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Impact of worker remittances on economic growth: evidence from Pakistan

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ABSTRACT

The main purpose of this study is to investigate the impact of worker remittance on economic growth of Pakistan by using annual data for the years 1991 to 2010. The multiple regression analysis and different diagnostic tests are applied in order to confirm the assumptions of multicollinearity, heteroskedasticity and autocorrelation in the data. On the basis of multiple regression researcher conclude that worker remittances received from overseas Pakistani has a positive and significant impact on economic growth of Pakistan after control for other important determinants of economic growth like household finical consumption, financial development, saving and current account balance. This study facilitates the policy makers, economists and Government of Pakistan in analysis regarding increasing inflows of emigrant's workers of Pakistan.

Introduction

All over the world people who migrate to other countries for earnings are exceeds from 215 billion. Most of these workers are belong to developing countries of the world and official receipt of remittances to developing countries in 2010 is US$325 billion (World Bank, 2011). This increased amount of remittances is more than 10% of the GDP of most developing countries. In south Asia region of developing countries more than 26.7 million emigrants are working aboard and send remittances to their home countries. Pakistan is one of top five emigrants country of south Asia having 9.4 billion remittance receipt in 2010 (World Bank, 2011). Currently Pakistani emigrants has sent $6.325 billion in the opening half of Pakistan's fiscal year and this amount is 19.54% more than the last years opening half amount which is US$ 5.291 billion (International The News, 2012). From all over the world inflows of remittances by overseers Pakistanis are significantly improved in 2011 as compared to 2010. In 2011 remittances of received from different countries of world like USA, UK and UAE are $1,150.24 million, $726.35 million and $1,412.92 million respectively against from last years values of 2010 which are $577.17 million, $626.29 million and $997.68 million respectively (International The News, 2012).

Due to the faster and improved inflows of worker remittances in developing countries like Pakistan, impact of worker remittances on macroeconomic factors of any country or countries has been most critical question for academic researcher and scholars all over the world. In literature most of the studies are focusing on investigates the impact of worker remittances in economic development, financial development, poverty reduction and other major economic and social issues in developing countries. Current study is also exploring impact of worker remittances on economic growth of Pakistan by using annual data from 191-2010.

The economic growth of any country is measured through GDP or GDP per capita. Traditionally, from the period of 1952-2011 the average GDP growth of Pakistan recorded was 5% with uppermost GDP growth was 10.22% in 1954 and lowest -1.8% in 1952. In 2011 Pakistan's GDP in 2nd quarter was improved to 2.39% against the last year 2nd quarter GDP (www.tradingeconomics.com - The National Accounts Committee, 2012). But further improvement in GDP of Pakistan is not possible due to political insatiability, energy crisis, greater rate of inflation and high unemployment. Pakistan's GDP annual growth rate from years 1991 to 2010 is shown in the figure 1.

Figure 1: GDP Growth rate of Pakistan from 1991-2010

SSource: www.tradingeconomics.com - The National Accounts Committee (2012)

The remaining structure of the paper as follows; section 2 covers the literature review, section 3 describes the data and methodology part of study, section 4 gives the empirical results and discussions on those results while the section 5 concludes the main findings of this study.

Literature Review:

In literature different studies that were employed to show the contribution of worker remittances on economic growth had provided mixed results. Some of the studies favoring that worker remittance has positive relationship with economic growth, some of them favoring negative relationship and some of them favoring neutral or no relationship. Faini (2002) claimed that remittances had a positive influence on economic growth by regressing remittances and other predictors on economic growth of selected countries. He suggested that this positive relationship of worker remittances and economic growth facilitates in improving productive infrastructure, reducing uncertainty and accumulation of industrious assets to households. Chami, Fullenkamp, and Jajah (2003) claimed that remittances had an inverse relationship with growth by taking a sample of 113 countries. They had provided justification of inverse relationship between remittances and growth as a moral hazard. Moral

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hazard inevitable that dependent of immigrants in developing countries only rely upon the income of immigrants in foreign countries. So, fundamentally they concluded that the families that received the remittances income were not working in their home countries and a huge shortage of labor will adversely effect economic growth of a particular country.

Giuliano and Ruiz-Arranz (2005) had worked on data set of more than 100 developing countries from years 19975-2002 and found that remittances can enhance economic growth only in less financially developed countries. In the same year Iqbal and Sattar (2005) had employed multiple regression analysis on annual data of Pakistan from 19972-2003 and found a positive and significant relationship between worker remittance and economic growth of Pakistan. Rahman, Mustafa, Islam, and Guru-Gharana (2006) had employed cointegration and vector error correction models to investigate the main factors that contribute in the economic growth of Bangladesh. They founded that remittances can boost economic growth and create employment opportunities in short run. Jongwanich (2007) had investigate the impact of worker remittances on economic growth and poverty reeducation in 17 countries of Asia and Pacific region. He employed Generalized Method of Moments (GMM) regression technique on the panel data of 17 countries from 1993-2003. He found that there is direct and marginal impact of remittance on economic growth of Asia and Pacific countries.

Pradhan, Upadhyay, and Upadhyaya (2008) that investigates the relationship between remittances and economic growth through panel data from 1980–2004 of 39 major developing countries. Both panel data techniques fixed effects and random effects are employed in order to confirm the contribution of remittances on economic growth and rejected random effects model on the basis of statistical test (Hausman's Specification test). They concluded that Remittances has a direct relationship with economic growth. Gapen, Barajas, Chami, Montiel, and Fullenkamp (2009) had explored the question "do workers remittances promote economic growth?" by using panel data of 84 countries from 1970-2004. They concluded that there would be an inverse relationship between remittances and economic growth when remittances is measured appropriate and economic growth questions are properly defined. In the same year Karagoz (2009) had worked on worker remittances and economic growth by using annual data of Turkey from 1970-2005. He had employed Johansen cointegration test to investigate the long run relationship between worker remittances and economic growth. He found an inverse but significant relationship between remittances and economic growth.

Siddique, Selvanathan, and Selvanathan (2010) had investigates the relationship between economic growth and worker remittances in three Asian countries India, Sri Lanka and Bangladesh by using time series annual data from 1975-2006. They had employed cointegration and Granger causality test to investigate the long run and short run relationship. They concluded that remittances had direct relationship in case of Bangladesh, no relationship was found between remittances and economic growth while in Sri Lanka worker remittances and economic growth had two-way relationship. Most recently, Nsiah and Fayissa (2011) had investigate the relationship between economic growth and remittances through panel data of 64 different countries of African, Asian, and Latin American-Caribbean from 1987-2007. They had employed panel unit root and panel cointegration tests to investigate the exact relationship between remittances and economic growth. They found that there is positive relationship between remittances and economic growth throughout the whole group.

Data and Methodology:

In this study data for all variables is collected from the publications of World Bank data set "World Development Indicators" and State Bank of Pakistan. Data set covers most recent year's annual data from 1990-2010. Gujarati (2003) recommended that standard tests of stationary are mostly applicable for large sample size and as the sample size in the current study is not so huge that is way researcher have not employed any test for stationary.

In order to investigate the impact of worker remittances on economic growth of Pakistan multiple regression analysis are employed. Some studies had been employed multiple regression analysis to investigate the impact of worker remittances on economic growth (Ang, 2007; Chami et al., 2003; Iqbal & Sattar, 2005; Singh, Haacker, Lee, & Le Goff, 2011). So, the final Ordinary Least Square (OLS) models of this study are as follows;

$GROWTH_i = \alpha_0 + \alpha_1 WORREM_i + \alpha_2 FINDEV_i + \alpha_3 CONSUM_i + \alpha_4 SAVING_i + \alpha_5 CABAL_i + \varepsilon_I$

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Here;

GROWTHi = Natural log of GDP per capita

WORREMi = CONSUMi

FINDEVi = Ratio of money and quasi money (M2) to GDP

CONSUMi = Household final consumption expenditure as a % of GDP

SAVINGi = Ratio of gross domestic savings to GDP

CABALi = Current account BAL or balance as a percentage of GDP

α_0 and ε_I= Intercept term and error term in the model

Proxies and expected relationship of all the variables is provided in Table 1. Here, $GROWTH_i$ is the dependent variable which is measured as natural log of Gross Domestic Product (GDP) per capita in US dollars. $WORREM_i$ is a stand for worker remittance is an independent variable and taken as ratio of worker remittances received to GDP. The worker remittances and economic growth has a positive relationship. While the remaining four variables are control variables which are add in the model to control for the effect of other most important variables that effects the economic growth. Including control variables in the model facilitates us to enhance the prediction power of variables or model and boost the precision of estimates(The Kellogg School of Management). First control variable $FINDEV_i$ stands for financial development and its proxy is ratio of Money and quasi money M2 to GDP. The expected relationship between financial development and economic grow this mixed some studies claimed positive relationship while other favor inverse relationship. The second control variable is household final consumption expenditure which represents by $CONSUM_i$ and this variable is calculated by ratio of Household final consumption expenditure to GDP. The theoretical relationship between house hold consumption expenditure and economic growth is positive. The third control variable is gross domestic savings $SAVING_i$ Gross domestic savings which is measured by taking a ratio of gross domestic saving to GDP. The theoretical association of saving is direct as saving boost investment which ultimately result in higher economic growth while negative association is also reported in

some situations. The last control variable is current account balance which is represented by$CABAL_i$ and this variable is also measured by taking ratio of current account balance to GDP. The expected linkage between current account balance and economic growth is either positive or negative in theory.

Table 1: Variables Descriptions and their Relationship

Empirical Results and Discussion:

Variable	Obs.	Mean	Std. Dev.	Min	Max
$GROWTH_i$	20	2.753172	0.1381553	2.596968	3.00812
$WORREM_i$	20	3.416221	1.239567	1.453638	5.478613
$FINDEV_i$	20	41.73324	3.251651	36.069	46.37045
$CONSUM_i$	20	74.55008	3.295544	68.21635	81.9007
$SAVING_i$	20	15.00785	2.259193	10.15377	17.61168
$CABAL_i$	20	-2.603952	3.684535	-9.551735	5.330064

This portion of paper describes the descriptive diagnostics, outcomes of multiple regression analysis, results of diagnostic tests and then discussion on these outcomes. First of all result of descriptive diagnostics is provided in Table 2.

Table 2: Descriptive Diagnostics

Variable	Proxy or Definition	Expected Relationship
$GROWTH_i$	Natural log of GDP per capita in current US dollars	
$WORREM_i$	Workers' remittances received as a % of GDP	+
$FINDEV_i$	Money and quasi money (M2) as a % of GDP	+/-
$CONSUM_i$	Household final consumption expenditure as a % of GDP	+
$SAVING_i$	Gross domestic savings as a % of GDP	+/-
$CABAL_i$	Current account BAL or balance as a % of GDP	-/+

The dependent variable growth has $2.75 average GDP per capita of Pakistan for 20 years form the years 1991-2010. The standard deviation of growth is only $0.14 which means the GDP per capita of Pakistan is deviate only $ 0.14 from the average $2.75 for sample period 1991 to 2010. The largest value of GDP per capita is $ 3.01 while lowest value is $2.597. Similarly the average, standard deviation, largest and smallest value of independent and control variables is given in this table. After descriptive diagnostics the diagnostics tests are employed in order to check the assumptions of OLS. The diagnostics tests are applied to investigates the OLS assumptions like; Multicollineartiy, Autocorrealtion and Heteroskedasticity.

The dignositc test for mulitcollinearity is multicollinearity diagnostics. The mulitcoolinearity diagnostics are given in Table 3. These statisitics incldes variance inflation factor (VIF) and tolerance (1/VIF). The cutt-off points for VIF and tolerance is that VIF must be less than 10 and tolerance value is must be greater than 0.1. In current study the values of VIF and tolerance are below from their cut points which suggest that there is no multicollinearity in the model.

Table 3: Multicollinearty Statistics

Variable	Variance Inflation Factor (VIF)	Tolerance (1/VIF)
$SAVING_i$	6.05	0.165241
$CONSUM_i$	5.55	0.180312
$CABAL_i$	2.98	0.335908
$FINDEV_i$	1.38	0.727252
$WORREM_i$	1.28	0.778615

The autocorrelation in the model is checked by looking at the Durbin-Watson Statistics. The rule of thumb is that Durbin-Watson Statistics which is in the range of 1.5 to 2.5 or near to 2 is shows the absences of autocorrelation. The Durbin-Watson Statistics in this study is 1.80 which is near to 2, so there is no autocorrelation in this model.

The heteroskedasticity is checked through Breush Pagan test. The outcome of this test is as follows;

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

H_0:

Constant variance of error term for all values of independent variables

H_1:

Not have a constant variance of error term for all values of independent variables

chi^2 (1) = 0.80 and Prob. > chi^2 = 0.3697

According to the test statistics 0.8 and p-value 0.3697 which is exceeds from 0.05 level of significance researcher fail to reject H_0 that concludes that the assumption of heteroskedasticity which is constant variance of error term for all values of independent variables is not violated. As all the major assumption of OLS are analyzed through different diagnostic tests and our model fulfill all the major assumptions. The final model of OLS is provided in Table 4.

Table 4: Multiple Regression Analysis

Variable	Model with Worker Remittances Coefficients	P-Value	Model without Worker Remittances Coefficients	P-Value
$WORREM_i$	.0495303	0.000***	-	-
$FINDEV_i$	-0.001049	0.781	0.0011273	0.857
$CONSUM_i$	0.0433833	0.000***	0.047726	0.001**
$SAVING_i$	0.0276599	0.027*	0.0214855	0.265
$CABAL_i$	-0.0225714	0.000***	-0.0187299	0.032*
CONstant	-1.080373	0.125	-1.223074	0.286
F test	33.39	0.000***	12.47	0.000***
R^2	0.923		0.767	
Adjusted R^2	0.895		0.707	

Notes:

Significant at *** 1%, ** 5%, and * 10% level of significance (2-tailed).

The major outcome of this study is provided in this table of multiple regression analysis. First model which includes the worker remittances has much better result than 2nd model which exclude worker remittances. The outcome of first model is shows that independent variable worker remittance has a positive and highly significant relationship with economic growth of Pakistan. This result is in same with the previous study that was done in Pakistan (Iqbal & Sattar, 2005). From the four control variables only 1 control variable financial development has an insignificant and negative impact on economic growth of Pakistan. Remaining three control variables (consumption, saving and current account balance) are significant. The coefficient of determination R^2 of model is 0.923 which shows that independent variables explain 92.3% variations in economic growth of Pakistan. The adjusted R^2 of model is 0.895 which means that if researcher adds or removes a variable in model then its R^2 is adjusted to 89.5%. The F test statistics is 33.39 which is significant at 1% level of significance shows that model is good fit.

The second model which is run with control variables shows that two variables consumption and current account balance are significant at 1% and 5% level of significance respectively. While other two control variables financial

development and saving are insignificant. Values of R^2 and adjusted R^2 of this model are 0.767 and 0.707 smaller than first model's values. The F test value is also very small as compared to first model F test value only 12.47 against 33.39. These smaller values R^2, adjusted R^2 and F test value shows the contribution of worker remittances on the economic growth of Pakistan.

So, contribution of worker remittance is the significant and most important in economic growth of Pakistan. But its productive use can helps the economy of Pakistan to maintain and improve the economic growth by investing this money into different long term and short term projects. Pakistan's Government should provide different incentives and lower down the cost of transactions to attract the overseas Pakistani emigrants that sent money through unofficial ways.

Conclusion:

This study is conduct to explore the impact of worker remittances on economic growth of Pakistan by employed the annual time series data from 1991-2010. In order to explore the relationship between worker remittances and economic growth multiple regression analysis is utilized. Different diagnostic tests are applied in order to confirm the major assumption of multiple regression analysis like multicollinearity, heteroskedasticity and autocorrelation. After employing all these tests multiple regression analysis is conducted which shows that worker remittances is positively and significantly contribute in the economic growth of Pakistan. This study has being focusing only on relationship between worker remittance and economic growth and the upcoming studies must investigates the relationship of worker remittances with other macroeconomic indicators like poverty reduction and entrepreneurship in Pakistan.

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