, and financial sector development favourably induce remittance flows from migrant workers abroad. Conversely, workers' remittances respond negatively to domestic economic and/or political instability.

However, the relative importance of these macroeconomic factors in influencing workers' remittances differs. In particular, the interest rate differential between migrant home and destination has been found to have a lesser statistical impact as compared to exchange rate depreciation, financial sector development, and economic and/or political stability in labour-sending Asian countries. Consequently, this somewhat underscores the relevance of favourable investment climates, as interest-rate-oriented policies to attract higher inflows of workers' remittances may not effectively function if hostile investment climate prevails in countries of migrants' origin.

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APPENDIX A

Table A.1: Panel unit root result for workers' remittances and domestic macroeconomic factors in labour-sending Asian countries 1984-2010

Level	Levin, Lin & Chu	Im, Pesaran and Shin	PP - Fisher Chi-square
Per Capita Workers' Remittances	0.345	0.535	33.418
Interest rate differentials	-----	-----	-----
Migrant real wages	3.783	1.250	18.888
Rate of inflation	-2.685	-2.826	69.462***
Financial sector development	1.186	0.338	53.635***
Bilateral exchange rates	-5.834	-2.314**	45.787
Political risk	0.143	-1.018	31.996
First-Difference	Levin, Lin & Chu	Im, Pesaran and Shin	PP - Fisher Chi-square
Per Capita Workers' Remittances	-6.826***	-6.279***	217.156***
Interest rate differentials	-----	-----	-----
Migrant real wages	0.875*	-4.206***	148.772***
Rate of inflation	-4.986***	-5.341***	339.889***
Financial sector development	-3.708***	-5.343***	211.385***
Bilateral exchange rates	-64.706***	-22.924***	403.149***
Political risk	-4.860***	-5.912***	150.310***

Note: interest differential is not included in the unit root test. Automatic lag length selection is used based on SIC. Values reported are t-statistic and null hypothesis is nonstationarity. ** and *** indicates significance at 1% and 5% levels.

Table A.2: Cointegration test results for workers' remittances and domestic macroeconomic factors in labour-sending Asian countries, 1984-2010

Pedroni residual cointegration test	Panel statistics	Group statistics
Variance ratio	-0.619	-----
Rho statistic	2.936	4.624
PP statistic	-6.560***	-5.437***
ADF statistic	-2.882***	-1.402**

Note: intercept and trend is used in Pedroni test. ** and *** indicates significance at 1% and 5% levels. Null hypothesis is no cointegration.

Johansen Fisher Panel Cointegration Test (1984-2010)				
Hypothesized No. of CE(s)	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from max-eigen test)	Prob.
None	694.2	0.000	392.5	0.000
At most 1	447.3	0.000	200.2	0.000
At most 2	333.8	0.000	178.9	0.000
At most 3	196.5	0.000	116.7	0.000
At most 4	112.3	0.000	71.53	0.000
At most 5	74.17	0.000	66.86	0.000
At most 6	37.61	0.160	37.61	0.160

Note: the test include intercept and the optimal lags interval (in first differences) is 11.

APPENDIX B

Table B: List of Labour-Sending Asian Countries Used in the Estimation Analysis and Private Capital Flows in 2010

Country Name	Workers' Remittances (% of GDP)	Foreign Direct Investment (% of GDP)	Net Official Development Assistance (% of GNI)
Bangladesh	10.81	0.91	1.29
China	0.89	3.12	0.01
India	3.21	1.43	0.17
Indonesia	0.98	1.94	0.20
Israel	0.65	2.37	-----
Korea, Rep.	0.86	-0.01	-----
Lebanon	19.38	10.97	1.16
Malaysia	0.55	3.86	0.0009
Pakistan	5.48	1.14	1.64
Papua New Guinea	0.16	0.31	5.52
Philippines	10.73	0.65	0.27
Sri Lanka	8.38	0.96	1.18
Syrian Arab Republic	2.78	2.48	0.24
Turkey	0.12	1.24	0.14
Thailand	0.55	3.04	-0.004

Source: World Development Indicators.