

## Impact of Global Output Gap on Workers' Remittances Inflows in Pakistan

Atif Ali Jaffri<sup>a</sup>, Moniba Sana<sup>b</sup>, RoomaAsjed<sup>c</sup> and Khushbu Tariq<sup>d</sup>

### Abstract

*Pakistan received 75 percent of total workers' remittances inflows (WRI) during FY2017 from four major source countries (Saudi Arabia, UAE, USA and UK). Economic situation in source countries relative to home country determines decision to remit by emigrants following either altruism (countercyclical) or portfolio rebalancing (pro-cyclical) approach. This study has applied Autoregressive Distributed Lag (ARDL) approach of cointegration to investigate whether WRI in Pakistan from four major source countries followed countercyclical or procyclical approach during the period 1982-2016. The results showed that WRI are positively and significantly affected by real per capita income difference between major source countries and Pakistan. WRI in Pakistan also responded positively and significantly to difference in domestic and foreign real interest rates, however, exchange rate changes showed insignificant impact. The study concluded that WRI in Pakistan follow compensatory (countercyclical) approach and these inflows respond to interest rate differential as well. The policy implication of the findings is that WRI being countercyclical may support policies of government towards social protection in bad economic conditions and interest rate increase may improve current account through surge in WRI.*

### Introduction

Workers' Remittances Inflows (WRI) are current transfers by migrants employed in new economies and considered residents there. WRI to developing countries are important due to sizeable volume, stable nature and important consequences for poverty reduction and enhancing growth. During 2016, US\$ 575 billion remittances were remitted globally and developing countries received US\$ 429.3 billion. According to World Bank's Migration and Development Brief 27, 2017 (April), Pakistan was top 5th recipient of remittances in 2016 receiving US\$ 19.8 billion after India(US\$62.7), China(US\$61.0), Philippines(29.9) and Mexico(28.5).

There are two main approaches revealing the reasons behind the intention of international migrant's decision to remit, one is called altruism (also called counter cyclical) approach and other is portfolio/self-interest (pro-cyclical) approach. According to altruistic approach, migrants care about their family left in their home country, so they transfer funds to them in order to meet their needs. In times of recession, high inflation and unstable exchange rate, migrants remit more in their home countries. Alternatively, portfolio or self-interest approach is associated with portfolio choice theory, in which migrants earn money and then allocate their savings to home country and host country's assets. They send their money to their family with the perspective of building family's wealth. In that case, an improvement in economic condition of country of origin as compared to host country is associated with greater inflow of remittances and vice versa (World Economic Outlook, April 2005).

Chami et al. (2008) argue that main motives of remitting to families in recipient economies are either altruism or exchange, the purpose of remitting is either to share risks or altering intertemporal consumption of recipient families. They also argue that end use of remittances

<sup>a</sup> Associate Professor, Department of Economics, University of Gujrat.

<sup>b</sup> PhD Scholar, Department of Economics, University of Gujrat.

<sup>c</sup> Lecturer, Department of Economics, University of Gujrat.

<sup>d</sup> MPhil Economics scholar in Economics Department of University of Gujrat.

may be decided by the remitter or receivers of these inflows. However, it is possible to have both altruism and exchange motives at the same time. Similarly, risk sharing and consumption smoothing functions could exist at the same time and multiple end users is possible.

In empirical literature on determinants of remittances, generally, demographic factors like number of migrants, economic factors like growth in home and host countries, financial factors such as interest rate differentials and other factors like disasters and political environment are considered (Chami et al., 2005; Chami et al., 2008; Gupta, 2005).

WRI in world and developing countries in 2016 and 2015 observed negative growth due to several factors including low oil prices, weak growth in Gulf Cooperation Countries (GCC), strong dollar against major currencies and anti-immigration sentiments in advanced countries. WRI in Pakistan during FY2017 also recorded negative growth of 3.08 percent following global trend of decline in WRI in major recipient economies. Pakistan received more than 75% workers' remittances from four countries Saudi Arabia, UAE, USA and UK in FY2017. During FY1982-FY2016, on average 73 percent remittances were received from these four countries. Recently, events like Brexit, USA Elections 2016, formation of Saudi led Islamic coalition, and labor market nationalization policies in Saudi Arabia and GCC countries are affecting WRI in Pakistan from these major source countries. Moreover, disturbed bilateral Pak-US relations in the background of US concerns over inadequate cooperation of Pakistan in war against terrorism have raised questions over smooth flow of remittances in Pakistan from USA as observed in past.

There is growing interest in studying the impact of output gap (between recipient and source countries of remittances) on WRI thus estimating countercyclical versus pro-cyclical hypothesis of inflow of remittances (Chami et al., 2008; Chami et al., 2005; Gupta, 2005; Umair and Waheed, 2017). In case of Pakistan, a few studies have been conducted on macroeconomic determinants of workers' remittance. Most of them have found countercyclical flow of remittances in Pakistan. Recent study by Umair and Waheed(2017) using annual data from 1973-2014 found that economic growth in Saudi Arabia and economic crisis in Pakistan are main determinants of increase in inflow of remittances from Saudi Arabia.

Global output gap(YGAP) terminology specifically for this study is defined as the difference between weighted real per capita income of four major source countries of remittances(WRPCI) and real per capita income (RPCI) of Pakistan. The changing weights for source countries in calculating annual WRPCI are their share in total WRI in Pakistan in that specific year. This study has followed Chami et al. (2008) in selecting empirical model to test the impact YGAP on log of workers' remittances inflows as percentage of GDP (LWRGDP) in Pakistan. Other variables included in the model are the difference between domestic real interest rate and US real interest rate (INTDIF), and change in exchange rate (DER).

The remaining part of the paper includes literature review covered in Section II, methodology of the study in Section III, estimation results in Section IV and conclusion of the study in Section V.

## Review of Literature

As discussed above, the motives of remitting money by emigrants may follow altruistic or opportunistic approach depending on several domestic and foreign factors including output gap, interest rate differentials, number of migrants, exchange rate changes etc. There exists vast literature supporting both approaches but in case of developing countries like Pakistan altruistic approach is dominant [Shahbaz and Amir, (2009); Bouhga-hagbe,(2006);Rahman and Wadud (2014)]

Chami, R & Fullenkamp, C. (2008) investigated the determinants of remittances using fixed effect and random effect model for the period 1970-2005 and 1985-2005. The average correlation between WRI and RPCI is negative supporting altruistic approach, which means

decrease in recipient country's economic activity is associated with increase in WRI to that country and vice versa. Worker's remittances have also negative and significant relationship with nominal exchange rate in both regressions. However, interest rate differential is insignificantly related to WRI.

Gupta (2005) examined determinants of remittances and concluded that WRI with reference to economic environment in home country appear to be countercyclical, which means remittances would be higher in period of low economic growth and vice versa. While interest rate and exchange rate insignificantly affected inflow of remittances.

Chami et al. (2005) investigated whether remittances are source of economic development or growth. By using panel data of 133 countries for 29 years, the study checked positive or negative impact of remittances on economic growth. Results of the study confirm countercyclical nature of remittances and also found that remittances are negatively associated with economic growth of these countries. So remittances do not act like source of capital for economic development. Shahbaz and Amir (2009) empirically examined determinants of remittances on micro level and their impact on income distribution. The study found that the major determinant of remittances is current economic condition of migrant's family. World interest rate has negative impact on remittance inflow to Pakistan, however, improvement in world economic situation and depreciation of home country's exchange rate work as encouraging factor for remittance inflow for Pakistan.

Rahman and Wadud (2014) investigated macroeconomic determinants of remittance inflows for South Asian countries using data from 1976 to 2012. The study found that remittance inflows in South Asia are altruistically motivated by the economic condition of home country while they are motivated by self interest in case of host country's economic condition. Official exchange rate does not affect significantly remittance inflows in South Asian countries, while inflation affects WRI negatively and significantly.

Tabit (2016) assessed various determinants of migrant's remittances for 22 developing countries over the period of 1990 to 2014. Results of the study state that in case of bad economic conditions migrants will remit more in their home country in order to protect the well-being of their family. This result also supports altruistic approach or counter cyclical approach. The coefficient of host country's GDP is positive and significant; indicating that the country which is more prosperous will send more remittances. Exchange rate and real interest rate do not significantly affect remittances received by the country.

### Methodology of the Study

This study has initially followed Chami et al. (2008) to select following log-lin model to estimate impact of global output gap (YGAP) on LWRGDP in Pakistan.

$$\text{LWRGDP} = \beta_0 + \beta_1 \text{YGAP} + \beta_2 \text{INTDIF} + \beta_3 \text{DER} + \mu \quad (1)$$

Where,

LWRGDP = natural log of workers' remittances inflows in Pakistan as ratio of GDP

INTDIF = real interest rate differential between Pakistan and USA

DER = change in nominal exchange rate between Pak-rupee and US-dollar  $\mu$ : Stochastic error term

YGAP is defined as the difference between weighted real per capita income of four major source countries of WRI in Pakistan (WRPCI) and real per capita income of Pakistan (RPCIPAK).<sup>a</sup>

<sup>a</sup> The data source of real per capita income for all countries is World Development Indicators, World Bank. GDP per capita is calculated at constant 2010 U.S. dollars prices and using mid-year population.

The annual weights assigned to real per capita income of each source country (Saudi Arabia, UAE, USA and UK) is equal to their annual share in WRI in Pakistan for that year.<sup>a</sup>

$$YGAP = WRPCI - RPCIPAK \quad (2)$$

$$WRPCI = \text{share of S. Arabia} \times RPCI(\text{S. Arabia}) + \text{share of UAE} \times RPCI(\text{UAE}) \\ + \text{share of USA} \times RPCI(\text{USA}) + \text{share of UK} \times RPCI(\text{UK}) \quad (3)$$

Example: For 2016, WRPCI and YGAP are calculated as follows.

$$WRPCI = 0.2997 \times 21395 + 0.2192 \times 40864 + 0.1268 \times 52194 + 0.1295 \times 41602 \\ = 27375 \quad (3a)$$

$$YGAP1 \text{ for 2016} = WRPCI(2016) - RPCIPAK(2016) = 27375 - 1181 = 26194$$

This study has used annual data from 1982 to 2016.<sup>b</sup>The data source for all variables except real interest rate of Pakistan is World Development Indicators (WDI), World Bank. Real interest rate of Pakistan is calculated using data of State Bank of Pakistan (SBP) with same definition used by WDI for calculating real interest rate of USA.<sup>c</sup>

### Estimation Results

Before applying any technique for estimation, we have conducted unit root tests to check stationarity of variables in model. Table 1 shows that LWRGDP, YGAP are integrated of order I(1) whereas INTDIF and DER are I(0). Due to combination of I(1) and I(0) variables in the model and presence of no I(2) variable, we have applied Autoregressive Distributed Lag(ARDL) model to check existence of cointegration and to find long run and short run estimation results.

Variable	At Level		At First difference		Decision
	Intercept	Trend and	Intercept	Trend and	
	Test Statistics (Prob)		Test Statistics(Prob)		
<b>LWRGDP</b>	-1.5240(0)	-1.3820(0)	-5.0726(0)***	-5.5074(0)***	I(1)
<b>INTDIF</b>	-5.2422(0)***	-5.3845(0)***	—	—	I(0)
<b>YGAP</b>	-1.3802(0)	-2.5511(0)	-5.0147(0)***	-4.9149(0)***	I(1)
<b>DER</b>	-4.0122(0)***	-4.7410(0)***	—	—	I(0)

Note: The asterisks \*\*\* showed that ADF statistic has probability less than .01 thus series is stationary at 1 percent level of significance.

Lags	Akaike Information Criterion	Schwarz Information Criterion	Hannan-Quinn
0	31.9236	32.1104	31.9834
1	29.3233	30.2575*	29.6222
2	29.7875	31.4689	30.3254
3	29.3436	31.7723	30.1206
4	28.5471*	31.7231	29.5631*

<sup>a</sup>Borio and Andrew (2007), Ihrig et al. (2007) and Milani(2009) have used trade weights and individual country output gaps to construct global output gap. Following similar methodology, we have constructed changing weighted real per capita income of four major source countries of WRI in Pakistan.

<sup>b</sup> The data period for this study starts from 1982 because before that Pakistan experienced fixed exchange rate regime for 35 years since independence in 1947.

We have selected optimal lag length 4 using Akaike Information Criterion on estimated Vector Autoregressive (VAR) model. At maximum lag length 4, ARDL model is used to apply Bounds test for cointegration. Table 3 shows that F-Stat = 4.8482 is greater than upper critical values at 5 percent level of significance thus indicating existence of cointegration relationship among variables.

<b>Table 3: ARDL Bounds Test for Cointegration</b>			
<b>Model: LWRGDP, YGAP, INTDIF, DER</b>			
<b>Table 4: Long Run and Short Run Estimation Results</b>			
<b>Long Run Results</b>			
	<b>Dependent Variable: LWRGDP</b>		
<b>Variable</b>	Coefficient	T-statistic	Prob.
Constant	-2.7146	-1.1177	0.2777
INTDIF	0.1177**	2.2020	0.0402
YGAP	0.00017*	1.8006	0.0877
DER	0.01812	0.2384	0.8141
<b>Short Run Results</b>			
D(LWRGDP(-1))	-0.26679	-1.4307	0.1687
D(INTDIF)	0.013490*	1.9572	0.0652
D(YGAP)	0.000057**	2.6747	0.0150
D(YGAP(-1))	0.000034	1.1852	0.2505
D(YGAP(-2))	-0.000002	-0.0581	0.9542
D(YGAP(-3))	-0.000051**	-2.4337	0.0250
D(DER)	-0.010369	0.8776	0.3911
ECM(-1)	-0.203308**	-2.1179	0.0476
R <sup>2</sup>	0.9136		
ADJ R <sup>2</sup>	0.8637		
F-statistic	18.283		
Prob. (F-statistic)	0.0000		
S.E. of Regression	0.1710		
J-B Test	0.416(0.812)		
Breusch-Pagan-Godfrey serial correlation test Chi-Square(prob)	1.1748(0.5558)		
Breusch-Pagan-Godfrey heteroscedasticity test Chi-Square(prob)	17.05(0.106)		
Ramsey RESET Test F-Stat(prob)	2.5052(0.130)		
<b>Maximum Lag:4, Selected Ordering (2,4,1,1)</b>			
<b>F-Statistics</b>	<b>4.8482**</b>		
Critical bound values	Lower Bound Value	Upper Bound Value	
1%	4.29	5.61	
5%	3.23	4.35	
10%	2.72	3.77	

Note: The above critical values are obtained from Pesaran et al. (2001), table CI (iii);unrestricted intercept and no trend.

In the second step, long run and short run relationships among variables are estimated. Results are supported by diagnostic tests to confirm existence of no serial correlation and heteroscedasticity problems and to ensure stability of model. Table 4 shows that in the long run coefficients of YGAP and INTDIF are positive and significant, whereas, the coefficient of change in nominal exchange rate is positive but insignificant. In the short run model, the coefficient of lagged ECM is significant and negative which reconfirms existence of long run



relationship. The value of lagged coefficient of ECM (-0.203308) indicates 20 percent convergence towards long run from short run path of LWRGDP is achieved in one year.

The positive coefficient of output gap (YGAP) shows that when weighted per capita of 4 major source countries of WRI in Pakistan increases as compared to real per capita of Pakistan then it causes increase in WRI in Pakistan which provides an evidence of compensatory (countercyclical) approach of WRI in Pakistan. This finding is consistent with existing empirical literature on countercyclical versus procyclical flow of WRI (Chami et al., 2008; Tabit and Moussir, 2016). In case of Pakistan, countercyclical nature of WRI is supported by various studies (Umair and Waheed, 2017; Ahmed, 2012).

The positive coefficient of INTDIF indicates that when the difference between domestic and US real interest rate rises then WRI increase in Pakistan which indicates that remitters follow portfolio approach with reference to interest rate differential in Pakistan. These findings are consistent with Chami et al. (2008) and Chami et al. (2005).

The sign and significance of coefficient of DER determines whether remittances follow opportunistic (portfolio rebalancing) or compensatory (smoothing of purchasing power) approach in response to exchange rate depreciation. Positive coefficient indicates evidence of opportunistic approach whereas negative coefficient indicates compensatory approach. In our study, results show that DER has positive but insignificant coefficient. This finding is consistent with existing literature that documents no impact of exchange rate depreciation on WRI (Gupta, 2005; Tabit and Moussir, 2016).

### Conclusion and Policy Implications

This study has followed model of Chami et al. (2008) to empirically investigate whether WRI in Pakistan from four major source countries follow countercyclical or procyclical approach. The study has applied ARDL approach of cointegration using annual data from 1982-2016 because variables in the models are mixture of I(1) and I(0). The coefficients of YGAP and INTDIF are positive and significant, whereas, the coefficient of depreciation of exchange rate was found insignificant in the model for long run. These results indicate that WRI in Pakistan follow compensatory (countercyclical) approach, however, these inflows respond to interest rate differential. Exchange rate changes do not play significant role in determining flow of WRI in Pakistan.

It is pertinent for policy makers in Pakistan to promote WRI through formal channels along with exploring new avenues for emigrants from Pakistan. The policy implication of the findings of this study is that WRI being countercyclical in nature may support policies of government towards social protection of recipient families in Pakistan. Positive and significant coefficient of interest rate differential indicates that foreign inflows in Pakistan respond to interest rate differentials. Thus applying tight monetary policy by SBP may benefit in supporting current account balance in Pakistan through increase in WRI.

### References

- Ahmed, J. (2012). Cyclical Properties of Migrants' Remittances to Pakistan: What the data tell us? *Economic Bulletin*, 32, 4, 3266-3278.
- Balance of Payments Manual 05, International Monetary Fund (IMF).
- Borio, C., & Andrew F. (2007). Globalization and Inflation: New Cross-Country Evidence on the Global Determinants of Domestic Inflation. Bank for International Settlements, BIS Working Paper no. 227.
- Chami, R., Fullenkamp, C., & Gapsen, M. (2008). Measuring Worker's Remittances: What should be kept in and what should be left out? (International Monetary Fund)

- Chami, R., Fullenkamp, C., & Jahjah S. (2005). Are Immigrant Remittance Flows a Source of Capital for Development? IMF Staff Paper, 52, 55-81.
- Gupta, P. (2005). Microeconomic Determinants of Remittances: Evidence from India. (unpublished; Washington: International Monetary Fund).
- Ihrig, J., Kamin, S. B., Lindner, D., & Marquez, J. (2007). Some simple tests of the globalization and inflation hypothesis. Board of Governors of the Federal Reserve System, IF Discussion Paper, 891.
- Jackman, M. (2013). Macroeconomic Determinants of Remittance Volatility: An Empirical Test. *International Migration*, 51, s1. *Migration and Development Brief 27*. (2017). World Bank
- Milani, F. (2009). Has global slack become more important than domestic slack in determining US inflation? *Economics Letters*, 102, 3.
- Pesaran, M. H., Shinb, Y., & Smithc, R. J. (2001). Bounds Testing Approaches to The Analysis of Level Relationships. *Journal of Applied Econometrics*, 16, 289–326.
- Rahman A., & Abdul Wadud, M. (2014). Macroeconomic Determinants of Remittances in South Asian countries: A Dynamic Panel Study. *Bangladesh Economic Association*
- ShahbazM., & Aamir I.I. (2009). Determinants of Workers' Remittances: Implications for the Poor People of Pakistan. *European Journal of Scientific Research*, 25, 1, 130-144.
- Tabit, S., & Moussir, E, C. (2016). Macroeconomic determinants of migrant's remittances: Evidence from a panel of developing countries. *International Journal of Business and Social Research*, 6, 7.
- Umair, M., & Waheed, A. (2017). What Drives Remittances from Saudi Arabia to Pakistan? Home Versus Host Country's Economic Conditions. *International Migration*, 55, 4, 141-153.