

Dynamic Impact of Remittances on Economic Growth: A Case Study of Pakistan

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Abstract

Remittances are one of the largest sources of financial inflow for developing countries. In recent years, they have gained significant importance for their role in balance of payments. In this study, we examine the dynamic impact of workers' remittances on economic growth of Pakistan. For this purpose, we used a Keynesian type simultaneous econometric model with a dynamic perspective. The macroeconomic key variables are investigated with an eventual purpose of estimating their respective contributions to economic growth. It is found that the highest induced growth rate by remittances to output growth took place in the early 1980s particularly, 1982-83 which corresponds to the high inflow of remittances from the Middle East. Our analysis shows that, although the workers' remittances mostly used for private consumption and partially for imports but it contributed to growth positively through the multiplier effects.

I. Introduction

As part of the spread of globalization and industrialization, the world has experienced a concomitant growth in the flow of labour across countries. With better working conditions and opportunities for higher wages in developed countries, these labour flows have been skewed towards the developed countries. It is now estimated that about 191 million people live and work outside the country of their birth (DESA, 2006). In 2007, recorded remittances sent to home by migrants reached \$265 billion, more than double the level reached in 2002 (Ratha, et al., 2008). Migrants send home remittances to support their relatives and/or friends. These flows tend to be more stable than other external flows and may even be counter cyclical to the

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receiving economy. As migrants tend to send more during hard times to help families and friends, remittances tend to go up when the receiving economy suffers from an economic recession (Orozco, 2003 & World Bank, 2005). In contrast, many other types of private capital flows move pro-cyclically, rising in booms and falling in recessions (Ratha, 2003).

Remittances go to the households and individuals, whereas other external sources of funds such as foreign aid go to public agencies in recipient countries. Hence the effectiveness of remittances is not hampered by the corruption of government officials (Kapur, 2005). Remittances improve a nation's creditworthiness and can thereby enhance access to international capital markets to finance infrastructure and other development projects (Ratha, 2005; Yang, 2004; Woodruff and Zenteno, 2004). Remittances also generate foreign exchange, essential for making up any shortfall in the balance of payments, for promoting investment, and in dealing with the problems of poverty. At the household-level, remittances can be used to smooth consumption levels and provide capital both for investment and old-age security (Schrieder & Knerr, 2000).

Empirically, Cattaneo (2005) has found that remittances are spent typically on investments that will promote growth-investments in both physical and human capital, the latter focused on health and education. Remittances have also been found to produce a significant impact on macro variables like consumption, investment and imports [Talafha, (1985); Glytsos, (2002); Glytsos, (2005)] and economic growth [Nishat & Bilgrami, (1991); Glytsos, (2002); Glytsos, (2005); Natalia, et al., (2006); Bichaka, (2008)]. Similarly, remittances have been found helpful in reducing poverty [Quartey, (2005); Rukshana & Nadeem, (2008)] by directly increasing incomes, allowing smoothing consumption and easing capital constraints on the poor (Jongwanich, 2007). The rest of the paper is organized as follows. Part II presents trends of worker remittances to Pakistan. Part III deals with theoretical framework, model specification and data description. Empirical results are presented in section IV and finally, section V provides conclusions.

II. Trends of Worker Remittances to Pakistan

Remittances have played a vital role in the economy of Pakistan. The flow of remittances have helped to stabilize Pakistan's financial sector (Shahbaz, et al., 2008) and have remained one of the most important components of the balance of payments since the late 1970's (Nishat & Bilgrami, 1991). The countries from which workers' remittances are received

include: the United States, United Kingdom, Saudi Arabia, United Arab Emirates, GCC countries (including Bahrain, Kuwait, Qatar and Oman), the European Union, Australia, Canada and Japan. In 1972-73 remittances were \$136 million. The oil shocks of 1973 dramatically increased the import bill and thus worsened the balance of payments problem. However, the emergence of the Middle East market and remittances they provided contributed significantly to an improvement in the balance of trade (Afzal, 2008). During the 1975-82 time period, Pakistan experienced large scale labour migration to countries experiencing rapid economic growth, particularly to the Middle East. Before their migration about half of these workers were engaged in low paid jobs (Arif, 1995). On arrival, these workers frequently transferred a major share of their income back to their families. Estimates suggest that migrants remit about 75% of their earnings to their country of origin (Gilani et al., 1981 & Addleton, 1992). Those who receive these remittances use roughly 62 percent for consumption, with 35 percent either saved or invested. A large part of the money received was used to pay for consumer goods, with lesser amounts used to finance house construction, to pay-off debts, and to purchase land. During 1980s, remittances from the Middle East provided strong social and economic benefit for many of Pakistan's households.

With the Gulf Crisis and the return of immigrants from Iraq and Kuwait, the boom of the 1980's reversed in the beginning of 1990s. By 1990-91, the inflow of remittances had declined to US \$1848 million of which the proportion from the Middle East decline from 86% in 1983-84 to 67%. Although in 1996-97 the share provided by the Middle East temporarily increased to 73%, total remittances fell overall to Rs.1409 million (Government of Pakistan,1998). Remittances once again experienced a setback in 1998-99 and 1999-00. This was mainly due to the imposition of sanctions and the seizing of foreign accounts caused by nuclear explosions (Asghar & Ashfaq, 2004) which in turn caused a declined in the confidence on the banking system by many Pakistani migrants (Haq, 2001). The decline in remittance inflows during the 1990s was a major contributor in increasing poverty in Pakistan (Siddiqui & Kamal, 2002).

Since September 11, 2001 remittances have increased sharply and now reach over \$4 billion annually. In 2005–06 (the year of the earthquake) official remittances reached \$4.6 billion, an increase of 10% over the previous year (State Bank of Pakistan, 2006). In 2006-07, Pakistan received \$5.493 billion as remittances (Govt. of Pakistan, 2007) and in 2007-08 the remittances were estimated at record \$6.5 billion (SBP, 2008). On the other

hand, other external flows such as foreign direct investment and portfolio investment from abroad have decreased due to the volatile political situation and shortage of energy; remittances continue to be a significant and increasing source of revenue.

III. Theoretical Framework, Model Specification and Data Description

The main objective of this study is to isolate empirically the short and long-run impacts of remittances on key economic variables and economic growth in Pakistan. We used Glytso (2002) model to test these effects. This involved constructing a linear simultaneous equation macro econometric model in order to determine the effects of workers' remittances on private consumption, investment, imports and the level of income. From this system the estimated effects of remittances and their time distribution on the key macroeconomic variables that affect economic growth could be found.

The model consists of three behavioral equations, consumption, investment and import function, and one equilibrium condition. The structure of the model is

$$Cp_t = \theta_0 + \theta_1 Y_t + \theta_2 Cp_{t-1} \quad (1)$$

$$Inv_t = \lambda_0 + \lambda_1 Y_t + \lambda_2 K_{t-1} \quad (2)$$

$$M_t = \delta_0 + \delta_1 Y_t + \delta_2 M_{t-1} \quad (3)$$

$$Y_t = Cp_t + Cg_t + Inv_t + (Ex_t - M_t) + WR_t \quad (4)$$

Where, Cp = Private Consumption Expenditures, Y = Gross Domestic Product + Workers' remittances, Inv = Gross Fixed Capital Formation (Public and Private) plus Changes in Stocks, M = Imports of Goods and Non-factor Services, Ex = Exports of Goods and Non-factor Services, K = Cumulative Gross Domestic Investment (used as a proxy for capital stocks), Cg = Government Consumption Expenditures and WR = Workers' remittances

Equation (1) is a dynamic consumption equation that incorporates partial adjustment. In this equation, the level of income, which also includes remittances, and lagged value of private final consumption expenditures are explanatory variables. The coefficients of these explanatory variables are

expected to be positive. Equation (2) assumes that investment is a positive function of income (Y) and a negative function of a lagged capital stock (K_{t-1}) allowing some time for investment to adjust to the stock². Equation (3) is the imports equation. In this equation the level of income and lag of imports used as explanatory variables. Both are likely to have positive impact on import. Equation (4) is income identity which includes workers' remittances as exogenous variable.

1. Impact Multiplier

After making necessary substitution in equations (1), (2) and (3)³ we derive the following reduced form equations for consumption, investment and import:

$$ZCp_t = \theta_0(1 - \lambda_1 + \delta_1) + \theta_1(\lambda_0 - \delta_0) + \theta_1 Cg_t + \theta_1 Ex_t + \theta_1 WR_t + \theta_2(1 - \lambda_1 + \delta_1)Cp_{t-1} + \theta_1 \lambda_2 K_{t-1} - \theta_1 \delta_2 M_{t-1} \quad (5)$$

$$ZInY = \lambda_0(1 - \theta_1 + \delta_1) + \lambda_1(\theta_0 - \delta_0) + \lambda_1 Cg_t + \lambda_1 Ex_t + \lambda_1 WR_t + \lambda_1 \theta_2 Cp_{t-1} + \lambda_2(1 - \theta_1 + \delta_1)K_{t-1} - \lambda_1 \delta_2 M_{t-1} \quad (6)$$

$$ZM_t = \delta_0(1 - \theta_1 - \lambda_1) + \delta_1(\theta_0 + \lambda_0) + \delta_1 Cg_t + \delta_1 Ex_t + \delta_1 WR_t + \delta_1 \theta_2 Cp_{t-1} + \delta_1 \lambda_2 K_{t-1} + \delta_2(1 - \theta_1 - \lambda_1)M_{t-1} \quad (7)$$

Where θ_1/Z , λ_1/Z and δ_1/Z represent impact multipliers for consumption, investment and import respectively and $Z = 1 - \lambda_1 - \theta_1 + \delta_1$

Finally, the reduced form equation for income is as follows:

$$Y_t = \Phi + \left(\frac{\theta_1 + \lambda_1 - \delta_1}{Z} + 1 \right) Cg_t + \left(\frac{\theta_1 + \lambda_1 - \delta_1}{Z} + 1 \right) Ex_t + \left(\frac{\theta_1 + \lambda_1 - \delta_1}{Z} + 1 \right) WR_t + \left(\frac{\theta_2}{Z} \right) Cp_{t-1} + \left(\frac{\lambda_2}{Z} \right) K_{t-1} + \left(\frac{\delta_2}{Z} \right) M_{t-1} \quad (8)$$

The short-run or impact multiplier for the income $\left(\left(\frac{\theta_1 + \lambda_1 - \delta_1}{Z} + 1 \right) \right)$ is

² Capital Stock is approximated by cumulative investment (Pavlopoulos, 1966).

³ Detailed derivation of the model may be provided on demand.

equal to impact multiplier for consumption θ_1/Z plus impact multiplier for investment λ_1/Z minus impact multiplier for imports δ_1/Z and plus one.

2. Dynamic Multipliers

It is valuable to find out the dynamic effects of workers' remittances on endogenous variables. For example a change in remittances by one unit in year 1 with no further increase in the following years 2, 3 ...n, the dynamic multipliers can be obtained. From the reduced form equation (5), consumption function for the following period can written as

$$ZCp_{t+1} = \theta_0(1 - \lambda_1 + \delta_1) + \theta_1(\lambda_0 - \delta_0) + \theta_1 Cg_{t+1} + \theta_1 Ex_{t+1} + \theta_1 WR_{t+1} \\ + \theta_2(1 - \lambda_1 + \delta_1)Cp_t + \theta_1 \lambda_2 K_t - \theta_1 \delta_2 M_t$$

Let suppose $\theta_0(1 - \lambda_1 + \delta_1) + \theta_1(\lambda_0 - \delta_0) = C_0$, then

$$ZCp_{t+1} = C_0 + \theta_1 Cg_{t+1} + \theta_1 Ex_{t+1} + \theta_1 WR_{t+1} + \theta_2(1 - \lambda_1 + \delta_1)Cp_t \\ + \theta_1 \lambda_2 K_t - \theta_1 \delta_2 M_t \quad (9)$$

By substituting (5) into (9) we get:

$$Cp_{t+1} = C_0 + \left(\frac{\theta_1}{Z}\right)Cg_{t+1} + \left(\frac{\theta_1}{Z}\right)Ex_{t+1} + \left(\frac{\theta_1}{Z}\right)WR_{t+1} + \left(\frac{\theta_1 \lambda_2}{Z}\right)K_t - \left(\frac{\theta_1 \delta_2}{Z}\right)M_t \\ \left(\frac{\theta_2(1 - \lambda_1 + \delta_1)}{Z}\right) * \left(\begin{array}{l} \left(\frac{\theta_1}{Z}\right)Cg_t + \left(\frac{\theta_1}{Z}\right)Ex_t + \left(\frac{\theta_1}{Z}\right)WR_t + \left(\frac{\theta_2(1 - \lambda_1 + \delta_1)}{Z}\right)Cp_{t-1} \\ + \left(\frac{\theta_1 \lambda_2}{Z}\right)K_{t-1} - \left(\frac{\theta_1 \delta_2}{Z}\right)M_{t-1} \end{array} \right) \quad (10)$$

It can be observed from equation (10) that any change of remittances in the current year has the following effects on private consumption in the following period as:

$$\frac{\partial Cp_{t+1}}{\partial WR_t} = A * \left(\frac{\theta_1}{Z}\right) \quad \text{Where} \quad A = \left(\frac{\theta_2(1 - \lambda_1 + \delta_1)}{Z}\right)$$

By continuing the process of iteration the dynamic multipliers can be found for the next years as.

$$\frac{\partial Cp_{t+2}}{\partial WR_t} = A^2 * \left(\frac{\theta_1}{Z}\right), \frac{\partial Cp_{t+3}}{\partial WR_t} = A^3 * \left(\frac{\theta_1}{Z}\right) \dots \frac{\partial Cp_{t+n}}{\partial WR_t} = A^n * \left(\frac{\theta_1}{Z}\right)$$

Similarly from the reduced form t equation (6), investment function for the following year can be written as

$$ZInv_{t+1} = C_1 + \lambda_1 Cg_{t+1} + \lambda_1 Ex_{t+1} + \lambda_1 WR_{t+1} + \lambda_1 \theta_2 Cp_t + \lambda_2 (1 - \lambda_1 + \delta_1) K_t - \lambda_1 \delta_2 M_t \quad (11)$$

Where, $C_1 = \lambda_0 (1 - \theta_1 + \delta_1) + \lambda_1 (\theta_0 - \delta_0)$

$$\text{let } K_t = K_{t-1} + Inv_t \quad (P)$$

Substituting (6) into (11) by using the identity (P) we get

$$Inv_{t+1} = C_1 + \left(\frac{\lambda_1}{Z}\right) Cg_{t+1} + \left(\frac{\lambda_1}{Z}\right) Ex_{t+1} + \left(\frac{\lambda_1}{Z}\right) WR_{t+1} + \left(\frac{\lambda_1 \theta_2}{Z}\right) Cp_{t-1} - \left(\frac{\lambda_1 \delta_2}{Z}\right) M_{t-1} + \left(\frac{\lambda_2 (1 - \theta_1 + \delta_1)}{Z}\right) K_{t-1} + \left(\frac{\lambda_2 (1 - \theta_1 + \delta_1)}{Z}\right) * \left[\begin{aligned} &\left(\frac{\lambda_1}{Z}\right) Cg_t + \left(\frac{\lambda_1}{Z}\right) Ex_t + \left(\frac{\lambda_1}{Z}\right) WR_t + \left(\frac{\lambda_1 \theta_2}{Z}\right) Cp_{t-1} \\ &+ \left(\frac{\lambda_2 (1 - \theta_1 + \delta_1)}{Z}\right) K_{t-1} + \left(\frac{\lambda_1 \theta_2}{Z}\right) Cp_{t-1} - \left(\frac{\theta_1 \delta_2}{Z}\right) M_{t-1} \end{aligned} \right] \quad (12)$$

From equation (12) it is found that any change of workers' remittances in the current year has following effects on investment in the subsequent period.

$$\frac{\partial Inv_{t+1}}{\partial WR_t} = B * \left(\frac{\lambda_1}{Z}\right) \quad \text{Where } B = \left(\frac{\lambda_2 (1 - \theta_1 + \delta_1)}{Z}\right)$$

By continuing the process of iteration the dynamic multipliers can be found for next coming years as.

$$\frac{\partial Inv_{t+2}}{\partial WR_t} = B^2 * \left(\frac{\lambda_1}{Z}\right), \frac{\partial Inv_{t+3}}{\partial WR_t} = B^3 * \left(\frac{\lambda_1}{Z}\right) \dots \frac{\partial Inv_{t+n}}{\partial WR_t} = B^n * \left(\frac{\lambda_1}{Z}\right)$$

Finally, from reduced form equation (7) import function for the coming year can be found as:

$$\begin{aligned}
 ZM_{t+1} = & C_2 + \delta_1 C g_{t+1} + \delta_1 E x_{t+1} + \delta_1 W R_{t+1} + \delta_1 \theta_2 C p_t \\
 & + \delta_1 \lambda_2 K_t + \delta_2 (1 - \theta_1 - \lambda_1) M_t
 \end{aligned}
 \tag{13}$$

Where $C_2 = \delta_0 (1 - \theta_1 - \lambda_1) + \delta_1 (\theta_0 + \lambda_0)$

Substituting (7) into (13) yields:

$$\begin{aligned}
 ZM_{t+1} = & C_2 + \left(\frac{\delta_1}{Z}\right) C g_{t+1} + \left(\frac{\delta_1}{Z}\right) E x_{t+1} + \left(\frac{\delta_1}{Z}\right) W R_{t+1} + \left(\frac{\delta_1 \theta_2}{Z}\right) C p_t + \left(\frac{\delta_1 \lambda_2}{Z}\right) K_t \\
 & \left(\frac{\delta_2 (1 - \theta_1 - \lambda_1)}{Z}\right) * \left(\begin{aligned} & \left(\frac{\delta_1}{Z}\right) C g_t + \left(\frac{\delta_1}{Z}\right) E x_t + \left(\frac{\delta_1}{Z}\right) W R_t + \left(\frac{\delta_1 \theta_2}{Z}\right) C p_{t-1} \\ & + \left(\frac{\delta_1 \lambda_2}{Z}\right) K_{t-1} - \left(\frac{\delta_2 (1 - \theta_1 - \lambda_1)}{Z}\right) M_{t-1} \end{aligned} \right)
 \end{aligned}
 \tag{14}$$

From equation (14) it is found that any change of remittances in the current year has the following effects on import in the subsequent period. That is

$$\frac{\partial M_{t+1}}{\partial W R_t} = C * \left(\frac{\delta_1}{Z}\right) \text{ where } C = \left(\frac{\delta_2 (1 - \theta_1 - \lambda_1)}{Z}\right)$$

By continuing the process of iteration the dynamic multipliers can be found for subsequent periods as. $\frac{\partial M_{t+2}}{\partial W R_t} = C^2 * \left(\frac{\delta_1}{Z}\right)$ $\frac{\partial M_{t+3}}{\partial W R_t} = C^3 * \left(\frac{\delta_1}{Z}\right) \dots$

$$\frac{\partial M_{t+n}}{\partial W R_t} = C^n * \left(\frac{\delta_1}{Z}\right)$$

For the income identity, dynamic multipliers can be calculated by summing the multipliers for consumption and investment and then subtracting multiplier for imports from their sum.

3. Data Description

Data series for private consumption expenditures, government final consumption expenditures, gross fixed capital formation (private and public sector investments), Exports of goods and non-factor services, import of goods and non-factor services, gross domestic product and worker remittances are obtained from annual report of State Bank of Pakistan and Federal Bureau of Statistics Pakistan. We used cumulative gross fixed capital formation as a

proxy for capital stock, for the period of 1973-2007. The level of income is defined as the summation of GDP and workers' remittances.

IV. Empirical Results

We estimated the equations (1), (2) and (3). However, these equations suffered at least with two problems. If these problems are not properly handled, then estimated parameters become biased and inconsistent. The first problem is the endogeneity between private consumption and income variables in the first equation, between investment and income variables in second equation and between imports and income variables in the third equation. If endogeneity is present, then OLS estimates will be biased and inconsistent. The second problem which arises in our equations is the autocorrelation due to the imposition of time aggregation on variables and presence of lagged values of dependent variables as explanatory variables. To solve these problems and obtain consistent estimators and standard error we have used Generalized Method of Moments (GMM) by using data from 1973 to 2007 for Pakistan. The GMM estimates of equations (1), (2) and (3) are given in table 1.

The results indicate that all the coefficients except capital stock are significant. The expected signs are achieved as predicted. The lagged dependent variable in equation (1) and (3), expressing the dynamic nature of the model, are statistically significant. In equation (2), investment behaves as expected, with highly significant coefficient of the income variable. The investment restraining factor of the capital stock has the right behavior but statistically insignificant. We also computed impact and dynamic multipliers from our GMM estimates by using equation (8) and results are summarized in table 2. From the reduce form equation (5), the short-run or impact multiplier for private consumption is equal to $\left(\frac{\theta_1}{Z}\right)$ and computed to be 0.696 implying that one unit increase in remittances in the current year leads to approximately 0.70 unit increase in private consumption expenditures. From the reduce form equation (6), the short-run or impact multiplier is equal to $\left(\frac{\lambda}{Z}\right)$ and computed to be 0.386 implying that one unit increase in remittances in the current year leads to 0.386 unit increase in investment. From the reduce form equation (7), the short-run or impact multiplier for investment is equal to $\left(\frac{\delta_1}{Z}\right)$ and computed to be 0.24 implying that one unit increase in remittances in the current year leads to 0.24 unit increase in import. Finally, The short-run or

Table: 1. GMM Estimates of Equation (1), (2) and (3)

Explanatory Variables	Private Consumption Equation	Investment Equation	Imports Equation
Y	0.378* (4.090)	0.210* (3.598)	0.132* (3.954)
CP (-1)	0.541* (4.116)	-----	-----
K(-1)	-----	-0.0018 (-0.0998)	-----
M(-1)	-----	-----	0.339** (2.063)
Constant	15573.92 (0.791)	-30462.57 (-0.599)	12128.80 (0.934)
Adjusted R²	0.99	0.95	0.94
J-Statistics	2.97	1.65	2.64
J-Statistics Critical	9.48	9.48	9.48
No. of observations	33	33	33
Instrumental Variables	CP(-2) Y(-1) Y(-2) CG(-1) M(-2) WR C	Y (-1) CP (-1) CP (-2) CG (-2) EX (-1) EX (-2) C	IM(-2) Y(-1) Y(-2) CP(-1) CG (-2) WR C

Values of the t-statistics (autocorrelation-heteroskedasticity consistent) are given in the parentheses. J test used for the validity of over identifying restrictions.

*, ** & *** shows Significance level at 1%, 5%, and 10%, respectively.

impact multiplier for the income is equal to $\left(\frac{(\theta_1 + \lambda_1 - \delta_1)}{Z} + 1\right)$ obtained from the reduce form equation (8) and computed to be 1.84, implying that one unit increase in remittances in the current year leads to increase 1.84 unit in the level of income through the multiplier effects.

Dynamic multipliers which demonstrate the impact of one unit change in remittances in the current year without any change in subsequent years on the endogenous variables are found for the three years. The dynamic multiplier for private consumption in year 2, 3 and 4 are 0.638, 0.585 and 0.536, respectively. The effect of remittances on private consumption converges gradually toward zero. The dynamic multiplier for investment in year 2, 3 and 4 are -0.000963, 0.000002 and -0.000000005, respectively. The effects of remittances on investment wear out in the second year. The dynamic multiplier for imports in year 2, 3 and 4 are 0.0623, 0.0160 and 0.00413, respectively. It is clear that the effect of remittances on investment wears out

in the second year but the effect of remittances on private consumption reduces gradually. The effects of remittances on imports reduce in the second year but not as much as investment. For the income identity, dynamic multipliers can be calculated by adding the multipliers for consumption and investment and then subtracting the multiplier for imports from their sum, which is found to be 0.575, 0.569 and 0.532 for second, third and fourth period respectively.

Table: 2. Impact and Dynamic (Interim) Multipliers⁴

	Impacts Multipliers (Short-Run Multipliers)	Dynamic Multipliers		
		Years		
	Year 1	2	3	4
Consumption	0.696	0.638	0.585	0.536
Investment	0.386	- .000963	0.000002	-0.000000005
Imports	0.243	0.0623	0.0160	0.00413
Income	1.838	0.575	0.569	0.532

Finally for calculating the quantities impacts on current and future growth rate of output the estimated dynamic multipliers are applied to the actual annual changes of remittances. For this purpose, for four years time distribution of remittances effects on output growth through the changes in private consumption, investment, and import, the following analytical expression is applied.

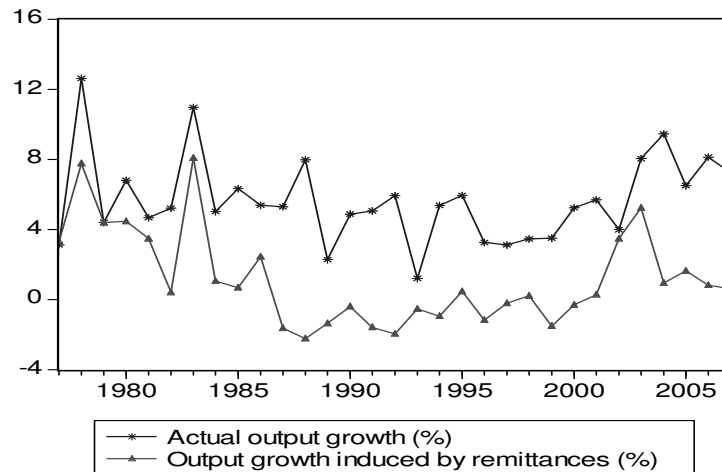
$$(Y_t - Y_{t-1}) = \Delta Y_t = \frac{\partial Y_t}{\partial WR_t} * dWR_t + \frac{\partial Y_t}{\partial WR_{t-1}} * dWR_{t-1} + \frac{\partial Y_t}{\partial WR_{t-2}} * dWR_{t-2} + \frac{\partial Y_t}{\partial WR_{t-3}} * dWR_{t-3}$$

According to the results of our study, workers' remittances affect output growth positively. In many years the decline in remittances inflows lead to a positive induced growth rate that is due to the dominant impact of preceding high increases in remittances arising from the dynamic nature of the study. As it is seen from figure-1 that the highest induced growth rate by remittances (8.09%) belongs to the year 1982-83, in that year, remittances contributed about 10.06% of GDP, account 96.6% of the trade deficit and 84.8 percent of

⁴ Since the dynamic multipliers for investment converges to zero in 3 years, so dynamic (interim) multipliers are calculated for 3 years.

the current account balance (Pakistan Economic Survey, 1983) . It is clearly observed that an induced growth rate in the year 1977 was 3.31 reach to maximum levels in the early 1980s, but it declined in 1990's and mostly with a negative induced growth rate. It is partially due to return of the Pakistani's from Kuwait and Iraq, Gulf crisis and seizing of foreign accounts caused by nuclear explosions, which declined the confidence on banking system of many Pakistanis (Haq, 2001). But induce growth rate in the beginning of the 21st century tends to increase once again and reaches to the maximum in 2003 due to September 11, 2001, remittances have increased very sharply to Pakistan.

Figure-1: Actual rates of output growth and rate of output growth induced by remittances, 1977-2007



V. Conclusions

This study concludes that workers' remittances have played a vital role in the economies of labour exporting developing countries. It constitutes an increasingly means for the transfer of funds from developed to developing nations. As concerned to Pakistan, the remittances were highest during the period of 1982-83 and contributed about 10.06 percent of GDP. After that, it started to decline. It might be due to; migrants returning from Middle East, decline in oil prices, Gulf crises (i.e. invasion of Kuwait by Iraq) and freezing of foreign currency account due to explosion of nuclear weapon. After experiencing a slump in the 1990s, remittances to Pakistan are again increasing. At the beginning of 21st century, remittances have increased very sharply during the period of 2001-02 to 2002-03, then, it decreases in 2003-

04. Afterward, remittances sent home by migrants showed a rising trends.

The study focused mainly on the dynamic impact of workers' remittances on economic growth through consumption, investment and imports in Pakistan. A Keynesian macro-econometric demand-oriented simultaneous equation model with a dynamic perspective consisting of three behavioral equations (private consumption, investment and import), national income identity is also included. First, we estimated the consumption, investment and imports equations by employing "Generalized Method of Moments (GMM)" and obtained short and long-run marginal propensities to consume (MPC) and marginal propensities to import (MPI). From the reduced form equations of consumption, investment and imports short-run multipliers are obtained, which are used to find the short-run (impact) multiplier for income. These findings demonstrate that one unit increase in workers' remittances in the current year leads to a 1.84 unit increase in the level of income through multiplier effects.

Dynamic multipliers are found for the following 3 years for the investigation of long-run multiplier effects of exogenous shocks of workers' remittances on private consumption, investment, import and therefore output growth. The effect of remittances on investment wears out in the second year but the effect of remittances on private consumption reduces gradually. Finally, the estimated dynamic multipliers are applied to the actual annual changes of remittances for calculating the quantitative impact of current remittances on current and future growth rates of output. For this purpose, 4 year time distribution of remittance effect on economic growth through the changes in consumption, investment and imports is analyzed.

The results point out that worker's remittances effect economic growth positively through multiplier process. In several years, the reduction in remittances leads to a positive induced growth rate due to the dominant impact of preceding high increases in remittances. Our analysis shows that, although the workers' remittances used mostly for private consumption and partially for imports but it contributed to the economy of Pakistan positively through multiplier process.

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