The Nexus between Remittances and Economic Growth: Empirical Evidence from Guyana

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Abstract

Remittances to developing countries generally arrive in large volumes, and Guyana is no exception. One important policy concern is the impact of remittances on economic growth. This paper explores the empirical impact of remittances on economic growth in Guyana using time series data from 1993 to 2013. Recorded remittances inflow to Guyana in 2014 amounted to 329.7 million dollars (approximately 12% of GDP). The model used by Karagoz (2009) was adopted to conduct this study. The results indicate that remittances positively impact economic growth. It was also found that foreign direct investment positively impacts growth.

Keywords: Guyana, Economic Growth, Remittances, Foreign Direct Investment.

1. Introduction

Remittances to developing countries generally arrive in large volumes. According to the 2014 Bank of Guyana Annual Report, remittances for 2014 amounted to 329.7 million dollars. Remittance flows to developing countries is estimated at 436 billion dollars in 2014 (World Bank 2015). This volume has captured the attention of governments and academics.

Mouhoud et al (2008) provides a cogent summation for why remittances occur. The reasons ranged from individual altruistic motives which can be pure or impure, family arrangements might embody gains from exchange motives, insurance, that is, acting as shock absorbers against income volatility, and the investment motive.[1]

[1] See Singh (2005) for other arguments for remitting.

Well noted in economic literature is a high acquiescence regarding remittance effect at the household level ((Ratha and Mohapatra, 2007), (Ghosh, 2006), (Julca, 2012), (Ratha, 2007)). That is, remittance has a positive effect on, *inter alia*, lowering poverty, increasing consumption, access to health care, education. Further, Ghosh (2006) posited that remittance has a community assets and services creating capacity built-in component. In essence, welfare at the community level improves significantly as remittance increases. However, on the contrary, Ratha (2007) found that remittance seems to have a "rather limited impact on growth and development at the macro-level" in itself from the cases they studied. Ratha (2007) noted the aforementioned outcome can be attributed to two possibilities, namely: 1) "the effects of remittances on human and physical capital are realized over a very long time; and 2) the difficulty associated with disentangling remittances' countercyclical response to growth." However, this outcome is not an absolute in all cases.

One of the major questions which have occupied recent remittance literature has to do with how governments can leverage the development impact of remittance (IDB and MIF 2007). Ratha and Mohapatra (2007), UNCTAD (2013), Ratha (2007), Pablo and López (2008) have provided extensive illustrations of how remittance can be leveraged. The several proposed possibilities include but not limited to Mexico's 3 to 1 development approach, raising capital on international financial markets, influencing interest rates and foreign exchange and addressing external debt, among a range of other possibilities.

Roberts (2007) observatory work on remittance trends and particularly in Guyana seems consistent as with what is expected in countries receiving high level of remittance. However, trends don't tell us about the strength of correlation or causality. To this extent, therefore, the authors of this paper will seek to examine such relationship in Guyana.

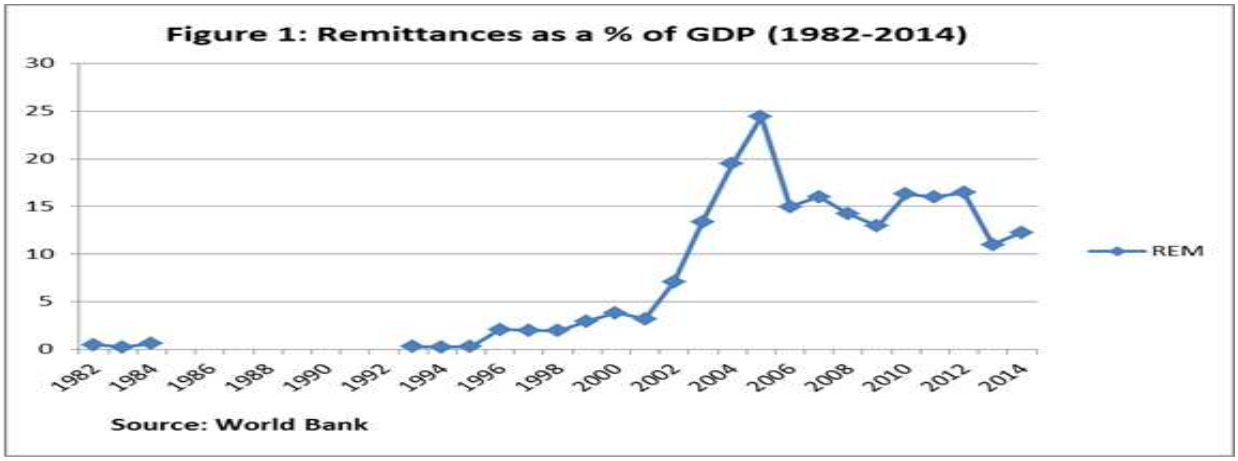
This paper's contribution to the literature on economic growth and remittances in Guyana is to fathom the long run nexus between the variables. It bolsters the foundation for further research in the area. The key literature on the phenomenon is reviewed and then the analysis follows.

2. Guyana's Remittance Sector

For the purpose of this paper, the World Bank's definition of remittances is adopted, which include personal transfers and compensation of employees. Remittances are transmitted via two channels: formal and informal. Within the context of Guyana, the formal channels consist of money transfer companies, commercial banks and cambios. Commercial banks and cambios are under the supervision of the Central Bank. It is worth noting that the money transfer companies are neither regulated nor supervised, however, they do supply the information needed in the calculation of the Balance of Payments accounts. The informal channel basically involves hand delivery by the remitter or a third party, the postal service or a transfer in kind or through a

business venture. It is unclear as to the actual size of the informal remittance sector; however, what is certain is that the reported remittances highly understate the true value of remittances.

It is imperative that the trends of remittances and economic growth be investigated. World Bank data shows 1982 as the first recorded year of remittance flow into Guyana with no noticeable fluctuation for a two year interval. From observation, a hiatus can be seen from 1984 to1992. The reasons are unclear to the authors. From 1993 – 2000, average remittances were well below 5%. In the period 2002 to 2006, a precipitous increase is noticed, with a peak[2] in 2005 at 24%. By 2006 a 9.4% decline was experienced when compared to the previous year. Further, from 2007 to 2014, the remittance inflow averaged at 14% (See figure 1 below). Roberts (2008)[3] based on her survey approach provides a detailed discussion on remittance by usage.



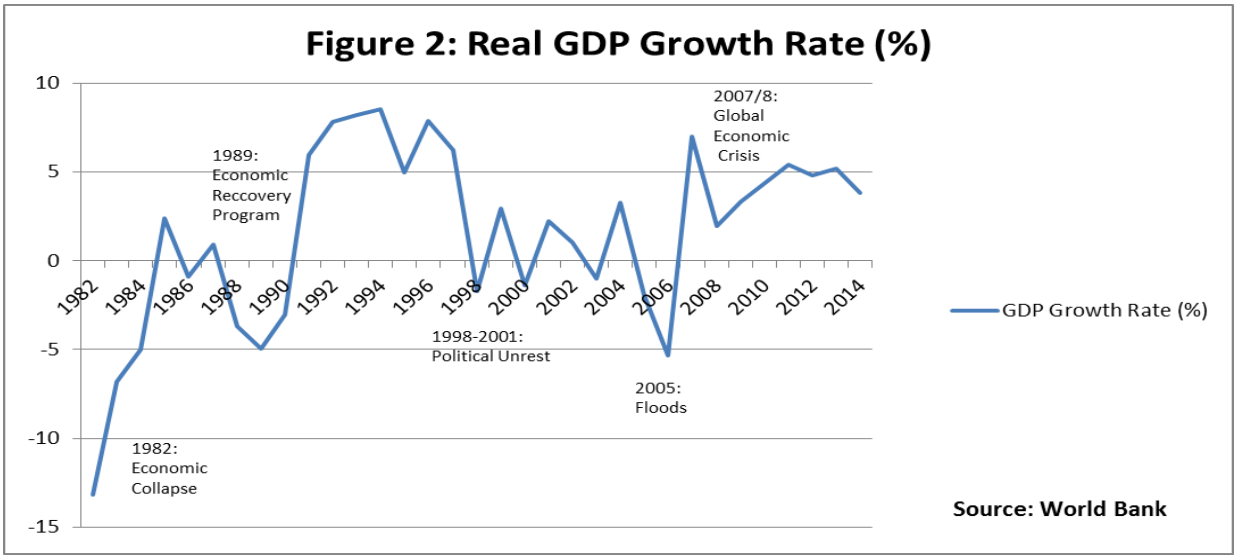
GDP growth has been very volatile over the 32 year period. This volatility is a result of Guyana's continued dependence on resource extraction and primary commodities, which are very vulnerable to external shocks (Mercier-Blackman and Melgarejo 2013).

The negative growth pattern that was experienced during the 1980s may be attributed to the fact that Guyana was a socialist, which had severe economic consequences. According to DaCosta (2007), the state controlled 80% of the economy by 1980. The implementation of Economic Recovery Programme (ERP) in 1987 was responsible for the reversal of the negative growth during the early 1990s. Guyana experienced superior growth averaging 7% from 1991 to 1997. This growth came to an immediate stop in 1998 and averaged 0.2% up to 2004, after which a sudden fall occurred in 2005 to -5%. Guyana experienced severe flooding in the early part of

[2] In 2005 Guyana suffered from a major flood. This might have been responsible in part for the large remittances figure seen in 2006.

[3] Roberts also carefully illustrates the main recipients of Guyana through a survey method approach.

2005. Consequently, the nation suffered economic losses amounting to 60% of gross domestic product (IDB 2008). However, positive economic expansion was experienced for the period 2006 to 2014. Pasha and Grenade (2012) posited that strong macroeconomic fundamentals and improving key social indicators were responsible for the growth averaging 4.2% over the period 2006 to 2010. (See figure 2)



3. Literature Review

Remittance literature concentrates mainly on three (3) broad strands. One strand focuses on the macroeconomic growth impact of remittances. Another focuses on the determinants of remittances. Then there are studies focusing on the developmental impact (direct and indirect) of remittances.

Mixed results can be seen from various studies on the economic growth – remittance relationship. For instance, an IMF (2005) study investigated 101 developing nations for the period 1970 – 2003 and found no relationship between remittances and GDP per capita. On the other hand, World Bank (2008) and Acosta et al (2008) find evidence that remittances positively impacts economic growth directly via the channels of savings and investments. They posited that remittances affect economic growth indirectly via consumption.

Giuliano and Arranz (2009) posited that remittance has a positive impact on economic growth in countries with poorly developed financial systems. They posited that the income is used as a substitute to finance business ventures and assists to surmount credit limitations. Panel data for 73 nations, spanning the period 1975 – 2002, was utilized to undertake the investigation.

Catrinescu et al (2009) articulated that institutional quality should be improved to increase the effect of remittances on economic growth. Garcia-Fuentes and Kennedy (2009) investigated the

impact of remittances on human capital development. Roberts (2007) investigated the developmental impact of remittances within the context of Guyana.

Barajas et al (2009) posited that financial development can come from remittances, as a result of larger inflows to the banking system. This they argued is likely to boost growth via either of two channels (or both): (1) improved economies of scale in the banking sector, or (2) a political economy effect, where lenders can pressure governments into undertaking reforms to the financial sector (Ukeje and Obiechina 2013). Remittances propel monetary policy and financial market development in developing countries.

4. Description Of The Model

The model used by Karagoz (2009) was adopted for this study. Karagoz (2009) investigated the remittance impact on economic growth in Turkey, employing data spanning 1970 to 2005. The results proved that remittances negatively impact economic growth. The following model was hypothesized:

$$GDPPC_t = \beta_0 + \beta_1 GDPPC_{t-1} + \beta_2 REM_t + \beta_3 EXP_t + \beta_4 INV_t + \beta_5 FDI_t + \varepsilon_t$$

where GDPPC is GDP per capita, REM is remittances as a percentage of gross domestic product, EXP is exports to GDP ratio, INV is gross domestic investment to GDP (captured by the gross capital formation), FDI is the foreign direct investment to GDP ratio and ε is the stochastic term. The natural logarithm form of each variable is used.

In accordance with the findings of Giuliano and Arranz (2009), remittance is expected to positively impact per capita GDP, given the fact that Guyana is a developing country. The control variables, INV and FDI, are also expected to have positive effects on GDPPC. The model was slightly modified by eliminating the EXP variable which proved to be insignificant.

5. Empirical Findings

Annual data for the period 1993 to 2013 is used for this study. Data on inflation was obtained from the Bank of Guyana and Bureau of Statistics. Data on the per capita GDP, gross capital formation, and remittances were obtained from the World Bank. Data on population, FDI and exports were obtained from the UNCTAD STAT database.

5.1 Descriptive Statistics of the Series

Each series was plotted on separate graphs. This was done to paint a clearer picture of the long run trend of the data. (See figure 1 in Appendix)

Skewness measures symmetry while Kurtosis measures curvature (peakedness) relative to a normal distribution. All series indicate closeness to normal distribution using the criteria put forward by George and Mallery (2010) which states that skewness and kurtosis values within ± 2. The skewness values suggest that the series are normally distributed. (See table 1)

Table 1: Descriptive Statistics of the variables

	GDPPC	REM	FDI	INV
Mean	1651.226	9.066728	7.649168	27.48675
Median	1010.004	9.017885	7.331864	24.95948
Maximum	3928.879	24.40220	24.59000	52.49493
Minimum	513.1976	0.247747	2.202599	18.59720
Std. Dev.	1095.664	7.570214	4.639181	7.486978
Skewness	0.911805	0.264497	2.180722	1.981241
Kurtosis	2.335944	1.732052	9.189781	7.038110
Jarque-Bera	3.452649	1.730234	52.55761	29.34030
Probability	0.177937	0.421002	0.000000	0.000000
Sum	36326.96	199.4680	168.2817	604.7085
Sum Sq. Dev.	25210093	1203.471	451.9619	1177.151
Observations	22	22	22	22

5.2 Stationarity Testing

The sequential strategy was employed to identify the appropriate model to be utilized in order to evaluate the degree of stationarity using the Augmented Dickey Fuller Test. The following three steps were taken:

1. The model with trend and constant is used. If trend coefficient is significant then this model is appropriate. If not, proceed to 2.

2. A constant only model is then used. If constant coefficient is significant then this model of stationarity is appropriate. If not, proceed to 3.

3. The model with no trend or constant is used.

Table 2: GDPPC stationarity test (GDPPC)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		4.646651	1.0000
Test critical values:	1% level	-2.674290	
	5% level	-1.957204	
	10% level	-1.608175	

The ADF results revealed that the GDPPC series is stationary in level at the 1% level.

Table 3: REM stationarity test (REM)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.285890	0.5713
Test critical values:	1% level	-2.674290	
	5% level	-1.957204	
	10% level	-1.608175	

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.131476	0.0003
Test critical values:	1% level	-2.679735	
	5% level	-1.958088	
	10% level	-1.607830	

The ADF results revealed that the REM variable is non-stationary in level but is stationary in first difference. That is, it is order 1 integrate, I (1). Using the first model, the variables INV and FDI are all stationary in level at the 1% level. (See table 1 in Appendix)

Granger (1981) postulated that albeit variables are individually non-stationary, they may be jointly stationary, that is to say, mutually dependent. He indicated that if variables are cointegrated, an error correction representation of the variables (known as the Granger Representation Theorem) must exist. That is to say, variables that possess unit root and are cointegrated will yield non- spurious regressions when ordinary least squares (OLS) is applied (Solomon 2013).

Engle and Granger (1987) argued that in order to detect cointegration, the model should be estimated and the residual should be tested for unit root using the ADF test. If the results prove I (0) then the variables are cointegrated. The result is I(0), that is, the variable is stationary. (See table 2 in Appendix) Therefore, the regression is not spurious.

5.3 Findings

The estimated model is as follows (t-values are in parenthesis):

$$GDPPC_t = 0.107 + 0.845GDPPC_{t-1} + 0.072REM_t + 0.194INV_t + 0.194FDI$$

(10.530) (2.372) (2.588) (0.993)

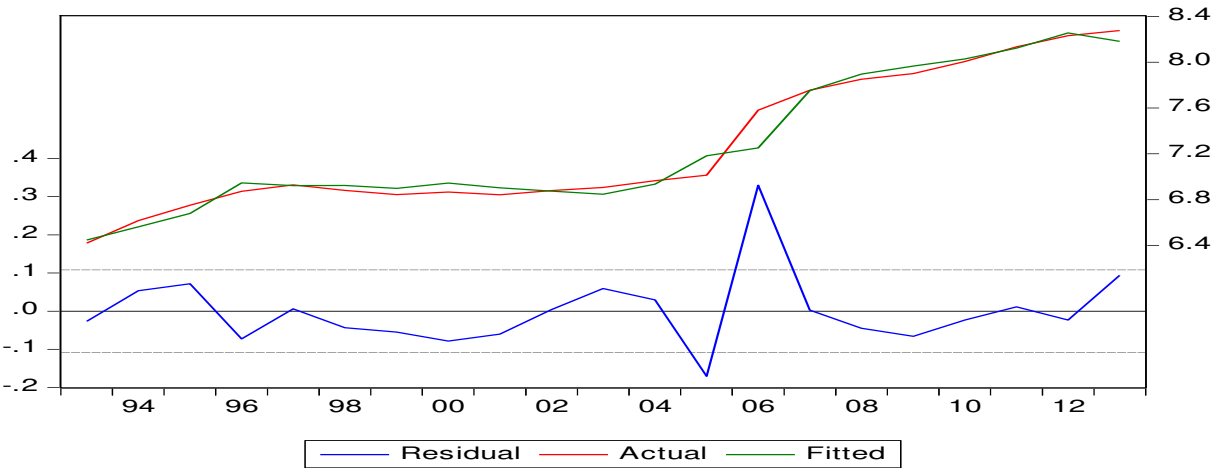
$R^2 = 0.974$ $F = 147.761$ $DW = 2.473$

The outcome of the model is consistent with the predictions. Remittances have a positive effect on the per capita GDP. While all signs are consistent with the predictions, FDI proves to be insignificant.

The coefficient of determination (R^2) indicates a good fit of the model. (See table 3 in appendix) The F statistic also gives credence to the model i.e. $F > F^c$. The DW statistic isn't valid to check for serial correlation because the model is autoregressive (i.e. $GDPPC_{t-1}$ is included in the model). The Breusch-Godfrey Serial Correlation LM test was used and no evidence of serial correlation was found (See table 4 in Appendix). No evidence of heteroscedasticity was found within the model when the Breusch-Pagan-Godfrey test was used (See table 5 in Appendix).

The model tends to be a good fit of the data, that is, it predicts per capita GDP with relative accuracy. However, it tends to over predict the per capita GDP between 1998 and 2002 and underestimate the per capita GDP between 2006 and 2006. (See figure 2 below)

Figure 2: Actual, Fitted, and Residual Values



6. Conclusion

Through the use of econometric analysis, this paper sought to study the nexus between remittances and GDP growth within the context of Guyana using times series data from 1993 to 2013. In doing so, it sought to fill the void that exists regarding current studies in Guyana on the said topic.

The findings indicate that remittances positively impact economic growth. While the coefficient is statistically significant by means of t-values, the magnitude (0.072) of it is worth noting. Therefore, albeit a positive relationship exists, it should be noted that it is a poor one. It was also found that foreign direct investment positively impacts per capita gross domestic product.

This study suffers from the following limitations. Firstly, remittances affect many other macroeconomic variables that were not captured in this study. Secondly, the remittances to GDP figure used captured only what was reported. The size of remittances within the informal sector is not captured within the model. Therefore, it is possible that the data highly underestimates the true level of remittances.

The limitations provide scope for further study into the remittance phenomenon within Guyana. Future research can attempt to capture or estimate the size of the informal remittances sector. This will provide more accurate data for improvements on the accuracy of this study and further research into the phenomenon. Future research should also investigate the possibility of remittances causing the Dutch Disease by, *inter alia*, increasing the demand for non-tradable goods and appreciating the real exchange rate. Additionally, there should be attempts to investigate the indirect and developmental impacts of remittances on economic growth. Such a research would seek to measure the extent to which remittances affect, *inter alia*, consumption, education and health within the economy.

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APPENDIX

Figure 1: Time plots of variables at their levels

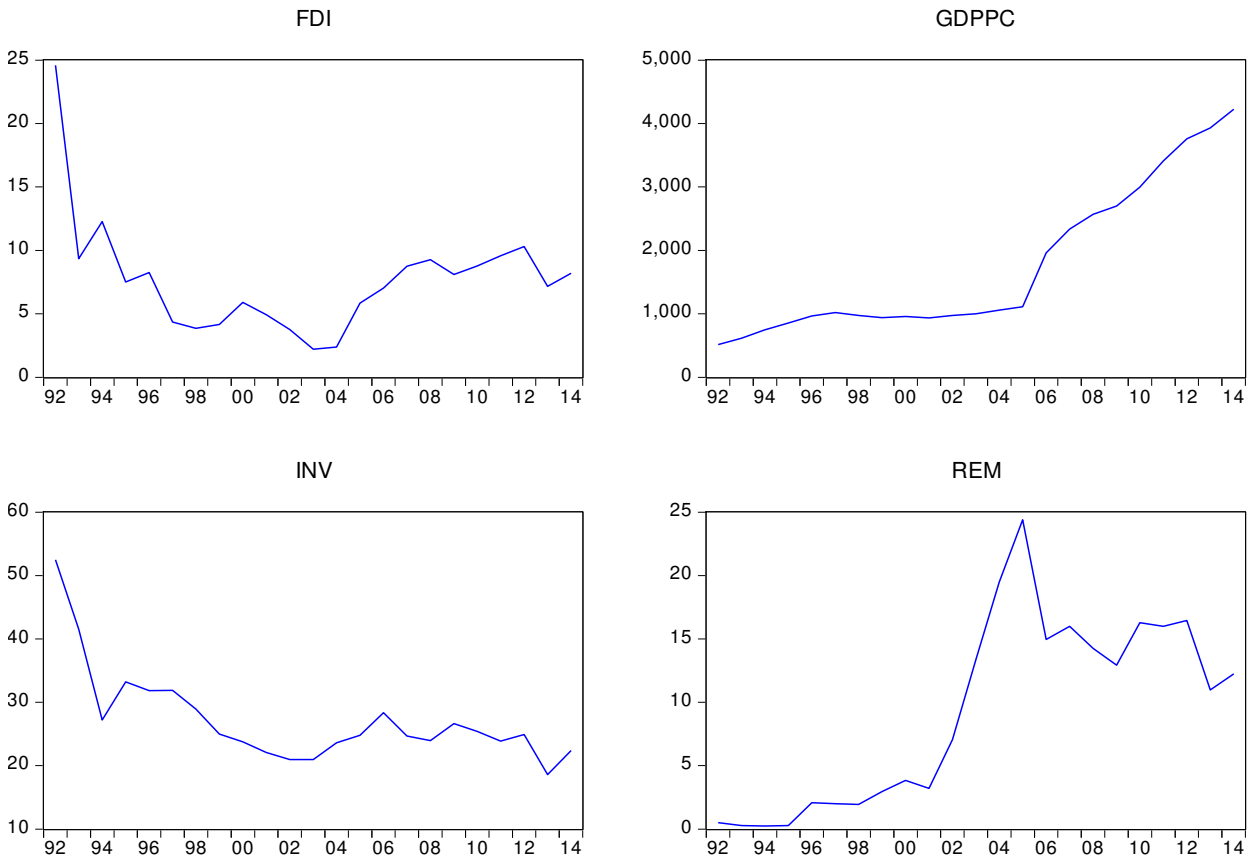

Table 1: ADF Stationarity Tests for INV and FDI

Null Hypothesis: FDI has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.048529	0.0003
Test critical values:	1% level	-4.440739	
	5% level	-3.632896	
	10% level	-3.254671	

Null Hypothesis: INV has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.595724	0.0073
Test critical values:	1% level	-4.440739	
	5% level	-3.632896	
	10% level	-3.254671	

Table 2: ADF Stationarity Test on the Residual

Null Hypothesis: RESIDX has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.595714	0.0000
Test critical values:	1% level	-2.685718	
	5% level	-1.959071	
	10% level	-1.607456	

Table 3: Regression Model

Dependent Variable: LOG(GDPPC)
Method: Least Squares
Date: 11/01/15 Time: 22:29
Sample: 1993 2013
Included observations: 21

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GDPPC(-1))	0.845295	0.080270	10.53070	0.0000
LOG(REM)	0.070189	0.029592	2.371874	0.0306
LOG(FDI)	0.194246	0.075057	2.587997	0.0198
LOG(INV)	0.193667	0.195111	0.992602	0.3357
C	0.107220	0.896529	0.119594	0.9063

R-squared	0.973643	Mean dependent var	7.263187
Adjusted R-squared	0.967053	S.D. dependent var	0.596020
S.E. of regression	0.108185	Akaike info criterion	-1.405697
Sum squared resid	0.187263	Schwarz criterion	-1.157001
Log likelihood	19.75982	Hannan-Quinn criter.	-1.351723
F-statistic	147.7610	Durbin-Watson stat	2.473068
Prob(F-statistic)	0.000000		

Table 4: Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.405215	Prob. F(4,12)	0.8014
Obs*R-squared	2.498963	Prob. Chi-Square(4)	0.6448

Table 5: Heteroscedasticity Breusch-Pagan-Godfrey Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.760299	Prob. F(4,16)	0.1862
Obs*R-squared	6.417423	Prob. Chi-Square(4)	0.1701
Scaled explained SS	12.52839	Prob. Chi-Square(4)	0.0138