Econometric Analysis of Income, Consumption and Remittances in Pakistan: Two Stage Least Square Method

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Abstract

The study explores the relationship among income, consumption and remittances in Pakistan. Two Stage Least Squares (2SLS) technique is used to analyze the impact of international remittances upon consumption during the period of 1973-2010. Specification of the model is based upon the two sectors Keynesian National Income Model. Results of the study suggest that international remittances positively affect the consumption level in Pakistan. The results explain that one per cent increase in the average annual amount of remittances in the country would yield a 0.95 per cent increase in the average annual aggregate consumption in the country. The Co-integration analysis shows the log-run stable relationship between consumption, remittances, income and investment. It is believed that remittances increase the money supply and stimulate demand for consumption and investment in the country. Hence remittances play imperative role in the improvement of the well being of the people in aggregate

Key words: Remittances, Income, Consumption, Two Stage Least Squares (2SLS)

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Introduction

A There are several sources that make contribution to the prosperity and development of the societies. International remittances are one of these sources that

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donate a large amount in the living standard and prosperity of the people. Remittances are among the important sources of external finance for developing countries, with remittances larger than official development assistance, foreign direct investment, and portfolio flows in many countries.

.International remittances are categorized under two headings: (i) remittances flowing to a country in the form of ideas and changing mind set (ii) remittances flowing in the form of goods and cash. The measurement of the first category of remittances is not the scope of the present study. This study examines the inter-relationships among income, consumption and second type of remittances in Pakistan.

Remittances are more readily observable for analysis than other international household resource flows as such type of funds on average flow through international financial intermediaries. Analysis of remittances has the prospective to the debates over intra-household resource allocations. The allocations of remittances inflows can be viewed by a unitary decision maker. In particular, do migrants have different preferences over the uses of household income in case of remitted funds? How do migrants weight their own utility versus the utility of remittance recipients when making remittance decisions?

In the public sector, several national governments have established public agencies dedicated to harnessing international migrant diasporas for national economic development. Exploiting the development potential of migrant remittances is a central motivation behind establishment of such public agencies; even as countries seek to expand their scope beyond the remittances to activities such as promotion of foreign direct investment by the diasporas. Examples include El Salvador's Vice-Ministry for Salvadorans abroad and India's Ministry of Overseas Indian Affairs. The Philippine government has perhaps gone the further in integrating international labor migration into its national development strategies. Philippine Overseas Employment Agency was established in 1982 to regulate the recruitment of Filipino workers for legal employment in a wide variety of overseas destinations. It also carries out worker protection initiatives in key migrant destinations. It has acted as a representation for other countries looking for to imitate the Philippines' success in the international labor market (Yang, 2011).

From mid seventies to early eighties, no other factor significantly affected the domestic employment and the balance of payments situation in a number of Asian countries like the inflow of worker's remittances from the Middle East, USA and European Union. Combes, J & Ebeke, C (2010) summed up that remittances

significantly reduced the household consumption instability. The insurance role of remittances is an additional in the less financially developed countries. The author found concluded that high transaction costs in labor-exporting countries act as a type of regressive tax on international migrants. This high transaction cost may be due to lack of competition, regulation, and/or low levels of financial sector performance in these countries. Therefore, the migrants tend to be poor and to remit small amounts of money with each remittance transaction. Lowering the transaction cost of remittances would help to increase the economic welfare-increasing impact of international remittances.

The largest part of the remittances might be used for the correction of balance of payments. Since 1990's international remittances all over the world has experienced an increasing trend, Pakistan has also experienced the same and particularly after 9/11, the inflow of remittances into Pakistan has recorded a large increase each year. Pakistan received a larger share in remittances from Kuwait, Bahrain, Qatar, Saudi Arabia and United States. The international remittances are the second major source of foreign exchange to Pakistan after exports of the country. Over the last few years, the foreign exchange remittances maintained a steady rising trend. During the year 2011, the remittances received from overseas Pakistani workers increased by 22.37 per cent i.e. from US$ 6,550.83 million during the year 2010 to US$ 8,016.18 million during the year 2011(State Bank of Pakistan). Poor people in the developing countries depend upon the income from their family members working abroad for their basic needs like shelter, health and education. Therefore such increasing amounts of remittances will be quite helpful for reducing poverty in Pakistan and raising the living standard of poor people.

Literature Review

Amjad (1986) analyzed the uses of remittances in Pakistan and concluded that remittances financed sufficiently large part of aggregate consumption, investments and other needs of the economy. Ratha & Mohapatra (2007) observed that remittances causes the prices in the country to increase because of unproductive investment of remittances received households on land, jewelry etc. Combes and Ebeke (2010) concluded that remittances positively and significantly contribute in reducing household consumption instability. Malik and Sarwar (1993) analyzed the differences in consumption behavior of the household that received remittances and those did not receive remittances and concluded that MPC was high for those household that received national remittances than those that received international remittances.

Clement, M (2011) analyzed the remittances impact on household expenditure patterns in Tajikistan and it was concluded that remittances have no role in productive investment. Therefore, remittances were interpreted in terms of short-term coping strategies that help dependent households to achieve a basic level of consumption. Ratha & Mohapatra (2007) observed that people spend their remittances on prominent consumption like land acquiring, jewelry etc. such unnecessary and unproductive consumption caused the price level in the countries upward that are receiving remittances. Iqbal, Z and Sattar, A. (2005) estimated the relationship between worker's remittances and real GDP growth in Pakistan. Results of the study showed that workers' remittances were an important source of economic growth in country.

Kalim, et al. (2008) tested the relationship between poverty and its various determinants in general with particular stress on remittances and poverty. Adams (1991) examined the effects of international remittances on rural Egypt and found that international remittances have a small but positive effect on poverty. Further their results showed that remittances were helpful in reducing poverty. Serino & Kim (2010) analyzed the panel data for 66 developing countries from 1981 to 2005 and concluded that remittances contribute to reduce poverty because a negative relationship was found between remittances and poverty. Anyanwu, et al. (2010) found that international remittances reduced the level, depth, and severity of poverty in Africa. Ratha & Mohapatra (2007) remittances have reduced poverty and resulted in better development outcomes in many low-income countries.

Stahl and Arnold (1986) remittances may positively affect growth, Fayissa & Nsiah (2008) economic growth is boosted by remittances, Roberts (2006) despite the fact that major portion of remittances are used for consumption purpose they contribute to the development of the country. Orrenius & Zavodny (2009) remittances can spur economic growth by affecting boosting GDP. Some researchers suggest small aggregate impacts of remittances on income (e.g., El- Sakka and McNabb 1999), while some others finds large positive effects (e.g., Adelman and Taylor 1992; Taylor et al. 1996).

In this study the relationship between international remittances, income, consumption and investment is explored.

Research Methodology

Time series data is used to estimate the impact of international remittances on consumption in Pakistan in this present study for the period of 1973 to 2011. Data on

the four variables including Income, Consumption, Investment and International Remittances is taken from State Bank of Pakistan, Karachi, World development Indicators (WDI) and Pakistan Bureau of Statistics (PBS) Islamabad.

The available literature survey on remittances explains that different studies use the different techniques to estimate the impacts of remittances upon different macroeconomic variables like consumption, interest rate and income levels in the economy. However, two sector Keynesian National Income Model is used in this study to analyze the impact of international remittances upon the consumption. This model is provided below:

$$LCONS_t = \beta_0 + \beta_1 GDP_t + \beta_2 LREM_t \text{ --------- (1)}$$
$$LGDP_t = LCONS_t + LINV_t \text{ --------- (2)}$$
Where:

LCONS= log of per capita real private consumption in Rs. Million
LREM=log of per capita real remittances in Rs. Million
LGDP= log of per capita real gross domestic product in Rs. Million
LINV= log of per capita real private investment in Rs. Million
t= Time

Augmented Dickey Fuller (ADF) unit root test is used to investigate time series properties of the time series data. In order to check the co integration among the variables, Johansen co integration test is used. Two Stage Least Squares (2SLS) technique is used with log-linear modeling specification for the purpose of estimation.

Results and Discussion

Data from 1973 to 2010 is used in the present study and four time series are generated for the purpose of analysis. The descriptive statistics including the mean, minimum and maximum values of the data series are provided in the table 1.

Table 1: Descriptive Statistics of the Variables

Variables	LREM	LCONS	LINV	LGDP
Mean	2.964	9.054	-6.341	-4.631
Maximum	5.134	11.192	-4.257	-2.471
Minimum	0.724	6.836	-8.918	-6.863
Observations	38	38	38	38

Where:

LCONS= log of per capita real private consumption in Rs. Million

LREM=log of per capita real remittances in Rs. Million

LGDP= log of per capita real gross domestic product in Rs. Million

LINV= log of per capita real private investment in Rs. Million

Augmented Dickey Fuller (ADF) unit root test is used to find the order of integration of the variables used. Standard Augmented Dickey and Fuller (1981) method is used and the following equations are estimated to find the order of integration of variable LGDP used in analysis.

$\Delta LGDP_t = \psi + \delta LGDP_{t-1} + \varepsilon_t$ (With constant)

$\Delta LGDP_t = \psi + \delta LGDP_{t-1} + \beta T + \varepsilon_t$ (With Constant and trend)

Where T is the time trend, $\delta = \rho - 1$ and

$\Delta LGDP_t = LGDP_t - LGDP_{t-1}$

The Null Hypothesis is:

 H^0: $\delta = 0$ (Unit Root)

The Alternative Hypothesis is:

H^1: $\delta \neq 0$ (No Unit Root)

The same procedure is adopted for the other variables to find their order of co integration.

Table 2: Results of Unit Root at Level

Variables	Without trend	With trend
LGDP	0.302	-2.756
LINV	-1.267	-4.541
LREM	0.302	-2.757
LCONS	0.488	-2.155
Critical Values at 1 % Significance	-3.622	-4.232
Critical Values at 5 % Significance	-2.944	-3.538

The results of the unit root test are provided in table 2. The results of the ADF test explain that the calculated values are greater than their critical values for all the variables. Therefore, it is concluded that all variables used in the study are non stationary with and without trend at level. The first difference of all the variables is generated. The same procedure is repeated to check the stationary of these generated

variables. However these series are stationary at their first difference. These results are provided in table 3.

Table 3: Results of Unit Root at 1st Difference

Variables	Without Trend	With Trend
LGDP	-5.361	-5.245
LINV	-4.788	-4.676
LREM	-5.361	-5.245
LCONS	-5.709	-5.636
Critical Values at 1 % Significance	-3.622	-4.232
Critical Values at 5 % Significance	-2.944	-3.538

Therefore all the data series taken in the study are found to be integrated of order one i.e I (1). Johansen Co integration test is used to test the co integration among the variables. The intercept and no trend in CE model is used to find the co integration vectors among the variables in the Johansen co integration model and all variables are found to be co integrated. The results of co integration are provided in table 4.

Table 4: Co Integration Results

Eigen Value	Likelihood Ratio	Critical Value at 5 % level	Critical Value at 1 % level	Hypothesized No. of CE(s)
0.813	93.197	47.21	54.46	None **
0.424	32.734	29.68	35.65	At most 1 *
0.244	12.826	15.41	20.04	At most 2
0.074	2.757	3.76	6.65	At most 3

Note: *(**) denotes rejection of the hypothesis at 5% (1%) significance level

Likelihood Ratio (L.R) tests indicate two co integrating equation(s) at 5% significance level and it is concluded that the variables in the consumption model are co integrated. A two sector Keynesian National Income Model is developed to analyze the impact of international remittances upon the consumption as explained in the section of data and methodology. Two Stage Least Squares (2SLS) method is used to estimate the model, to avoid the problem of over estimation of the consumption model. LGDP is estimated by using Ordinary Least Square (OLS) Method from equation (2) in the first stage. The estimated value of LGDP is then used to estimate the consumption function in the second stage by using Ordinary Least Squares (OLS) method. The Cochrane-Orchutt Method is used to correct the

autocorrelation in the estimated consumption model and AR (1) is converged after nine iterations. The regression results are given in the table 5.

Table 5: Regression Results

Variables	Coefficient	Std. Error	t-statistics
Intercept	6.297	0.613	10.261
LGDP	0.012	0.081	0.155
LREM	0.950	0.079	11.920

$R^2 = 0.99$, Adjusted $R^2 = 0.99$ and Durbin- Watson = 2.02

It is concluded that a one per cent increase in the average annual amount of remittances in the country would yield a 0.95 per cent increase in the average annual aggregate consumption in Pakistan.

Conclusion & Policy Implications

The relationship between consumption, income remittances and investment is tested in this study. Time series data ranging for the period of 1973-2010 is utilized. Augmented Dickey Fuller (ADF) test is applied for the existence of a unit root in the level and first difference of each of the variable. All the variables used in the study are found stationary at their first difference. The Co-integration analysis shows the log-run stable relationship between consumption, income, remittances and investment in Pakistan. Results suggest that consumption has positive association with remittances and GDP per capita. Therefore in order to improve the economic welfare of the people of the country, it is suggested that such policies should be devised that attract the inflow of large amounts of remittances by the countrymen working abroad.

Government should devise such policies that can help to persuade unemployed manpower to go abroad. It will provide them work opportunities there for the betterment of their families as well as of the country. Government should focus on the well established international destinations where people of the country could be sent and a large amount of international remittances could be earned and used for the welfare of the people. Government should devise policies which could discourage aggregate consumption and the remittances could be saved and used for the correctness of problem of deficit in balance of payment.

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