



## Relationship between Remittances and Economic Growth in Philippine: A co-integration Analysis

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### ABSTRACT

The study's main idea is to check the theoretical association between remittances and economic growth in Philippine. The conclusions demonstrate that remittances (REMIT) and Gross National Expenditures (GNE) have long-run co-integrated relation with Gross Domestic Product (GDP). Likewise, remittances (REMIT) has long run co-integration relationship with the Gross Domestic Product (GDP), Gross National Expenditures (GNE), Domestic Investment (DI) and Total Trade (TRADE). The outcomes of the Granger Causality test show that Gross Domestic Product (GDP) does Granger Cause Domestic Investment (DI) and TRADE does Granger Cause remittances (REMIT). Moreover, both have unidirectional relationship. Furthermore, there is bi-directional relationship between remittances (REMIT) and Gross National Expenditures (GNE). The study recommend that remittances inflow increase could be improved by utilizing the advanced innovation for remittances.

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### Introduction

A remittance is the transfer of money from a far-off professional to an individual back home. One of the largest financial outflows into developing nations is money returned home by migrants, according to the global reference. "The total of employee compensation and personal transfers is known as personal remittances." A new line item in the balance of payments called "personal transfers" gives worker remittances a more expansive meaning. (World Bank, 2022) The advantages to starting point countries are acknowledged for the most part through remittances. Remittances are a vital wellspring of outside account for developing states, with remittances bigger than authority advancement help, foreign direct investment, and assortment flows in numerous states. Remittances are individual to individual flows, very much focused to the requirements of the beneficiaries, who are frequently poor, and do not regularly experience the harsh effects of the administration issues that might be related with authority help flows.

Without a doubt, remittances are vital in the growth procedure, especially when the beneficiary is a developing state. Remittances add to economic growth, poverty decrease and soothing social issues while empowering the beneficiary families to build utilization and to some scale, taking an interest in capital project. Although, there are a few arguments in regards with the impact of remittances on growth as far as disparity, its commitment to profitability and growth. In this manner, it is essential to take a gander at the impact of remittances on a state by-

state evidence.

There are not many investigations done at large scale level to experimentally interface remittances to economic growth in the country of Philippine. This investigation hereafter contributes towards clarifying the relationship of remittances and economic growth in the Philippine economy, utilizing the cointegrated limits test examination. The information on remittances in the course of the most recent three decades demonstrates that inflow of remittances has expanded directly. Further, since Philippines has a long convention as a provider of migrants, (López-Marmolejo et al., 2021) it is imperative to research whether remittances in Philippines have a long run impact or transitory short-run impact on economic growth.

Remittances have been generating to have various beneficial outcomes on the producing economies. They have filled in as protection approaches against dangers related with new generation exercises and reduced salary disparity (Taylor, 1999). Given the positive effect of remittance flows into the rising economies, and ascend in migratory remittances into South Asia, the commitment of the present examination is to explore the effect of transient remittances on economic development in this region. Subsequently high-remittance accepting states with similarly better created physical and human capital frameworks, and money related structures, ought to have the capacity to effectively channel remittance flows to growth of economy. As needs be, this examination additionally researches the intuitive impacts of remittances on growth of economic. Haouas et al., (2022)

## **Literature Review**

Aneja and Praveen (2022) cited the connection among Economic Growth and Remittances in Bangladesh. The discoveries of this investigation demonstrate that there is a probability of a long-run connection among remittances and GDP, however there is no prescient causal relationship, neither in the short-run nor in long-run in Bangladesh.

Cao and Kang (2020) Cited that the relationship between economic growth, remittances and finance. Discovering demonstrates that remittances having negative growth impacts, which can turn out to be substantial over the long run in developing nations. Remittances have immediate and beneficial outcome on economic growth however these exchanges still can influence GDP per capita through various methodologies speculation, money related advancement, yield unpredictability, absolute factor efficiency and the genuine transaction scale.

Ofeh and Muandzevara (2017) investigated the relationship among economic growth and remittances in Cameroon. The outcomes exposed that migratory remittances create to absolutely and fundamentally impact economic growth although investment consumption and transients' remittances then again were found to emphatically however unimportant impact economic growth. Just imports adversely and altogether impact on the economy.

Biswas and Sergio (2018) analyzed the relationship between economic growth and remittances in Philippine. This study explores the role that remittances have in the Philippine economy and provides strong evidence of the positive relationship between remittances and GDP, demonstrating that a positive stationary direct connection describes the log sizes of both variables.

## **Theoretical Framework and Methodology**

Utilized Annually Time Series Data in this study for 1975 to 2022 of Philippine and World Bank is data source.

For estimation in the initial steps this investigation connected PPF Unit root test to look at the time series properties of data. We discovered every one of the variables be stationary at their first level. At last in the wake of having established the long run cointegration among the variable study connected Granger Causality Test to determine the way of causal association between the variables.

Capital and labour, together with  $L(t)$ , the rate of input, are the two components of production that are employed to generate the output, according to Robert M. Solow (1956). Technology possibilities are exploited in the manufacturing function.

$$Y = F(K, L)$$

Romer extended the Solow Growth Model in 1992, and the production function's structure will be,

$$Y_{(t)} = F\{K_{(t)}, A_{(t)}, L_{(t)}\}$$

Where "Knowledge" or "Effectiveness of work" is symbolised by A and "Time" is signified by t.

### A Theory of Remittances as an Implicit Family Loan Arrangement

Poirine, 1997 revealed a Theory of Remittances as a Contained Household Loan Preparation which clarifies the major variable of research named as Remittances. Remittances are dictated by the variable, similar to refund of advance and the verifiable family rate of interest. Remittances are devoured on the refund of credit and instruction of kids. Remittances are preserved as a wellspring of salary in Philippine. Along these lines, remittances ought to be the same than all out pay. Migrated are preferable instructed over non-relocated and moved return is higher than locals at same element of training. This theory products numerous animating methodology planning for less created countries wishing to build the remittances entry from vagrants.

### Methodology

To check the required findings of the research, study applied johansons Co-integration analysis and data duration is 1975-2022. Econometric model of the study is, The following are estimated variables and their impact on model explained.

$$GDP = \alpha_0 + \alpha_1 \text{Remit} + \alpha_2 \text{DI} + \alpha_3 \text{Trade} + \alpha_4 \text{GNE} + \varepsilon$$

Where

- GDP = Gross domestic product
- Remit = Remittances
- DI = Domestic investment
- Trade = Trade
- GNE = Gross national expenditure
- E = Error term

### Variables Descriptions

**Table: Summary of Variables**

Variables	Description
<b>Dependent Variable</b> <b>Gross Domestic Product</b>	Economic growth is measured using the gross domestic product, expressed in million rupees at market rates.
<b>Independent variables</b>	
<b>Trade</b>	The value of all commodities and other market services offered to the rest of the world is represented by exports of goods and services.

<b>Domestic Investment</b>	Spending on new economic fixed assets as well as net changes in inventory levels make up gross domestic investment.
<b>Remittances</b>	Personal remittances comprise personal transfers and compensation of employees.
<b>Gross National Expenditure</b>	Gross national expenditure is the sum of household final consumption expenditure, government final consumption expenditure and gross capital formation

Note: World Bank

## Results & Discussion

### Descriptive Statistics

The three measures of a random variable's central tendency—mean, median, and mode—are determined by descriptive statistics, which are used to characterise the fundamental characteristics of a dataset (Gujarati 2022). Presenting quantitative representations of the data in a digestible format, such as a table, is the essential component of descriptive statistics. As a result, estimates for descriptive statistics are made for each variable in the model.

**Table: Results of Descriptive Statistics**

	<b>GDP</b>	<b>GNE</b>	<b>DI</b>	<b>REMIT</b>	<b>TRADE</b>
<b>Mean</b>	6.931985	106583.7	3.085719	6.845895	3.973774
<b>Median</b>	6.873897	79988.06	3.040836	7.104572	3.865989
<b>Maximum</b>	8.002678	343650.6	3.396171	13.32332	4.551731
<b>Minimum</b>	5.887967	15501.18	2.775541	1.725357	3.488953
<b>Std. Dev.</b>	0.591777	95295.36	0.143845	3.969992	0.329222
<b>Skewness</b>	0.412017	1.245833	-0.06423	0.092618	0.519929
<b>Kurtosis</b>	2.190222	3.311772	2.654746	1.412635	1.949501
<b>Jarque-Bera Probability</b>	2.391468	11.29754	0.243134	4.575985	3.914527
	0.302482	0.003522	0.885532	0.10147	0.141244
<b>Sum</b>	298.0754	4583100	132.6859	294.3735	170.8723
<b>Sum Sq. Dev</b>	14.70841	3.81E+11	0.869042	661.9552	4.552256
<b>Observations</b>	47	47	47	47	47

Source: Software E-Views 9

### Unit Root

We employ co-integration analysis to determine the long-term relationship between the variables. The co-integration analysis's first presumption is that the data should be stationary. This assumption is satisfied by using the unit root test. A stationarity test (or non-stationarity test) is a unit root test. The independent and identical distribution of the error term is a crucial presumption of the ADF test. Phillips and Perron manage the serial correlation in the error terms without adding delayed difference terms by employing nonparametric statistical

approaches. Since the asymptotic distributions of the ADF test statistic and the PP test statistic are the same. (Gujarati, 2022). The variance's value is assumed to be constant in the second place. Furthermore, if we examined the stationarity of the data at the level and found non-stationarity, we would take the first difference and find stationarity, which would be the necessary outcome for the co-integration study. (Gujarati, 2022)

**Table: Results of Unit Root Test**

		Level		1 <sup>st</sup> Difference	
		t-Statistic	Prob	t-Statistic	Prob
<b>GDP</b>	PPF	-0.371547	0.9048	-0.371547	0.0048
<b>REMIT</b>	PPF	6.282157	1	-5.42447	0.0001
<b>DI</b>	PPF	-2.109968	0.2419	-2.109968	0.0019
<b>TRADE</b>	PPF	-1.339991	0.6021	-4.85315	0.0003
<b>GNE</b>	PPF	3.77327	1	-3.903537	0.0045

Source: Software E-Views 9

The results of the tables confirmed that every variable become the stationary at Difference 1<sup>st</sup> in the test of Phillip Peron Fuller (PPF).

**Analysis of Co-integration**

Coordination of efforts A linear combination of two or more time series can be stationary even though they are non-stationary singly. The long-term, or equilibrium, relationship between two or more time series is displayed through co-integration. (Source: Gujarati, 2022). However, the co-integration does not reveal the causality's direction. (Hendry & Juselius, 2001).

**Table: Results of Co-Integration Analysis (Trace)**

Unrestricted Cointegration Rank Test (Trace)					
Hypothesized	Trace	0.05			
No. of CE(s)	Eigen Value	Statistics	Critical Value	Prob	
None*	0.713372	123.012	69.81889	0.0000	Co – Integration
At Most 1 *	0.580479	71.77964	47.85613	0.0001	Co – Integration
At Most 2 *	0.411474	36.16537	29.79707	0.0081	Co – Integration
At Most 3	0.28396	14.42988	15.49471	0.0719	No Co – Integration
At Most 4	0.017769	0.735094	3.841466	0.3912	No Co – Integration

Source: Software E-Views 9

Note: “ \* “ illustrate the 5% level of significance

**Table: Results of Co-Integration Analysis (Maximum Eigen Value)**

Unrestricted Cointegration Rank Test (Maximum Eigen Value)					
Hypothesized	Max- Eigen	0.05			
No. of CE(s)	Eigen Value	Statistics	Critical Value	Prob	
None *	0.713372	51.23237	33.87687	0.0002	Co – Integration
At Most 1 *	0.580479	35.61428	27.58434	0.0038	Co – Integration
At Most 2 *	0.411474	21.73549	21.13162	0.0411	Co – Integration
At Most 3	0.28396	13.69479	14.2646	0.0614	No Co – Integration
At Most 4	0.017769	0.735094	3.841466	0.3912	No Co – Integration

Source: Software E-Views 9

Note: “ \* “ illustrate the 5% level of significance

The Analysis of Multivariate Co – Integration Results for all the series are reported in the tables. The outcomes indicate that GDP, REMIT and DI are in long run Co – Integrated.

**Table: Bi – Variate Co – Integration**

Variables	Egien Value	Statistic	Critical Value	
GDP GNE	0.362027	20.24715	15.49471	Co-Integration
	0.043404	1.819329	3.841466	
GDP DI	0.227264	11.3138	15.49471	No Co-integration
	0.017965	0.74328	3.841466	
GDP REMIT	0.522418	37.03383	15.49471	Co-Integration
	0.151466	6.734036	3.841466	
GDP TRADE	0.053181	2.953553	15.49471	No Co-integration
	0.01724	0.713011	3.841466	
GNE DI	0.27702	16.92422	15.49471	Co-Integration
	0.084616	3.624881	3.841466	
GNE REMIT	0.53719	32.09325	15.49471	Co-Integration
	0.012248	0.505263	3.841466	
GNE TRADE	0.166415	9.771208	15.49471	No Co-integration
	0.054747	2.30842	3.841466	
DI REMIT	0.462586	32.18781	15.49471	Co-Integration
	0.151328	6.727363	3.841466	
DI TRADE	0.218308	12.41121	15.49471	No Co-integration
	0.054856	2.313122	3.841466	
REMIT TRADE	0.588026	36.68087	15.49471	Co-Integration
	0.00783	0.322286	3.841466	

Source: Software E-Views 9

Note: “ \* “ illustrate the 5% level of significance

Presence of the Bi-Variate Co-integration is checked by watching the follow measurements and the critical value. At the point the follow worth is more significant than the Critical Value it demonstrates that closeness of The variables have a long-term connection of bi-variate co-integration. The result for Bi-Variate association of GDP, REMIT, DI, TRADE and GNE are revealed in the exceeding table. when the crucial value of the trace statistic is exceeded which indicates that Bi-Variate relationship between the variables exist in the long run. In this table GDP and GNE are co-integrated in the long run. Similarly, GDP and REMIT, GNE and DI, GNE and REMIT, DI and REMIT, REMIT and TRADE are co-integrated in the long run.

**Analysis of Granger Causality Test**

Null Hypothesis	Obs	F-Statistic	Prob
GNE does not Granger Cause GDP	41	1.53429	0.2294
GDP does not Granger Cause GNE		1.69796	0.1974
DI does not Granger Cause GDP	41	1.28152	0.2900

GDP does not Granger Cause DI		3.62665	0.0367
REMIT does not Granger Cause GDP	41	3.7051	0.0344
GDP does not Granger Cause REMIT		2.13047	0.1335
TRADE does not Granger Cause GDP	41	0.29287	0.7479
GDP does not Granger Cause TRADE		0.27674	0.7598
DI does not Granger Cause GNE	41	1.43622	0.2511
GNE does not Granger Cause DI		0.04778	0.9534
REMIT does not Granger Cause GNE	41	8.06826	0.0013
GNE does not Granger Cause REMIT		3.40522	0.0442
TRADE does not Granger Cause GNE	41	1.37651	0.2654
GNE does not Granger Cause TRADE		2.13522	0.1330
REMIT does not Granger Cause DI	41	0.36157	0.6991
DI does not Granger Cause REMIT		0.89583	0.4172
TRADE does not Granger Cause DI	41	1.06267	0.3561
DI does not Granger Cause TRADE		0.41047	0.6664
TRADE does not Granger Cause REMIT	41	0.55451	0.0009
REMIT does not Granger Cause TRADE		0.30982	0.7355

Source: Software E-Views 9

Note: “ \* “ illustrate the 5% level of significance

The null hypothesis is shown in the table's first column for potential rejection at various levels of significance. The observations are displayed in the second column, the F statistic is shown in the third, and the probability value is shown in the fourth. Because of the probability worth, i.e. the worth of GDP does Granger because DI is 0.0367. It indicates that gross domestic product has optimistic effect on DI. It has a unidirectional relationship with the GDP. Similarly, REMIT has positive impact on GDP. There is a bi-directional relationship between REMIT and GNE in the long run. While TRADE has positively related to the REMIT in the long run.

## Conclusion

This paper estimates the relationship between Remittances and Economic Growth in Philippine. In this study by applying the co-integration econometric technique over the time of 1975 to 2022 and source of data is World Bank. The finding of this study shows that gross domestic product (GDP), remittances (REMIT) and domestic investment (DI) are co-integrated in long run. The result for Bi-Variate relationship between GDP and gross national expenditure (GNE) exist in the long run. Similarly GDP and REMIT, GNE and DI, GNE and REMIT, DI and REMIT, REMIT and TRADE are long run Co – Integrated. According to the Granger Causality study, gross domestic product (GDP) has positive impact on domestic investment (DI). Furthermore, it has a unidirectional relationship with the GDP. Similarly REMIT has positive impact on GDP. Moreover, there is a bi-directional relationship between REMIT and GNE in the long run. While TRADE has positively related to the REMIT in the long run. The outcomes of this article suggests that government should focus on progressively migrant and workers remittance inflows. Likewise must to be utilized modern innovation for remittance inflows.

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