Remittances and Savings in Asia: Some Empirical Evidence Based on the Life-Cycle Model

Azmat Gani[*]

*Correspondence: Azmat Gani, Department of Economics and Finance, College of Economics and Political Science, Sultan Qaboos University, P.O.Box 20, Al Khod, Muscat, Oman. Email: azmat@squ.edu.om

Copyright © Azmat Gani [**]

Abstract

This study empirically examines the effect of remittances on private real savings for a sample of Asian economies using cross-country time-series data. Our findings consistently show that remittance inflows in Asian countries are positively and statistically significantly correlated with their private real savings. Our findings also reveal economic growth, real deposit interest rate and credit provided by the banking sector as other significant determinants of private real savings. Some policy implications are drawn.

JEL Classifications: F24, O16, F21

Keywords: Remittances, Savings, Life Cycle, Working Population, Asian Countries

1. Introduction

In the last three to four decades robust economic growth and demographic developments (aging population and declining population of working age), largely in the high-income countries, has led to increasing employment opportunities, creating labor shortages that have been hard to fill from the domestic labor supply. This has attracted an increasing number of people from the low and middle-income countries that is now considered to be a global phenomenon. Among this movement of people to the high-income countries is a growing proportion of movement of workers in search for better employment opportunities and living standard. Available statistics indicate that in 2013, the number of international migrants reached 232 million up from 175 million in 2000 and 154 million in 1990 and that between 2000 and 2010, the international migrant stock grew by an annual average rate if 2.3 percent as opposed to 1.2 percent between 1990 and 2000 (United Nations, 2013).

One aspect of remittances is that its magnitude has varied depending on the type of migrants: permanent (resident seekers) or temporary (workers). Highly educated people have generally migrated for permanent settlements elsewhere and therefore have a tendency to remit lesser amounts than the temporary workers. For example, in his study, Adams Jr. (2009) found that countries which exported a larger share of high-skilled (educated) migrants received less per capita remittances than countries which exported a larger proportion of low-skilled migrants.

The outcome of this rising pattern of international migration as described above has generally being beneficial as it has allowed concerted improvement of economic and social conditions in both migrant sending as well as receiving countries. One aspect of direct benefit accrued to the migrant sending countries has been their receipts of large volumes of remittances – the portion of international migrant (permanent migrants and workers) earnings sent back from the country of residence or employment to the country of origin (home country).

In a study involving migrants in Germany, Bauer and Sinning (2011) showed that migrants save significantly more than comparable natives. Given high levels of savings by migrants, the likelihood of remittances to their origin countries increases. For example, in monetary terms, in 2010, worldwide remittance flows are estimated to have exceeded US$440 billion of which developing countries received US$225 billion (The World Bank, 2011). The developing economies of East Asia and the Pacific region is one example where remittances have gradually increased over time. Figure 1 depicts the trend in annual average remittances as a share of gross domestic product (GDP) for developing countries in East Asia and the Pacific and South Asia, compared against the low and middle-income countries for 1982 to 2011. Generally remittances have increased significantly over this period for the South Asian countries and remained higher than the average for the low and middle-income countries (Figure 1).
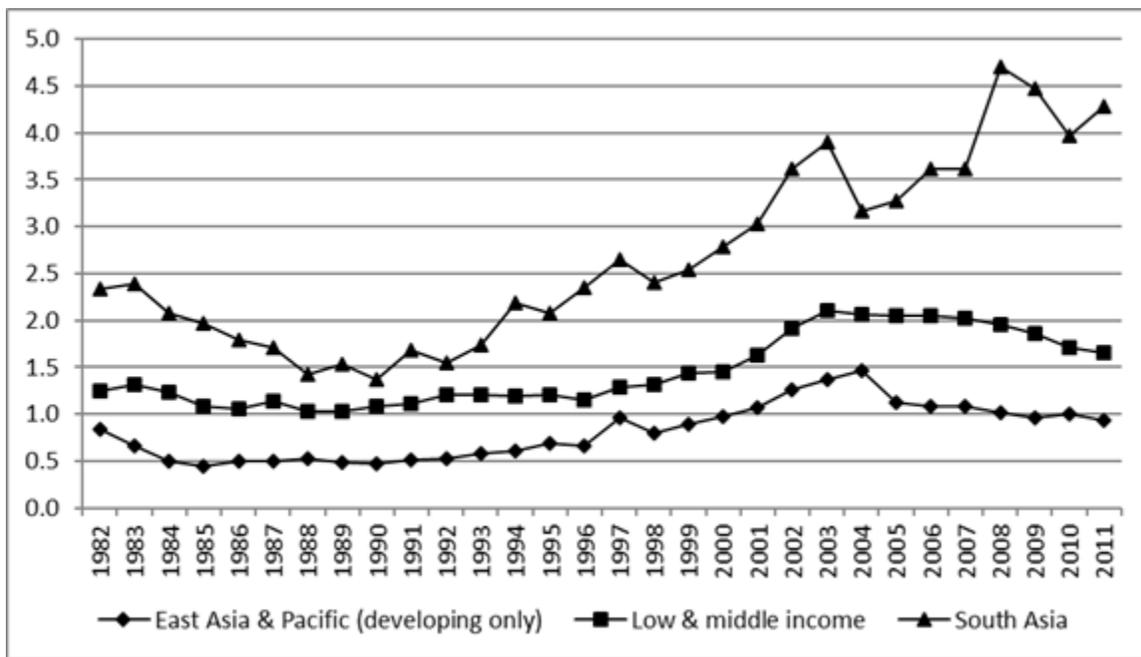

Figure 1. Personal remittances received (percent of GDP)

Source: The World Bank (2012)

Another reality of the Asian countries is that to some extent remittances have been closely associated with savings that gradually increased over the period 1982-2011 (Figure 2). The saving

pattern in the Asian countries as depicted in Figure 2 indicates its importance in terms of influencing future investment, overall growth and population well-being. High levels of savings are also a good indicator in terms of countries having resistance to shocks such as the financial crisis as seen in recent times.
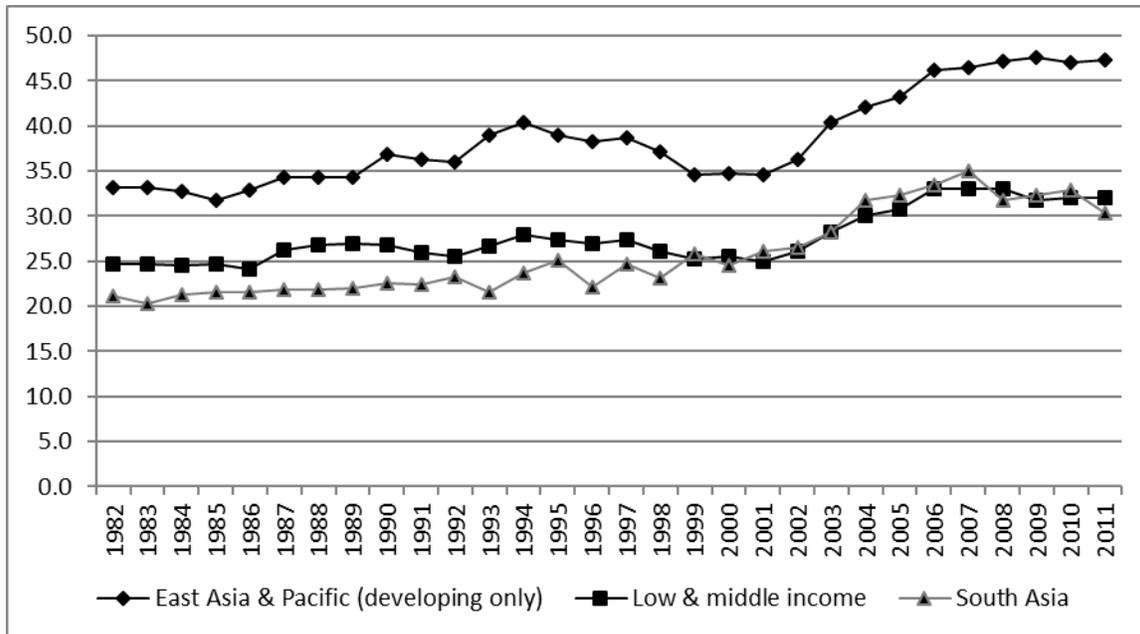
Figure 2. Gross savings (percent of GDP)

Source: The World Bank (2012)

The pattern of savings as depicted in Figure 2 can have important policy implications for the remittance receiving Asian economies given the dynamics associated with a faster globalizing economy both in terms of commodity as well as finance. Many of the Asian economies are now actively seeking greater levels of integration within the global economy so as to raise their level of economic progress. For example, Brooks and Ferrarini (2011) have noted of the expansion of bilateral and regional co-operation initiatives involving Asian economies in the last two decades. Sen (2006) argued that following the regional financial crisis of 1997-1998, there has been an ongoing phenomenon of proliferation of bilateral and regional trading agreements in the Asia-Pacific region.

Low savings rate would raise concern for policy makers as it can imply low levels of investment, fewer job creations, and therefore a lower standard of living. Remittances as a flow of foreign capital can constitute an important part of private savings. As a result of global financial crisis, many donors have also started to cut back on their financial aid. Thus, remittances are most likely to become an ever growing important foreign financial inflow for many labor exporting countries such as the developing Asian economies. Other than this, remittances can have direct beneficial effects on the recipient countries domestic economic activity through an increase in domestic financial resources required for investment, among others. For example, Giuliano and Ruiz-Arranz (2009) found that remittances boost growth in countries with less developed financial system by providing an alternative way to finance investment and helping overcome liquidity constraint.

The patterns of remittances and savings as depicted in Figures 1 and 2 respectively raise the intriguing question of whether remittances are driving private savings in Asia. Past research on remittances and savings, although covering a wide range of discussion on the effects of remittances

on recipient countries household welfare as well as aggregate national welfare, have largely overlooked investigating the direct effects of remittances on national savings at an empirical level. Thus, there exists a gap in the savings and remittances literature that specifically focuses on the remittances and savings relationship in the developing Asian economies. Given the rising trend in remittances as well as savings in the developing economies as depicted in Figures 1 and 2, it is worthy to investigate if there is any relationship between these two macroeconomic fundamentals. This missing link forms the main focus of this paper. In this paper, we empirically examine the direct effect of remittances on private savings in a sample of the developing Asian economies. In doing so, we adopt the well known life-cycle model (Modigliani, 1966 & 1970) as the main conceptual and theoretical framework for our analysis. The next section presents a review of the relevant literature and outlines the conceptual framework. Section 3 discusses the choice of variables and data. Section 4 presents the empirical results. Section 5 concludes.

2. Remittances and Savings: Literature and the Conceptual Framework

Savings is an important component of the macro-economy since they are linked to long-run economic growth. The life-cycle model of Modigliani (1966, 1970) suggests that a country should experience a high rate of national saving if a large proportion of its population is of working age since workers provide for their retirement. Conversely, when workers reach retirement age and begin dis-saving, aggregate savings rate should decline (Masson, Bayoumi, & Samiei, 1998). Thus, the life cycle hypothesis implies that private savings rise with a higher percentage of working population, and fall with a higher percentage of the young and the aging population. The hypothesis also contends that factors such as the elderly dependency ratio, declining fertility rates, life expectancy, and income levels are all possible determinants of private savings (Yasin, 2008). Modigliani (1970) and Masson and Tryon (1990) also argue that higher proportions of the young and elderly in relation to persons of working age – dependency ratios – are associated with lower saving rates.

Mei (1999) emphasizes the importance of the dependency ratio as a key inhibitor of national saving in the United States of America. While a larger working force promotes national output, a higher dependency ratio increases aggregate consumption and thus depresses national savings (Guest & McDonald, 1998). In addition, higher income levels are usually associated with rising saving rates, although Masson *et al.* (1998) reports that such a relationship exists only up to a certain income threshold above which the saving rate tends to fall. Masson *et al.* (1998) study on private savings in a sample of industrial and developing countries revealed that demographics and growth are important determinants of private savings, among others. Furthermore, Poterba (2004) contends that income earned during the individual's prime working stage exerts the highest impact on the individual saving rate.

Corbo and Schmidt-Hebbel (1991) discuss the effect of fiscal policy on savings and argue that cutting expenditures is a more effective way to increase national savings. Ostry and Reinhart (1992) investigate the relationship between terms of trade and savings. Their findings show that an improvement in the terms of trade increases income and hence savings. Loayza, Schmidt-Hebbel and Serven (2000) show that in the developing countries a doubling of income per capita is estimated, other things equal, to raise the long-run private saving rate by 10 percentage points of disposable income.

Research on remittances provides ample evidence that remittances can influence national economic welfare in several ways including its effects on national savings. Keynes (1929) and Ohlin (1929) were the first to initiate the discussion on remittances, and then known as the transfer problem of the receiving economies. Remittances are now found to be a significant source of household income for developing economies (Edwards & Ureta, 2003) and that the financial capital

that is transferred to home country also contributes to domestic investment required for economic development. In a recent study, Osili (2007) found that remittances sent to finance origin country investments are positively associated with migrant's country of origin household wealth. The current discussion on remittances in literature focuses on a range of economic effects: microeconomics and the households; macroeconomy; financial markets and social and human well being. Amuedo-Dorantes and Pozo (2006) and Balderas and Nath (2008) analyzed macroeconomic impacts of remittances. Amuedo-Dorantes and Pozo (2006) argued that remittances are in part transferred to the home country to purchase family provided insurance and self insurance. Remittances can also have direct effects on financial markets as discussed in Calero, Bedi and Sparrow (2009) and S. Gupta, Patillo and Wagh (2009). Finally, remittances can also have an impact on the social and family welfare as noted by Liu and Reilly (2004); and Adams Jr. and Page (2005). S. Gupta *et al.* (2009) found that remittances had a direct poverty-mitigating effect and promoted financial development in sub-Saharan Africa.

Remittance inflows impacts recipient countries. The first round effect of remittances in recipient countries is on the monetary side. In terms of monetary effects, theoretically remittances increase the supply of money in the recipient country. An expanded supply of money in circulation increases the availability of loanable funds, which lowers the interest rates. Once the remittances are deposited in the home country currency accounts, the banking system is likely to experience an increase in liquidity and domestic credit will probably expand. This can aid investment as more liquidity in the banking sector encourages borrowing, which then gets invested. Since private investment is assumed to be inversely related to prevailing interest rates, investments expand as interest rates fall thus contributing to higher levels of economic activity.

Secondly, remittances can matter for the financial markets. In theory, remittances reflect portfolio allocation decisions involving the relative rates of return on investment on financial and real assets in origin and destination countries. If returns are higher in home countries, workers will transfer their funds without hesitation. Even if workers chose to leave their savings in the country of residence or employment as a short-term portfolio allocation decision, they would certainly compare the rates of returns with that of their home country. Theoretically, from a neoclassical perspective, high interest rates (lending) increase the user cost of capital and so reduces investment. In their study on remittances, transaction costs and informality, Freund and Spatafora (2008) found that recorded remittances depend positively on the stock of migrants and negatively on transfer costs and exchange rate restrictions. However, in contradiction, the McKinnon-Shaw hypothesis establishes a positive relationship between interest rate and investment. The interest rate in question is the deposit interest rate. Higher interest rates on deposits will attract more real balances, which allow them to finance more investment. However, low or negative real interest rates discourage savings, which reduce the amount of funds available for investment.

The real gains of remittances to home countries should be qualified as demonstration effect. That is, it is the type of consumption/investment patterns of migrants and workers that can positively influence demand-led economic growth in home country. For example, re-zoning areas for residential living, development of public services (roads, schools, health facilities), development of community services (recreational parks, community halls, places of worship), and establishment of business centers (shopping malls, gas stations and tourism services). Such demand side effect can also induce some degree of inflationary pressures. Remittances can also be used to finance entrepreneurial activities that may generate multiplier effect that may lead to an increase in aggregate demand. Remittances can also affect income and wealth in home countries. For example, if workers remit large amounts of savings, they may in fact be better off financially than the non-migrant workers and this may create income and inequality gaps.

Of much importance to this study is the effect of remittances on private savings. A review of the empirical literature reveals that remittances have tended to exert both negative as well as positive

effect on savings. Some of the earlier studies such as Chenery and Eckstein (1970), Griffin and Enos (1970) and Papanek (1972) studying the effect of foreign capital on savings confirmed negative effect. At the same time, studies by K. L. Gupta (1987), Over Jr. (1975) and Chen (1977) showed positive effect of foreign capital inflows on savings. This pattern of positive and negative effects of remittances is also evident in some of the studies conducted in 1980s and 1990s. For example, Reinhart and Talvi (1998) study on 24 countries in Latin America and Asia for the period 1970-1995 revealed negative correlation between foreign capital inflows and domestic savings for most of the countries in their sample. Similarly, Yenturk (1999) also showed that a surge in capital inflows adversely affected domestic savings. On the other hand, Gruben and McLeod (1998) and Brown and Ahlburg (1999) in their study found positive effect of foreign capital inflows including remittances on domestic savings.

Much of the empirical studies in post-2000 period using more improved estimation techniques continued to show both positive and negative effects of remittances on savings. Athukorala and Sen (2004) investigated the determinants of private savings in the process of economic development in India. Their empirical results revealed that the terms of trade and inward remittances by expatriate Indians seem to have a negative effect on savings rate. Caceres and Saca (2006) in their study on El-Salvador found that increased remittance flow has been accompanied by a sharp decline in domestic savings rate while Morton, Panday, and Kula (2010) also found strong negative relation between remittances and domestic savings for top 20 remittances recipient countries for year 2008. Similar results were also confirmed by Sahoo and Dash (2013) whose findings revealed foreign savings depressing domestic savings in five South Asian countries. In a more recent study, Hossain (2014) examined the role of foreign capital and remittance inflow on the domestic savings of 63 developing countries for 1971-2010 period using the common correlated effects mean groups estimator technique. His findings revealed that remittance flows have a significant negative impact on domestic savings.

Studies in the post-2000 period also revealed positive effect of remittances in savings. Connell and Conway (2000) study revealed positive impact of remittances in savings in a number of countries. Osili (2007) study revealed that remittances had a potential to contribute to economic development by reducing poverty and providing savings for capital accumulation in the country of origin. In addition, Das and Serieux (2010) found that overseas development assistance and remittances generated significantly positive effect in developing economies. Further, the study by Balde (2011) revealed that remittances and foreign aid had significantly positive impacts on savings in 37 sub-Saharan countries.

3. Method, Variable Selection and Data

Our measure of savings is real private savings *(RPS)* as a percentage of gross national income. Our core variable of interest is real remittances and its measure is workers' remittances and compensation of employees, received as a percentage of GDP. Other than this core variable, we include other potential variables known in the previous literature to influence savings. Thus, our right hand side variables include a set of demographic variables *(DEM)* common to most studies examining savings from the perspective of the life-cycle model. We also include a set of non-demographic variables *(N-DEM)* known to have an influence on savings. Thus, estimable equation takes the following general form.

$$RPS = f (REM, DEM, N\text{-}DEM) \tag{1}$$

Our vector of *DEM* variables includes *dependent population (DP)*. This is the young population (population with ages 0-14) and old population (population aged 65 and above) as a ratio of working-age population (population aged 15-64). We also include *working age population (WAP)*.

This is the population ages 15-64 as a percentage of total. We also include *urbanization (URB)*, measured by urban population as a percentage of total). Our vector of *N-DEM* variables include *economic growth* (GRW), measured by growth in real gross domestic product per capita, annual percentage; *bank credit (BNK)*, measured by domestic credit provided by banking sector as a percentage of gross domestic product; and real *deposit interest rate (DIR)*. As part of our *N-DEM* variables, we also control for the effects of the global financial crisis *(GFC)*. This is measured by a dummy variable, taking a value of one for years 2007 to 2011 and zero for other years. The data source for all the variables indicated above is The World Bank's *World Development Indicators*. Hence, the regression equation is specified in equation (2).

$$\Delta RPS_{i,t} = \lambda_{0,it} + \lambda_1 \Delta REM_{i,t} + \lambda_2 \Delta DP_{i,t} + \lambda_3 \Delta WAP_{i,t} + \lambda_4 \Delta URB_{i,t} + \lambda_5 GRW_{i,t}$$
$$+ \lambda_6 \Delta BNK_{i,t} + \lambda_7 \Delta DIR_{i,t} + \lambda_8 GFC_{i,t} + \tau_{i,t} + \upsilon_{i,t} \tag{2}$$

where, Δ is the first difference operator; *i* is the country; *t* is the time; λ is the coefficient; τ is the country fixed effect; and υ is the error term. The expected effects are *REM (+); DP (-); WAP (+); URB (-); GRW (+); BNK (+); DIR (-)* and *GFC (-)*. The justification for including the right-hand side variables is discussed below.

Demographic variables (*DP* and *WAP*) in the life-cycle hypothesis underscore the importance of the age structure of the population and its link to the saving rate. Prior studies suggest that if the proportion of the population of working age is high, then the economy should have a high rate of private saving as workers provide for their saving (Modigliani & Sterling, 1983; Masson & Tryon, 1990; Masson *et al.*, 1998; and Yasin, 2008). Another demographic force that typically affects private saving rates is the degree of urbanization *(URB)* and some past studies find its effect on saving to be inhibiting (Loayza *et al.*, 2000). Moreover, Loayza *et al.* (2000) note that rural incomes are more uncertain than urban incomes and, in the absence of financial markets through which risks are diversified, rural residents would likely save a greater fraction of their income.

Higher *economic growth (GRW)* is likely to increase the aggregate income of those working relative to those not earning labor income, that is, retired and the young (Modigliani, 1966). Modigliani (1970) argued that saving does seem to be positively correlated with income growth because fast growing economies such as South Korea which has high saving rate. The permanent income theory (Friedman, 1957) predicts that higher growth (that is higher future income) reduces current saving. But in the life-cycle model, income growth has a positive effect on saving and some previous research seems to support that posture (Carol & Weil, 1994).

The financial sector is now regarded as a fundamental component of modern market led economies and its contribution to economic growth and development has been well documented (Levine, 2005). A country's financial system is an integral component of the general economic system. In particular, the role of the banking sector in terms of enhancing national welfare is of critical importance. One of the primary roles of the financial system is to mobilize savings (Figure 1 in Levine, 1997) that may be invested. Banks play an important role in mobilizing savings. The credit provided the banking sector also enters in the estimating equations. Thus, the role of organized financial intermediaries is important, as they are able to mobilize private savings and efficiently allocate them to their most productive uses. The banking sector is a critical ingredient in the promotion of long-term investment and economic growth. Banks supply medium and long-term funds that are needed for the creation or expansion of the industrial base. Through investment, capital gets accumulated and finally contributes to growth. Theoretically, the expansion of bank credit *(BNK)* could reduce private saving as individuals become more able to finance higher consumption at the current income level (Loayza *et al.*, 2000).

The global financial and economic crisis seriously undermined economic growth for the United States and the European Union countries. Ziesemer (2010) showed that the credit crisis of the

OECD countries had a negative impact on growth of the world economy. Celik (2012) found evidence of contagion during US sub-prime crisis for most of the developed and emerging countries. As such, we hypothesize that recent developments as a result of the financial crisis would have also affected the savings patterns in the developing Asian economies and so we control for the effect of the global financial crisis *(GFC)*.

The analytical procedure in this paper is largely dictated by availability of published data on core variables of concern. The sample years are 2002 to 2011, annual data. The sample of Asian economies number nine for which data on all variables are available. The sample countries are: Bangladesh; Cambodia, India; Indonesia; Malaysia; Pakistan; Philippines; Sri Lanka; and Thailand.

4. Results and Discussion

The empirical analysis in this paper combines the cross-country time-series data involving the nine countries and ten time periods constituting 90 observations. It is well-known that the use of ordinary least squares estimation (OLS) leads to biased estimates since it assumes a single set of slope coefficients and one intercept. Our estimation begins with the estimation of a cross-sectionally heteroskedastic and time-wise autoregressive model followed by the estimation of a fixed and random effects model.

Table 1. Results of the cross-section estimation

Variables	Specification (1)	Specification (2)	Specification (3)	Specification (4)
DP	-0.076	-0.235	0.014	0.045
	(0.922)	(2.887)*	(0.646)	(0.699)
WAP	0.429	0.659	0.158	0.162
	(3.0343)*	(4.993)*	(1.593)	(1.603)
REM	0.370	2.303	2.761	2.746
	(0.925)	(5.823)*	(9.133)*	(9.008)*
GRW	. . .	0.739	1.249	1.265
		(1.948)**	(4.387)*	(4.455)*
DIR	. . .	-0.144	-0.508	-0.512
		(4.933)*	(2.736)*	(2.722)*
BNK	. . .	. . .	0.188	0.188
			(8.662)*	(8.608)*
URB	. . .	. . .	0.062	-0.016
			(1.137)	(1.123)
GFC	. . .	. . .	. . .	0.945
				(0.727)
Observations	90	90	90	90
Adjusted R-square	0.12	0.41	0.74	0.74

*, **, and *** indicates statistically significant at the 1, 5 and 10 percent levels respectively. T-statistics are in parentheses beneath coefficient estimates.

… indicates variables are not tested.

The cross-section model combines cross-country and time-series data involving nine countries and ten time periods. Table 1 presents the regression results of the cross-section model where the control variables are successively added to the core variables. In Tables (1) to (3), specification (1) includes the core variables while specifications (2) and (3) include the results of the additions of control variables. The effect of GFC is tested in specification (4). The discussion is largely based on the results presented in specification (3) that accounts for all possible influences on private savings.

Our variable of interest is real remittances received. It is the most significant addition to the usual core variables in the regression analysis. The purpose of including this variable is to test whether remittances have any impact on private savings. The basis of the hypothesis is that an increase in remittances received by the developing Asian economies can have a positive effect on overall national savings. Turning to the results of the cross section estimation, the estimated coefficient of remittances does have the expected positive sign and is statistically significant at better than the one percent level (specifications 2, 3 and 4 in Table 1). This finding is consistent with our prior expectations and provides support to the argument that remittance inflows in the developing Asian countries are positively correlated with their private national savings. Our findings of the cross-section estimation also revealed that economic growth, real deposit interest rates and credit provided by the banking sector as other statistically significant determinants of private savings.

Table 2. Empirical results of fixed effects model

Variables	Specification (1)	Specification (2)	Specification (3)	Specification (4)
DP	-0.287	-0.336	-0.035	-0.033
	(2.652)*	(3.718)*	(0.433)	(1.215)
WAP	0.532	0.711	0.161	0.163
	(3.049)*	(4.967)*	(1.208)	(1.215)
REM	2.018	3.032	3.213	3.203
	(4.708)*	(7.381)*	(9.735)*	(9.704)*
GRW	. . .	0.738	1.169	1.108
		(1.486)	(2.990)*	(2.793)*
DIR	. . .	-1.274	-0.578	-0.589
		(5.225)*	(2.570)**	(2.610)*
BNK	. . .	. . .	0.169	0.173
			(6.822)*	(7.013)*
URB	. . .	. . .	-0.033	-0.094
			(1.336)	(1.498)
GFC	. . .	. . .	. . .	4.749
				(1.053)
Observations	90	90	90	90
Adjusted R-square	0.30	0.50	0.73	0.74

*, **, and *** indicates statistically significant at the 1, 5 and 10 percent levels respectively. T-statistics are in parentheses beneath coefficient estimates.

… indicates variable not tested.

The cross-section results presented in Table 1 are, however, all biased and inconsistent as the underlying model overlooks the unobserved time- invariant country-specific factors. Thus, we proceed with the fixed and random effects estimation (Tables 2 and 3). The fixed effects models are usually based on the assumption that the slopes are common but that each cross-sectional unit has its own intercept. The random effects model assumes that the intercepts are drawn from a common distribution with a mean and constant variance.

Table 2 presents the regression results of the fixed effects model after controlling for unobserved time-invariant country-specific factors that the cross-section model in Table 1 overlooked. According to the results presented in Tables (2) and (3), the estimated coefficient of remittances is as expected, positive and statistically significant (specifications 1 to 4 in Table 2 and specifications 2 to 4 in Table 3). Similar to the findings of the cross-section model, the results of the fixed effects model indicate that real remittances received are strongly and positively associated with private savings in Asia.

Table 3. Empirical results of random effects model

Variables	Specification (1)	Specification (2)	Specification (3)	Specification (4)
DP	-0.083	-0.228	0.009	0.016
	(1.012)	(2.889)*	(0.129)	(0.214)
WAP	0.430	0.639	0.158	0.166
	(3.079)*	(4.810)*	(1.310)	(1.350)
REM	0.471	2.117	2.860	2.848
	(1.119)	(4.998)*	(8.460)*	(8.372)*
GRW	. . .	0.726	1.099	1.144
		(1.925)**	(3.506)*	(3.628)*
DIR	. . .	-1.115	-0.519	-0.524
		(4.405)*	(2.342)**	(2.345)**
BNK	. . .	. . .	0.165	0.167
			(6.744)*	(6.765)*
URB	. . .	. . .	-0.053	-0.542
			(0.887)	(0.896)
GFC	. . .	. . .	. . .	1.135
				(0.843)
Observations	90	90	90	90
Adjusted R-square	0.12	0.36	0.67	0.67

*, **, and *** indicates statistically significant at the 1, 5 and 10 percent levels respectively. T-statistics are in parentheses beneath coefficient estimates.
… indicates variable not tested.

Our variable of interest is remittances. It is the most significant addition to the usual core variables in the regression analysis. The purpose of including this variable is to test whether remittances have any impact on private national savings. The basis of the hypothesis is that an increase in remittances received by the developing Asian countries can have a positive effect on overall private national savings. Turning to the results, the estimated coefficient of remittances does have the expected positive sign and is highly significant at better than the one percent level under

all three estimation procedures. This finding is consistent with our prior expectations. The empirical results of the three different estimation procedures are consistent with each other and therefore provide compelling evidence that remittance inflows in the developing Asian economies are positively correlated with their private national savings. To our knowledge, this paper represents the first attempt to model the effect of remittances on savings in a sample of large developing Asian economies. The gradual rise in national savings that the developing Asian economies has witnessed (Figure 2) does appear to be potently related to the rise in remittance inflows, among other factors as confirmed by the findings presented in Tables 1 to 3.

The coefficient of remittances across the three estimation procedures generally have signs that accord with intuition and are statistically significant indicating that increases in remittances are strongly associated with increases in savings. Specification (2), (3), and (3) in Tables 1 to 3 tests the effects of remittances together with other control variables.

The finding here is generally consistent with some the prevsious studies revealing positive effects of remittances on savings such as K. L. Gupta (1987), Over Jr. (1975) and Chen (1977) Connell and Conway (2000); Osili (2007); Das and Serieux (2010); and Balde (2011). Yet at the same time, as per the review of the literature in section 2.0, a number of studies such as Athukorala and Sen (2004); Caceres and Saca (2006); Sahoo and Dash (2013); and Hossain (2014) show remittance flows have a significant negative impact on domestic savings. The divergence in this study and the studies revealing negative effect of remittances on domestic savings is largely attributable to a whole range of factors including methodological differences in the estimation process, differences in choice of variables and their measures, differences in sample countries, and differences in the time period of study.

As to the effects of other variables on national savings, the variable *DP* has the expected negative but statistically insignificant effect when the full model is tested (Table 2, specifications 3 and 4). However, the negative effect of the variables is consistent with the predictions of the life-cycle model as it predicts a negative relationship between the saving rate and the dependency ratio. Variable *WAP* has the expected positive sign on its coefficient and is statistically insignificant in the complete model (Specification 4 in Tables 1 to 3). Again the positive effect of *WAP* is consistent with the theoretical predictions of the life cycle model. The coefficient on *GRW* is as expected, positive and statistically significant at the one percent level across all the estimations (Table 1, 2 and 3). This suggests that as economies grow, so do their national savings. Our findings also confirm the positive effect of *BNK* on private savings. The coefficient *BNK* is as expected, positive and statistically significant in all the models estimated. The findings of *BNK* imply the importance of the financial intermediaries as they are able to mobilize savings and efficiently allocate them to their most productive uses which in turn generate income and contribute to savings. Our findings provide strong inverse relationship between *DIR* and remittances. The coefficient real deposit rate is as expected, negative and statistically significant at high levels across all three estimation procedures. Our findings of the fixed and random effects estimation also confirm a regressive effect of *URB* on private savings. The coefficient *URB* although has a negative sign is statistically insignificant. This finding does weakly suggest that urban dwellers face higher costs of living and thus their saving levels are likely to be low. In addition, urban dwellers may have better access to a variety of services, both necessary and unnecessary, inducing them to spend rising portions of their incomes. The sign on coefficient *GFC* is contrary to our expectations. There is no evidence to suggest that *GFC* had a regressive effect on real private savings in the developing Asian countries.

5. Conclusion

We examined the effect of remittances on private national savings in a sample of the developing Asian economies using cross-country annual data for the 2002-2011 periods. In doing so, we

conducted an empirical analysis of the relationship between real remittances received and real private savings within the theoretical framework of the well known life-cycle model. The regression analysis is based on the cross-section, fixed and random effects estimation procedures. The empirical findings consistently suggest that remittance inflows in the developing Asian economies are positively and are statistically significantly correlated with their private national savings. Our findings also reveal that economic growth, bank credit and real deposit interest rates as other statistically significant correlates of private savings.

A direct association between remittances and savings emerge from the specifications in the different estimation methods employed in this study. This finding does have some policy implications for the developing Asian countries. It is now well known that remittances are a major source of foreign exchange for many developing countries. Thus, the Asian developing country financial sector is also a crucial link of facilitating the easy flow of remittances. This calls for the expansion of the financial sector in the developing economies. In particular, investment in financial infrastructures is important. It has been shown that financial infrastructures increase the efficiency of the banking sector: decrease the market power of the financial intermediaries, lower the cost of capital, increase the number of depositors and the amount of intermediated savings; factors which in turn increase growth, and may help countries to take off from poverty trap (Amable & Chatelain, 2001). Thus, any investments that the developing Asian countries take to upgrade their financial sector and particularly financial infrastructure will not only facilitate the easy inflow of remittances but it will also deliver beneficial effects to the wider population. The developing Asian country economic environment also matters a lot. Among others, it has been also shown that fostering better quality of institutions can ensure that remittances can contribute to positive economic growth (Catrinescu, Leon-Ledesma, Piracha, & Quillin, 2009).

Acknowledgements

References

[1] Adams Jr., R. H. (2009). The determinants of international remittances in developing countries. *World Development*, *37*(1), 93-103. doi:10.1016/j.worlddev.2007.11.007

[2] Adams Jr., R. H., & Page, J. (2005). Do international migration and remittances reduce poverty in developing countries? *World Development*, *33*(10), 1645-1669. doi:10.1016/j.worlddev.2005.05.004

[3] Amable, B., & Chatelain, J-B. (2001). Can financial infrastructures foster economic Development. *Journal of Development Economics*, *64*(2), 481-498. doi:10.1016/S0304-3878(00)00147-4

[4] Amuedo-Dorantes, C., & Pozo, S. (2006). Remittances as insurance: Evidence from Mexican immigrants. *Journal of Population Economics*, *19*(2), 227-254. doi:10.1007/s00148-006-0079-6

[5] Athukorala, P.-C., & Sen, K. (2004). The determinants of private savings in India. *World Development*, *32*(3), 491-503. doi:10.1016/j.worlddev.2003.07.008

[6] Balde, Y. (2011). The impact of remittances and foreign aid on savings/investment in Sub-Saharan Africa. *African Development Review*, *23*(2), 247-262. doi:10.1111/j.1467-8268.2011.00284.x

[7] Balderas, J. U., & Nath, H. K. (2008). Inflation and relative price variability in Mexico: The role of remittances. *Applied Economics Letters*, *15*(3), 181-185. doi:10.1080/13504850600722070

[8] Bauer, T. K., & Sinning, M. G. (2011). The savings behavior of temporary and permanent migrants in Germany. *Journal of Population Economics*, *24*(2), 421-449. doi:10.1007/s00148-010-0306-z

[9] Brooks, D. H., & Ferrarini, B. (2011). Asia's melting trade costs. *The World Economy*, *34*(7), 1138-1147. doi:10.1111/j.1467-9701.2011.01369.x

[10] Brown, R. P. C., & Ahlburg, D. A. (1999). Remittances in the South Pacific. *International Journal of Social Economics*, *26*(1/2/3), 325–344. doi:10.1108/03068299910229721

[11] Caceres, L. R., & Saca, N. N. (2006). *What do remittances do? Analyzing the private remittance transmission mechanism in El Salvador* (IMF Working Paper, No. WP/06/250). Washington, DC.: IMF. Retrieved from https://www.imf.org/external/pubs/ft/wp/2006/wp06250.pdf.

[12] Calero, C., Bedi, A. S., & Sparrow, R. (2009). Remittances, liquidity constraints and human capital investments in Ecuador. *World Development*, *37*(6), 1143-1154. doi:10.1016/j.worlddev.2008.10.006

[13] Caroll, C. D., & Weil, D. N. (1994). Savings and growth: A reinterpretation. *Carnegie-Rochester Conference Series on Public Policy*, *40*, 133-192. doi: 10.1016/0167-2231(94)90006-x

[14] Catrinescu, N., Leon-Ledesma., M., Piracha, M., & Quillin, B. (2009). Remittance, institutions and economic growth. *World Development*, *37*(1), 81-92. doi:10.1016/j.worlddev.2008.02.004

[15] Celik, S. (2012). The more contagion effect on emerging markets: The evidence of DCC-GARCH model. *Economic Modelling*, *29*(5), 1946-1959. doi:10.1016/j.econmod.2012.06.011

[16] Chen, E. K. Y. (1977). Domestic saving and capital inflow in some Asian countries: A time-series study. *Asian Survey*, *17*(7), 679–687.

[17] Chenery, H. B., & Eckstein, P. (1970). Development alternative for Latin America. *Journal of Political Economy*, *78*(4, Part II), 966–1006.

[18] Connell, J., & Conway, D. (2000). Migration and remittances in island microstates: A comparative perspective on the South Pacific and the Caribbean. *International Journal of Urban and Regional Research*, *24*(1), 52-78. doi: 10.1111/1468-2427.00235

[19] Corbo, V., & Schmidt-Hebbel, K. (1991). Public policies and saving in developing countries. *Journal of Development Economics*, *36*(1), 89-115. doi:10.1016/0304-3878(91)90006-H

[20] Das, A., & Serieux, J. (2010). *Remittances and reverse flows in developing countries* (IDEAs Working Paper, No. 02/2010). UK: IDEAs. Retrieved from http://www.networkideas.org/working/dec2010/02_2010.pdf.

[21] Edwards, A. C., & Ureta, M. (2003). International migration, remittances and schooling: Evidence from El Salvador. *Journal of Development Economics*, *72*(2), 429-461. doi:10.1016/S0304-3878(03)00115-9

[22] Freund, C., & Spatafora, N. (2008). Remittances, transaction costs, and informality. *Journal of Development Economics*, *86*(2), 356-366. doi:10.1016/j.jdeveco.2007.09.002

[23] Friedman, M. (1957). *A theory of consumption function* (General Series 63). Cambridge, MA: National Bureau of Economic Research.

[24] Giuliano, P., & Ruiz-Arranz, M. (2009). Remittances, financial development, and growth. *Journal of Development Economics*, *90*(1), 144-152. doi:10.1016/j.jdeveco.2008.10.005

[25] Griffin, K. B., & Enos, J. L. (1970). Foreign assistance: Objectives and consequences. *Economic Development and Cultural Change*, *18*(3), 313–327.

[26] Gruben, W. C., & McLeod, D. (1998). Capital flows, savings and growth in the 1990s. *The Quarterly Review of Economics and Finance*, *38*(3, Part 1), 287-301. doi:10.1016/S1062-9769(99)80119-7

[27] Guest, R., & McDonald, I. (1998). The socially optimal level of saving in Australia, 1960-61 to 1994-95. *Australian Economic Papers*, *37*(3), 213-235. doi:10.1111/1467-8454.00017

[28] Gupta, K. L. (1987). Aggregate savings, financial intermediation, and interest rate. *The Review of Economics and Statistics*, *69*(2), 303–311. doi:10.2307/1927238

[29] Gupta, S., Pattillo, C. A., & Wagh, S. (2009). Effect of remittances on poverty and financial development in Sub-Saharan Africa. *World Development*, *37*(1), 104-115. doi:10.1016/j.worlddev.2008.05.007

[30] Hossain, D. (2014). Differential impacts of foreign capital and remittance inflows on domestic savings in developing countries: A dynamic heterogeneous panel analysis. *Economic Record*, *90*(s1), 102-126. doi:10.1111/1475-4932.12114

[31] Keynes, J. M. (1929). The German transfer problem. *The Economic Journal*, *39*(153), 1-7.

[32] Levine, R. (1997). Financial development and economic growth: Views and agenda. *Journal of Economic Literature*, *35*(2), 688-726.

[33] Levine, R. (2005). Finance and growth: Theory and evidence. In P. Aghion & S. N. Durlauf (Eds.), *Handbook of Economic Growth* (vol. 1, Part A, pp. 865-934). Amsterdam: Elsevier. doi:10.1016/S1574-0684(05)01012-9

[34] Liu, Q., & Reilly, B. (2004). Income transfers of Chinese rural migrants: Some empirical evidence from Jinan. *Applied Economics*, *36*(12), 1295-1313. doi: 10.1080/0003684042000191101

[35] Loayza, N., Schmidt-Hebbel, K., & Serven, L. (2000). Saving in developing countries: An overview. *The World Bank Economic Review*, *14*(3), 393-414.

[36] Masson, P. R., Bayoumi, T., & Samiei, H. (1998). International evidence on the determinants of private saving. *The World Bank Economic Review*, *12*(3), 483-501.

[37] Masson, P. R., & Tryon, R.W. (1990). Macroeconomic effects of projected population aging in industrial countries. *IMF Staff Papers*, *37*, 453-485. doi:10.2307/3867261

[38] Mei, H. (1999). *Is population ageing a major cause of the falling saving rates – YES*! Paper presented at the Proceeding of Conference on the Aging Populations, 29 March - 5 April.

[39] Modigliani, F. (1966). The life-cycle hypothesis of saving, the demand for wealth, and the supply of capital. *Social Research*, *33*(2), 160-217.

[40] Modigliani, F. (1970). The life cycle hypothesis of saving and intercountry differences in saving ratio, In W. A. Eltis, M. F. Scott, & J. N. Wolfe (Eds.), *Induction, growth and trade: Essays in honour of Sir Roy Harrod* (pp. 197-225). Oxford: Clarendon Press.

[41] Modigliani, F., & Sterling, A. (1983). Determinants of private savings with special reference to the role of social security: Cross-country tests. In F. Modigliani & R. Hemming (Eds.), *The Determinants of national saving and wealth*. Paper presented at the Proceedings of a conference held by the International Economic Association, Bergamo, Italy (pp.24-55). New York: St. Martin's Press.

[42] Morton, J., Panday, P., & Kula, M. (2010). Remittances, poverty and economic growth. *International Journal of Arts and Sciences*, *3*(7), 390–399.

[43] Ohlin, B. (1929). The reparation problem: A discussion. I: Transfer difficulties, real and imagined. *The Economic Journal*, *39*(154), 172-182.

[44] Osili, U.O. (2007). Remittances and savings from international migration: theory and evidence using a matched sample. *Journal of Development Economics*, *83*(2), 446-465. doi:10.1016/j.jdeveco.2006.06.003

[45] Ostry, J. D., & Reinhart, C. M. (1992). Private saving and terms of trade shocks: Evidence from developing countries. *IMF Staff Papers*, *39*, 495-517. doi:10.2307/3867471

[46] Over Jr., A. M. (1975). An example of the simultaneous-equation problem: A note on "Foreign assistance: Objectives and consequences". *Economic Development and Cultural Change*, *23*(4), 751– 756.

[47] Papanek, G. F. (1972). The effect of aid and other resource transfers on savings and growth in less developed countries. *The Economic Journal*, *82*(327), 934–950.

[48] Poterba, J. M. (2004). Impact of population aging on financial markets in developing countries. *FRB Kansas City - Economic Review*, *89*(4), 43-53.

[49] Reinhart, C. M., & Talvi, E. (1998). Capital flows and saving in Latin America and Asia: A reinterpretation. *Journal of Development Economics*, *57*(1), 45–66. doi:10.1016/S0304-3878(98)00077-7

[50] Sahoo, P., & Dash, R. K. (2013). Financial sector development and domestic savings in South Asia. *Economic Modelling*, *33*, 388–397. doi:10.1016/j.econmod.2013.04.018

[51] Sen, R. (2006). "New regionalism" in Asia: A comparative analysis of emerging regional and bilateral trading agreements involving ASEAN, China and India. *Journal of World Trade*, *40*(4), 553-596.

[52] The World Bank. (2011). *Migration and remittances factbook 2011* (2nd ed.). Washington, D.C.: The World Bank. Retrieved from http://data.worldbank.org/data-catalog/migration-and-remittances.

[53] The World Bank. (2012). *2008 World development indicators* [CD ROM]. Washington, D.C.: The World Bank.

[54] United Nations. (2013). *The number of international migrants worldwide reaches 232 million* (Population Facts, No. 2013/2). Population Division, Department of Economic and Social Affairs, United Nations. New York: United Nations publication. Retrieved from http://esa.un.org/unmigration/documents/the_number_of_international_migrants.pdf.

[55] Yasin, J. (2008). Demographic structure and private savings: Some evidence from emerging markets. *African Review of Money, Finance and Banking*, *32*(s1), 7-21.

[56] Yenturk, N. (1999). Short-term capital inflows and their impact on macroeconomic structure: Turkey in the 1990s. *The Developing Economies*, 37(1), 89–113. doi:10.1111/j.1746-1049.1999.tb00866.x

[57] Ziesemer, T. H. W. (2010). The impact of the credit crisis on poor developing countries: Growth, worker remittances, accumulation and migration. *Economic Modelling*, *27*(5), 1230-1245. doi:10.1016/j.econmod.2010.02.008