INTERNATIONAL JOURNAL OF SOCIAL AND MANAGEMENT STUDIES (IJOSMAS)

Vol. 4 No. 2 https://www.ijosmas.org e-ISSN: 2775-0809

Productivity: A Hidden Engine of Growth in Philippine Remittance Inflows under Gravity Model (Pre-Pandemic Period)

Maria Jessica Navarro, Nicole Anne Peñafiel, Ederliza Magpantay
University of Santo Tomas, Manila, Philippines

Abstract *- As the primary source of income for the Philippines, remittances have increased in the past few years. This study employed the gravity model to determine the extent of the definition of the gravitational and controlled variables of remittances. This study is the first in the literature to examine remittances in the Philippines using the gravity model. Using data from 15 key host nations from 1996 to 2017, panel least squares data with a fixed effect model was adopted using the Housman test to tackle the time-invariant problem. The analysis found that the GDP of the sending country, population, and labor productivity are statistically significant and positively affect the remittance inflow in the Philippines. Whereas distance, the GDP of the recipient country, migrant stock, and political stability are statistically insignificant factors in the remittance inflow into the Philippines.*

Keywords*: remittance, gravity model, Philippines*

I. INTRODUCTION

Remittances are often associated with foreign currency inflows, or the money that Filipinos abroad send to their families in the Philippines (Philippine Statistics Authority, 2020). Thus, according to PSA (2020), remittances are also money transfers that can come from both domestic and foreign sources. Moreover, remittances are playing an increasingly vital role in the economies of many countries. Studies have shown that increased human mobility has a positive impact, particularly in the age of globalization. The outmigration of a country's citizens to various foreign countries has intensified, resulting in the inward flow of money to the household economy in urban, semi-urban, and rural areas (Mazumder, 2018). In 2021, the Business World stated in their article that in 2020, the Philippines received over $35 billion in remittances despite the worldwide health crisis.

The Philippines managed to rank second in remittance inflows in East Asia and the Pacific region last year, as overseas Filipino workers (OFWs) proceeded to send money back home amidst the COVID-19 pandemic. However, China accumulated $59.5 billion, making it the country with the highest remittance inflows throughout the region (Business World, 2021b). Hence, according to Nikkei Asia (2022), Filipinos working abroad sent home a record $31.4 billion in cash remittances last year, bolstering the Philippines' economic recovery from the pandemic and proving that remittances to the Philippines increased. Alongside this, the Philippines is one of the top labor exporting countries in the world, with approximately 10% of the country's population working abroad and obtaining over $12.8 billion per year, which supports and promotes the efficient growth of the country's economy (Duan & Lu, 2018). According to Duan and Lu's (2018) paper, "the Philippines exported 24.47 million workers, including 11.97 million males and 12.5 million females, in 2015," with exporting destinations spread across five continents.

These remittances have become the most critical source of foreign exchange for the economy and a significant source of income for recipient families (Asian Development Bank, 2009). Most professionals are flexible in finding other work opportunities and have the potential to become permanent residents, unlike domestic and production workers, who have fixed contracts and are susceptible to fluctuations in the business of their employers. (ADB, 2009, par. 3, p. 3). In their working paper, Series No. 18, they also mentioned that production workers, in contrast, are directly hit by the crisis since they are primarily involved in export industries and construction projects in receiving countries. This was validated by the impacts of the closing down of factories in Taipei, China; hotels in Macau, China; and construction delays in the Middle East (ADB, 2009, par. 3, p. 3). On the other hand, ADB (2009) also discussed that most domestic workers are virtually

shielded from the crisis because most of their employers have gotten used to a lifestyle with domestic help. Besides, the pay of these workers is relatively affordable, despite the problem.

Like this, the study aimed to investigate the significant factors affecting remittance inflows in the Philippines by considering gravitational factors. The study evaluated the economic, governmental, and geographical determinants of remittance. For the first time, the study employed a gravity model for remittances based on the available data for bilateral remittance flows in the Philippines. The model replicated the classical gravity model from Newton, which is extensively used in various social sciences to estimate certain behaviors that resemble gravitational interaction (Hartarto & Mataram, 2018). Based on their paper entitled "Testing the gravity model of remittances inflow: The case of Indonesia" reports that the gravity model incorporates economic mass and distance, as well as institutional aspects of the monetary group, to account for the concurrent bias that occurs among migrant stock and remittance flows.

It is essential for a developing nation like the Philippines to receive a substantial amount of remittances and understand the factors that affect this influx to assist in its stability (Akter, 2018). Having said that, the researchers wanted to decipher the extent of gravitational and controlled variables that define the remittance inflows into the Philippines. The previous research supports that is a significant relationship between gravitational variables and controlled variables, so this research has made the hypothesis as follows:

H1: Gravitational variables extensively define inflows of remittance in the Philippines.

Gravitational variables in this study were composed of the GDP of the recipient country (GDP_rt), GDP of the source country (GDP_srt), and distance (DIST_sr). The GDP is a good indicator of the overall development of a particular country (Dynan & Sheiner, 2018). In the interconnected world that people live in, a country's GDP from a thousand kilometers away can affect another country (Jones, 2016). The prime example of this is through remittance; when migrants work in a country that has a stable GDP, their compensation gets better by increasing their remittance to their home country (OECD, 2006). This was supported by the study made by Vargas-Silva and Huang (2006), where they concluded that a higher level of remittance in the recipient countries is associated with a higher level of GDP in the source countries. This is due to the fact that improved economic conditions in the source country will enable migrants to enhance their employment prospects and transfer more remittances, regardless of the reasons they choose to send money back home. However, a study made in Indonesia by Hartaro & Azizurrohman (2018) reveals that the source nation's GDP negatively impacts remittances to the country of origin. This suggests that the features of remittances in Indonesia are profit-driven and primarily motivated by investment considerations, which is opposed to altruistic motivation. This would be explained in the assertion of Lueth and Ruiz- Arranz (2006) that more economic activity in the source nation encourages migrants to save their money in the source country rather than remitting it.

Depending on the transfer form, the recipient nation's GDP appears to have a mixed effect on remittances. If the motive to remit is driven by portfolio investment, remittances might grow if the destination country's earnings outlook improves. Alternatively, if the migrant is primarily motivated by altruism, they will send more remittances if the earning potential of the destination country drops (Ahmed & Zarzoso, 2014).

This variable has been commonly employed as the proxy of transfer costs. According to several studies, remittances are inversely proportional to geographical distance. The more significant the distance, the greater the transaction costs, reducing the motivation to remit through official channels (Rapoport and Docquier, 2005; Lueth and Ruiz-Arranz, 2006; Frankel, 2011). In the research conducted by Ferriani & Oddo (2019) in Italy, they found a negative correlation between remittances and geographical location because of high transaction fees and slow transfer speeds. Another reason remittance decreases as geographical location increases is because migration is mutually decided with the family (Borjas, 1999). The more a family member gets farther, migratory resources are visible (Rapoport and Docquier, 2006). Sousa & Duval (2010) found an interesting point in their study in Romania. They found that long-distance migrants tend to remit more than short-distance migrants. However, this influence tends to be declining and exclusive to specific groupings of nations. Moving forward, the second hypothesis has made as follows:

H2: Controlled variables extensively define inflows of remittance in the Philippines.

Controlled variables in this study were composed of migrant stock (MigStock_srt), labor productivity (Ln_productivity_st), total population (Ln_Population_st), and political stability (Political Stability_st). According to the Philippine Statistics Authority (2017), Migrant stock is a group of people who have, both directly and indirectly, encountered a migration event and currently reside in a country, state, or territory. While Freund and Spatafora (2008) investigated the determinants of remittances and their associated transaction costs

for a cross-section of 102 developing countries for the year 2005, discovering that recorded remittances rely positively on migrant stock and negatively on transaction cost. Lastly, Ahmed et al. (2021) find that remittances are positively correlated with most of the variables in their study on "Sending money home: Transaction cost and remittances to developing countries" but negatively associated with the sending country's liquid liabilities and transaction cost. They also stated in their paper that the stock of migrants has the highest correlation with remittances, with a score of 0.76.

It has also been claimed that labor productivity affects the amount of money sent back to the migrant's home country. This is because labor productivity will impact the migrants' choice of workplaces, which will reflect their salaries. The higher migrant workers' wages are in their nation of origin, the more money they send back to their families (Sharpe et al., 2000). According to the research made by (Al Mamun, Sohag, Uddin, and Shahbaz, 2015), remittances have a positive effect on domestic labor productivity in nations with a large remittance inflow and a large labor force.

Based on the findings of Green (2005), the total population has a positive effect on remittances since any rise in population would stimulate migration, which may accumulate the salary of emigrants, and so do the remittances obtained by the receiving nation. According to ADB's economic paper series 126 (2008), "Remittances rise in proportion to the level and rate of migration in the source countries, the development of the financial sector and population, and the decline in per capita income and the expected growth rate." This way, international migration has a wide range of effects on the countries of origin concerning remittances. Its distant migrants, for example, may change consumption behavior within sending communities, while exposure to various cultural norms may change other behaviors (Carr & Davis, 2010).

Based on Azizurrohman & Hartato's (2018) study, "Political instability in source countries may reflect an unfavorable business climate, reducing the opportunity costs to invest in host countries and encouraging more remittances to recipient countries" (Lueth and Ruiz-Arranz, 2006). They also mentioned that "Political stability does not appear to be a significant determinant of remittance flows, implying that remittances are less dependent on political conditions in the recipient country, resulting in remittances to their country are more dependent on economic conditions compared to the political circumstance. Correspondingly, the third hypothesis has made as follows:

H3: There is bilateral relationship between inflows of remittance in the Philippines and gravitational and controlled variables.

Straubhaar's (2006) study stated that the remittances sent are in no way correlated with the GDP of the source country because the money sent is not part of the computation of the source country's GDP. Remittances are said to be a contributor to economic growth, which shall be reflected in one's GDP (Meyer & Shera, 2016). Contextual distance may be considered a distance that changes over time as countries go through economic, institutional, and cultural changes (Beugelsdijk, Ambos, & Nell 2018). Lim & Morshed's (2014) study stated that there might be a two-way relationship between migrant stock and remittance because other family members may be motivated to also seek greener pastures abroad based on the amount of money they are receiving. Remittances can lead to fertility reductions because of the increases in living standards, mainly as related to a rise in maternal education and access to contraception, leading to declines in household fertility rates which then decrease the total population of a country (Heaton et al., 2005). Namsuk's (2021) study saw a two-way relationship between labor productivity and remittance. This is because he also used the variables labor supply, particularly labor market participation which is not part of this study. Lastly, no matter the number of remittance inflows to a country, it will not change the political climate nor improve the political stability in the region (Yoshino, Taghizadeh-Hesary, & Otsuka, 2019). Therefore, the fourth hypothesis has been made as follows:

H4: The gravitational and controlled variables have random effects in the inflows of remittance in the Philippines.

The researchers utilized the Hausman test to explore whether the gravitational and controlled variables have fixed or random effects on remittance. It is assumed that the country-fixed effects are correlated with the regressors. Hence, random effects produce biased results based on Harato & Azizurrohman’s (2018) findings.

II. METHOD

Panel least squares or panel data regression was used to answer the problem statement in the study. Panel data is an empirical econometric data analysis in which data sets consist of multiple observations on each sampling unit and space and time dimensions (Debarsy, 2012). This is done by combining a time series of cross-section observations such as countries, regions, firms, or randomly sampled individuals or households (Baltagi, 1995). Given the diversity of factors that may be incorporated in panel data, it can give more meaningful data, more significant variability, less collinearity across variables, more degrees of freedom, and greater efficiency. According to Hsiao (1986), one of the most apparent advantages of panel data is that it is a considerably bigger data set with more significant variability and less collinearity across variables than is characteristic with cross-section or time-series data. In addition, since there is more data, obtaining more accurate estimates and testing more complex behavioral models with fewer restrictive assumptions is possible.

Panel data sets are also better equipped to find and quantify impacts that are simply undetectable in pure cross-sectional or time-series data. In particular, panel data sets are more suited to investigating complicated concerns about dynamic behavior. One may estimate the unemployment rate at a specific moment, for instance, using cross-sectional data collection. Repeated cross-sections can reveal how this proportion shifts over time. Only panel data sets can determine what proportion of people who are unemployed in one period remain unemployed in the next. Panel data's limitations are more applicable when dealing with primary data; however, there is not much issue if applied to secondary data.

Next is to run the Hausman test (1978) to choose the most appropriate model between fixed and random effects. In the event that a fixed-effect model is deemed unbiased and consistent but does not contain any coefficients of time-invariant variables. Granger causality was performed to check if any of the regressors have a bilateral relationship with the regressand. A variable X is the general cause of a second variable Y if Y can be better predicted from the pasts of X and Y together than from the past of Y alone, with other relevant information factored into the forecast (Pierce, 1977).

For the final stage, the researchers performed several estimation diagnostic tests to evaluate the quality of the estimated parameters. To check for multicollinearity, the Variance Inflation Factor (VIF) was utilized to quantify how much the variance of an estimated regression coefficient rises with time (Montgomery, 2001). The Breusch-Pagan-Godfrey test was done to assess if heteroscedasticity is present in the model, which indicates that residual variance is constant over time (Jiménez, 2013). However, the autocorrelation test was performed since cross-sectional dependency is not a significant issue in micro panels with a small number of years and a high number of individuals (Baltagi, 2005). Any re-specification, like applying natural logarithmic of the variables, was in order to get the model results accurately.

The model specification of this study was based on the gravity model formula:

$$X_{ij} = A \frac{Y_i^{a1} Y_i^{a2}}{D_{ij}^{a\ni}}$$

Xij represents the bilateral trade volume between trading partners, which corresponds to the economic scale of trading partners, and Dij represents the geographical distance between corresponding countries.

In accordance with the gravity model for trade, the model used was based on a classical gravity-type foundation that argues that remittance inflows are positively in relationship to the economic scale of the source country and that of the recipient country, as measured by GDP, and negatively proportional to the distance between the two countries (Lueth and Ruiz-Arranz, 2006). The greater the distance between two nations, the higher the remittance cost, and hence the lower the amount of remittance transmitted to the country of origin. Thus, the gravity model of remittance may be stated as follows:

$$REM_{srt} = A \frac{(GDP_{st} * GDP_{rt})^{a_1}}{(Dist_{srt})^{a_1}} Z_{srt}$$

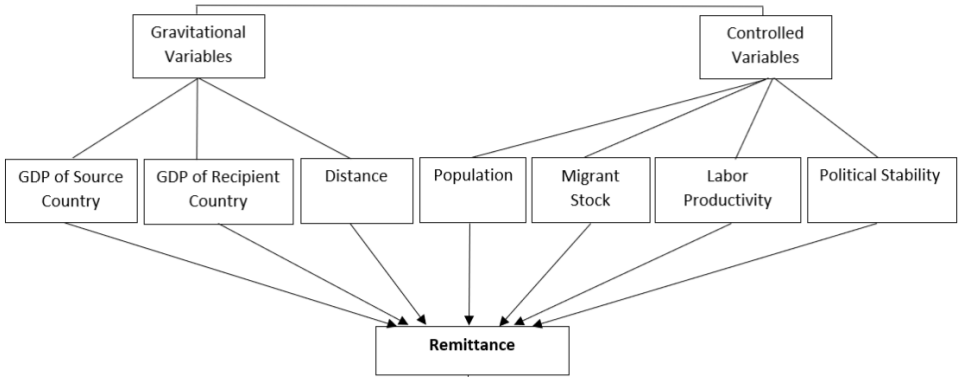
In the preceding model, GDP reflects source (st) and receiver nation revenue (rt). Philippines is considered a recipient country, whereas the other 25 source nations are referred as host nations. Dist. is the geographical distance between the capitals of nations st and rt, and Z is a collection of control variables.

Based on all of that information the model specification of this study was:

ln(REMsrt) = b0 + b1ln(GDPsrt) + b2ln(GDPrt) + b3ln(DISTsr) + b4(MigStocksrt) + b5ln(Populationst) + b7ln(Productivityst) + b6(Political Stabilityst) + u

Bilateral remittance flows from the source country s to the recipient country r at time t (REMsrt) are connected to GDP in source and recipient countries, geographical distance, migrant stock, total population, political stability, and labor productivity using natural logarithms. GDPst and GDPrt are the real gross domestic products of the source nation (s) and the recipient country (r) in period t, whereas DISTsr is the distance between the capital cities of the two countries. MigStocksrt represents the number of Indonesian migrant workers in nation s at time t. The extra regressors Zsrt that account for other control variables is Populationsrt, which is the total population of nation s at time t, Politicalst, which is the political situation in the source country at time t, and Productivityst, which is the labor productivity in country s. The country-specific effect that adjusts for unobserved heterogeneity is denoted by u, while indicating the error term.

Graphically, this was the expected relationship between the remittances and independent variables:



III. RESULT AND DISCUSSION

A. Result

The hypotheses that were stated in Chapter 1 were answered based on the methodology that the researchers have used. All the answers are presented in a tabular and verbal format.

Table 1. Hypothesis 1: Gravitational variables extensively define inflows of remittance in the Philippines.

Variable	Coefficient	Std. Error	T-Statistics	Prob.
ln_GDP_srt	235388.6	76031.46	3.095938	0.0021
ln_GDP_rt	213734.0	148542.0	1.438879	0.1512
ln_DIST_sr	-27244.78	137481.0	-0.198171	0.8430

Throughout this study, the gravitational variables, namely distance, and GDP_rt, resulted in being statistically insignificant, with a 0.8430 p-value of distance and a 0.1512 p-value of the GDP of the recipient country (GDP_rt). Looking at the t-statistics of the GDP of the recipient country (GDP_rt), there is a positive

relationship between the variable and remittances in the Philippines. This means that the money being sent is primarily motivated by altruism, where migrants send more remittances because the earning potential of the destination country drops (Ahmed & Zarzoso, 2014). For distance (DIST_sr), the t-statistics have a negative value, which states a negative relationship between distance and remittances. This can be explained since the greater the distance, the greater the transaction costs, reducing the motivation to remit through official channels (Rapoport & Docquier, 2005; Lueth & Ruiz-Arranz, 2006; Frankel, 2011).

On the other hand, the variable GDP of the source country (GDP_srt) generated a p-value of 0.0021, which suggests that the GDP of the source country (GDP_srt) is a significant variable in this study that changes remittance by $235,388.6 for every 1 unit of increase. The positive relationship can be explained by the study conducted by the OECD (2006), which stated that when migrants work in a country with a stable GDP, their compensation improves by increasing their remittances to their home country. Given the following results: only 1 out of 3 variables is statistically significant, the hypothesis was rejected.

Table 2. Hypothesis 2: Controlled variables extensively define inflows of remittance in the Philippines.

Variable	Coefficient	Std. Error	T-Statistics	Prob.
MigStock_srt	-2010.312	192056.9	-0.010443	0.9917
ln_Population_st	538858.9	93504.93	5.762893	0.0000
ln_productivity_st	1633173	309718.8	5.273082	0.0000
Political Stability_st	41831.54	100653.3	0.415600	0.6780

As for the controlled variables of the study, two of them are insignificant, namely, migrant stock and political stability. Opposed to the references gathered, the study produced a negative relationship between migrant stock and remittances. This result explains that the number of OFWs abroad does not predict the increase in remittances in the country (Ahmed et al., 2021). The insignificance of political stability, on the other hand, resonates with Lueth and Ruiz-Arranz's (2006) study, where they mentioned that "political stability does not appear to be a significant determinant of remittance flows, implying that remittances are less dependent on political conditions in the recipient country resulting remittances to their country are more dependent on economic conditions compared to the political circumstance." Meaning, no matter the political situation in the Philippines, the OFWs will still send the same amount of remittances.

Variable population and labor productivity generated a p-value of 0.0000 which is less than 0.05 which makes it statistically significant. In every 1 unit of change in population, the remittance in the Philippines increases by $538,858.9. This positive relationship is supported by the findings of Green (2005), the total population has a positive effect on remittances due to the fact that any rise in population would stimulate migration, which may possibly accumulate the salary of emigrants and so do the remittances obtained by the receiving nation. For labor productivity, with every 1 unit of change in this variable, the remittance increases by $1,633,173. Labor productivity of migrants causes an increase to the remittance in the country because the higher a migrant worker's salaries are in their nation of origin, the greater the amount of money they send back to their families (Sharpe et al, 2000).

Since 2 out of 4 controlled variables became statistically significant, the researchers accepted the hypothesis. Hence, controlled variables extensively define inflows of remittance in the Philippines.

Table 3. Hypothesis 3: There is no bilateral relationship between inflows of remittance in the Philippines and gravitational and controlled variables. Granger Causality for GDP_srt and Remittance.

Null hypothesis	Obs	F-statistics	Prob.
LN_GDP_SRT does not Granger Cause REM	300	0.49193	0.6119
REM does not Granger Cause LN_GDP_SRT		0.07289	0.9297

As per the results in the table above, 0.6119 > 0.05 and 0.9297 > 0.05 mean that GDP_srt does not granger cause remittance inflows and vice versa. Hence, there is no bilateral relationship between the two variables. GDP_srt will continue to be significant in the model with a one-way relationship with the remittance inflows. This result can be supported by Straubhaar's (2006) study, wherein he stated that the remittances sent

are in no way correlated with the GDP of the source country because the money sent is not part of the computation of the source country's GDP.

Table 4. Granger Causality for GDP_rt and Remittance

Null hypothesis	Obs	F-statistics	Prob.
LN_GDP_RT_ does not Granger Cause REM	300	1.53172	0.2179
REM does not Granger Cause LN_GDP_RT		0.38020	0.6841

As per the results in the table above, 0.2197 > 0.05 and 0.6841 > 0.05 means that GDP_rt does not granger cause remittance inflows and vice versa. Hence, there is no bilateral relationship between the two variables. GDP_rt will continue to be insignificant in the model. Remittances are said to be a contributor to economic growth (Meyer & Shera, 2016). However, based on this test's result, the Philippines' remittances do not cause any changes in its GDP. This can be explained through Francois et al. (2022)'s study, where they stated that remittances could sometimes hurt the recipient economies by fostering conspicuous consumption and discouraging saving. This non-relationship also indicates a more significant contributor to the Philippine GDP, which is wholesale and retail trade (Philippine Statistics Authority, 2023).

Table 5. Granger Causality for Distance and Remittance

Null hypothesis	Obs	F-statistics	Prob.
LN_DISTANCE_does not Granger Cause REM	300	NA	NA
REM does not Granger Cause LN_DISATNCE_		NA	NA

Based on the results in the table, distance does not granger cause remittance inflows and vice versa. Hence, there is no bilateral relationship between the two variables. Distance will continue to be insignificant in the model. The non-bilateral relationship is only accurate as the variable used is a geographical distance of a source country to the Philippines. There is no way that remittance or money can change the earth's geographical features. If the variable utilized is contextual distance, it may be considered as this type of distance that changes over time as countries go through economic, institutional, and cultural change (Beugelsdijk, Ambos, & Nell 2018).

Table 6. Granger Causality for Migrant Stock and Remittance

Null hypothesis	Obs	F-statistics	Prob.
DUMMY does not Granger Cause REM	300	0.10311	0.9021
REM does not Granger Cause DUMMY		1.48940	0.2272

As seen above, both null hypotheses are more significant than 0.05, which means that the dummy variable does not granger cause remittance inflows and vice versa. Hence, there is no bilateral relationship between the two variables. The dummy variable will continue to be insignificant in the model. The result can be supported by Lim & Morshed's (2014) study, wherein they stated that there is a one-way relationship between migrant stock and remittance because the money sent will not cause any changes in the number of migrants in a particular country.

Table 7. Granger Causality for Total Population and Remittance

Null hypothesis	Obs	F-statistics	Prob.
LN_TOTAL_POPULATION_ does not Granger Cause REM	300	1.18628	0.3068

REM does not Granger Cause LN_TOTAL_POPULATION	0.139900	0.8703

As seen above, both null hypotheses are more significant than 0.05, meaning the total population does not granger cause remittance inflows and vice versa. Hence, there is no bilateral relationship between the two variables. The total population will remain significant in the model with a one-way relationship with the remittance inflows. This shows that the Philippine population is not affected by remittance, unlike in Guatemala, where remittance income led to fertility reductions because of the increases in living standards, mainly as related to a rise in maternal education and access to contraception, leading to declines in household fertility rates (Heaton et al. 2005).

Table 8. Granger Causality for Labor Productivity and Remittance

Null hypothesis	Obs	F-statistics	Prob.
LN_PRODUCTIVITY_ does not Granger Cause REM	300	0.32739	0.7211
REM does not Granger Cause LN_PRODUCTIVITY		0.000345	0.9966

Based on the results in the table, productivity does not granger cause remittance inflows and vice versa at 0.7211 and 0.9966. Hence, there is no bilateral relationship between the two variables. Labor productivity will continue to be significant in the model with a one-way relationship with the remittance inflows. This opposed the study of Namsuk (2021), where he saw a two-way relationship with labor productivity and remittance. The reason for this is because he also used the variables labor supply, particularly labor market participation which is not part of this study.

Table 9. Granger Causality for Political stability and Remittance

Null hypothesis	Obs	F-statistics	Prob.
POLITICAL_STABILITY does not Granger Cause REM	300	0.20379	0.8157
REM does not granger cause POLITICAL_STABILITY		2.24816	0.1074

Based on the results in the table, political stability does not granger cause remittance inflows and vice versa. Hence, there is no bilateral relationship between the two variables. Political stability will continue to be insignificant in the model. This result explains that no matter the number of remittance inflows to the Philippines, it will not change the political climate nor improve the political stability in the country (Yoshino, Taghizadeh-Hesary, & Otsuka, 2019).

Out of 7 granger causality tests conducted by the researchers, none of them showed any two-way relationship with the dependent variable, remittance. Hence the null hypothesis is accepted, there is no bilateral relationship between inflows of remittance in the Philippines and gravitational and controlled variables.

Table 10. Hypothesis 4: The gravitational and controlled variables have random effects in the inflows of remittance in the Philippines.

Test Summary	Chi-Sq. Statistic	Chi-Sq. D.f	Prob.
Period Random	0.528554	5	0.9910
Period random effects test comparison:			
Variable	Fixed	Random	
LN_GDP_SRT_	236642.2...	235388.64...	
LN_GDP_RT_	-29854.71...	-2744.777...	
LN_TOTAL_POPULATION_	540694.1...	538858.93...	
LN_PRODUCTIVITY	1645753...	892007303...	

POLITICAL_STABILITY	39111.90...	21111644...

The Hausman test was utilized by the researchers in order to explore whether the gravitational and controlled variables have fixed or random effects in remittance. Based on p-value 0.9910 which is greater than 0.05, the variables have random effects which leads to the acceptance of the null hypothesis. The country fixed effects are correlated with the regressors; hence, random effects generate biased results. This was also the result in Harato & Azizurrohman's (2018) study, where they found the country fixed effects are correlated with the regressors, hence random effects produce biased results.

B. Discussion

Based on the results generated in the panel least squares and other econometric tests, 3 of the 4 null hypotheses are accepted where it was discovered that gravitational variables do not extensively define inflows of remittance in the Philippines, there is no bilateral relationship between inflows of remittance in the Philippines and gravitational and controlled variables, and the gravitational and controlled variables have random effects in the inflows of remittance in the Philippines. 1 of the null hypotheses were rejected which leads to the researched to accept the alternative hypothesis that controlled variables extensively define inflows of remittance in the Philippines.

To explain further, the results of tests for hypothesis 1 showed that the remittances sent to the Philippines (GDP_rt) are primarily motivated by altruism, where migrants send more remittances because the earning potential of the destination country drops (Ahmed & Zarzoso, 2014). The results also showed that distance is optional for the OFWs when choosing a country to work in. The negative relationship was caused by greater transaction costs when a country is farther from the Philippines (Rapoport & Docquier, 2005; Lueth & Ruiz-Arranz, 2006; Frankel, 2011). The GDP of the source country (GDP_srt) significantly affects the remittances of the Philippines by increasing it to $235,388.6 for every 1 unit. The positive relationship can be explained by the study conducted by OECD (2006), which stated that when migrants work in a country with a stable GDP, their compensation improves by increasing their remittance to their home country.

The results of the tests done in hypothesis 2 showed that migrant stock does not predict the increase in remittances in the country (Ahmed et al., 2021). Political stability also appeared insignificant, but remittances increased as the Philippines got more control over corruption. For a total population, the results showed that in every 1 unit of change in the variable, the remittance in the Philippines increases by $538,858.9 because any rise in population would stimulate migration, which may accumulate the salary of emigrants, and so do the remittances obtained by the receiving nation (Green, 2005). On the other hand, the results for labor productivity showed that remittances would increase by $538,858.9 for every 1 unit of change in the variable. This means that the higher a migrant worker's salaries are in their nation of origin, the greater the money they send back to their families (Sharpe et al., 2000).

Granger causality results for hypothesis 3 explains that all independent variables used in the study have a one-way relationship with the remittances in the Philippines. There are many explanations as to why the relationship was like this. For the GDP of the source country because the money sent is not part of the computation of the GDP_srt (Straubhaar, 2006). The one-relationship of remittance to GDP_rt indicates a more significant contributor to the Philippine GDP, which is wholesale and retail trade (Philippine Statistics Authority, 2023). There is also no way that remittance or money can change the earth's geographical features. One-way relationship between migrant stock and remittance because the money sent will not cause any changes in the number of migrants in a particular country (Lim & Morshed, 2014). The total population's relationship with remittances shows that the dependent variable cannot increase living standards and decline fertility rates (Heaston et al., 2005). Since labor market participation was not part of this study, labor productivity opposed Namsuk's (2021) findings of his study. Lastly, no matter the number of remittance inflows to the Philippines, it will not change the political climate nor improve the political stability in the country (Yoshino, Taghizadeh-Hesary, & Otsuka, 2019).

For the last hypothesis result, the Hausman test showed that the country-fixed effects are correlated with the regressors; hence, random effects generate biased results. This result showed that there are years that do not follow the relationships founded, but most do. This was also the result of Harato & Azizurrohman's (2018) study, where they found that country-fixed effects are correlated with the regressors. Hence random effects produce biased results.

IV. CONCLUSION

The results generated by the panel least squares and other econometric tests indicate that three out of the four null hypotheses are accepted: gravitational variables do not extensively define remittance inflows in the Philippines; there is no bilateral relationship between remittance inflows in the Philippines, and gravitational and controlled variables; and gravitational and controlled variables have random effects on remittance inflows in the Philippines. One of the null hypotheses was rejected, causing the researchers to accept the alternative hypothesis that controlled variables extensively define remittance inflows in the Philippines.

The variables population and labor productivity generated a p-value of 0.0000 which is less than 0.05 which makes it statistically significant. In every 1 unit of change in population, the remittance in the Philippines increases by the GDP of the sending country ($235,388.6), population ($538,858.9), and labor productivity ($1,633,173) are statistically significant and have a positive effect on the remittance inflow in the Philippines. Whereas distance, GDP of the recipient country, migrant stock, and political stability are statistically insignificant in the remittance's inflow in the Philippines.

In conclusion, the GDP of the source country, total population, and labor productivity are the biggest contributors to remittances in the Philippines; as well as labor productivity which is the most statistically significant variable in this study which generated a p-value of 0.0000. Thus, labor productivity causes an increase in the remittance in the country because the higher a migrant worker's salaries are in their nation of origin, the greater the amount of money they send back to their families (Sharpe et al, 2000). Given this result, the researchers conclude that as individuals who possess labor productivity, the OFWs are indeed the country's modern-day heroes. They contribute not only to our country's economic growth through remittances but more importantly, by making personal sacrifices to provide a decent life for their families despite experiencing hardships and homesickness abroad.

REFERENCES

Asian Development Bank. 2022. COVID-19 and Overseas Filipino Workers Return Migration and Reintegration into the Home Country—the Philippine Case. Retrieved from https://www.adb.org/sites/default/files/publication/767846/sewp-021-covid-19-ofws-return-migration-reintegration.pdf

Asian Development Bank. 2009. Remittances and Household Behavior in the Philippines. Retrieved from https://www.adb.org/sites/default/files/publication/28401/economics-wp188.pdf

ADBI. 2019. Determinants of International Remittance Inflows in Middle Income Countries in Asia and the Pacific. Retrieved from https://www.adb.org/sites/default/files/publication/506406/adbi-wp964.pdf

ADB. 2008. Remittances and the Brain Drain: Skilled Migrants Do Remit Less. Retrieved from https://www.adb.org/sites/default/files/publication/28226/economics-wp126.pdf

ADB. 2009. Remittances in Asia: Implications for the Fight against Poverty and the Pursuit of Economic Growth. Retrieved from https://www.adb.org/sites/default/files/publication/28397/economics-wp182.pdf

Ahmed et al., 2021. Sending money home: Transaction cost and remittances to developing countries. Retrieved from https://onlinelibrary.wiley.com/doi/10.1111/twec.13110

Ahmed et al., 2014. What drives bilateral remittances to Pakistan? A gravity model approach. Retrieved from https://ideas.repec.org/p/zbw/cegedp/209.html

Akter, S. 2018. Impact of remittance on domestic labour productivity in Bangladesh. Retrieved from https://www.banglajol.info/index.php/PA/article/view/37478/25392

Atminaitė, G. 2015. Political Instability in Developing Countries: The Effect on Remittance Inflows. Retrieved

from https://vb.ism.lt

Ang et al., 2009. Remittances and Household Behavior in the Philippines. Retrieved from https://www.adb.org/sites/default/files/publication/28401/economics-wp188.pdf

Baltagi, H. (2005). Econometric Analysis of Panel Data. 3rd Ed. West Sussex: John Wiley and Sons Ltd

Borjas, G. 1999. Immigration and Welfare Magnets. Retrieved from https://econpapers.repec.org/article/ucpjlabec/v_3a17_3ay_3a1999_3ai_3a4_3ap_3a607-37.htm

Beugelsdijk, S., Ambos, B. & Nell, P.C. Conceptualizing and measuring distance in international business research: Recurring questions and best practice guidelines. J Int Bus Stud 49, 1113–1137 (2018). https://doi.org/10.1057/s41267-018-0182-

Business World. 2021. Remittance inflows likely to pick up 'modestly' this year. Retrieved from https://www.bworldonline.com/top-stories/2021/05/14/368234/remittance-inflows-likely-to-pick-up-modestly-this-year/

Carr & Davis. 2010. The effects of migrant remittances on population–environment dynamics in migrant origin areas: international migration, fertility, and consumption in highland Guatemala. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3003829/

Commission on Filipino Overseas. 2022. Stock Estimates of Overseas Filipinos. Retrieved from https://cfo.gov.ph/yearly-stock-estimation-of-overseas-filipinos/

Department of Labor and Employment. 2019. OWWA to OFWs: save more, spend less. Retrieved from https://www.dole.gov.ph/news/owwa-to-ofws-save-more-spend-less/

Department of Science and Technology. 2015. Migration of Science and Technology Human Resources: Temporary and Permanent Migrants. Retrieved from https://www.sei.dost.gov.ph/images/downloads/migrationvol3.pdf

Dorantes, C. n.d. The good and the bad in remittance flows. Retrieved from https://wol.iza.org/articles/good-and-bad-in-remittance-flows/long

Dynan, K. 2018. GDP as a Measure of Economic Well-being. Retrieved from https://www.brookings.edu/wp-content/uploads/2018/08/WP43-8.23.18.pdf

Duan & Lu. 2018. The Revelation of Philippine Labor Exporting Experiences in the Context of the Belt and Road. Retrieved from https://www.atlantispress.com/proceedings/isbcd-18/25900752

Duval & Sousa. 2013. Geographic distance and remittances in Romania: Out of sight, out of mind?. Retrieved from https://www.cairn.info/revue-economie-internationale-2010-1-page-81.htm

Francois et al., 2022. Remittances Increase GDP with Potential Differential Impacts Across Countries. Retrieved from https://blogs.worldbank.org/peoplemove/remittances-increase-gdp-potential-differential-impacts-across-countries

Hartarto & Mataram. 2018. Testing the gravity model of remittances inflow: The case of Indonesia. Retrieved from https://www.researchgate.net/publication/349250107_TESTING_THE_GRAVITY_MODEL_OF_REMITANCE_INFLOWS_THE_CASE_OF_INDONESIA_1

Hausman, J. (11/1978). Specification Test in Econometrics. Econometrica Vol. 46 No. 6.

Heaton TB, Huntsman TJ, Flake DF. The effect of status on women's autonomy in Bolivia, Peru and Nicaragua. Population Research and Policy Review. 2005;24(3):283–300. doi: 10.1007/s11113-005-4082-5. [CrossRef] [Google Scholar]

Huang & Vargas. 2005. Macroeconomic Determinants of Workers' Remittances: Host vs. Home Country's Economic Conditions. Retrieved from https://www.researchgate.net/publication/23745556_Macroeconomic_Determinants_of_Workers'_Remittances_Host_vs_Home_Country's_Economic_Conditions

International Labor Organization. N.d. Labour productivity. Retrieved from https://ilostat.ilo.org/resources/concepts-and-definitions/description-competitiveness-indicators/

International Monetary Fund. 2022. Gross Domestic Product: An Economy's All. Retrieved from https://www.imf.org/external/pubs/ft/fandd/basics/gdp.htm

IMF. 2009. International Transactions in Remittances: Guide for Compilers and Users. Retrieved from https://www.imf.org/external/np/sta/bop/2008/rcg/pdf/ch2.pdf

Issahaku & Ustarz. 2017. International Migrant Remittance and Productivity Growth in Ghana. Retrieved from https://www.ajol.info/index.php/gjds/article/view/162111

Jiménez, E. (2013). Introduction to Econometrics. Retrieved from https://www.uv.es/uriel/Chapter%206%20Slides.pdf

Jones, C.I. 2016. The Facts of Economic Growth. Retrieved from https://web.stanford.edu/~chadj/facts.pdf

Lim, S. & Morshed, A.K.M. 2014. International migration, migrant stock, and remittances: Reexamining the motivations to remit. Retrieved from https://www.sciencedirect.com/science/article/abs/pii/S1062976914000805

Mathy, G. 2016. Expectations and Forecasting during the Great Depression: Real-Time Evidence from the Business Press. Retrieved from https://www2.gwu.edu/~forcpgm/2016-011.pdf

Mamun et al., 2015. Remittance and domestic labor productivity: Evidence from remittance recipient countries. Retrieved from https://www.sciencedirect.com/science/article/abs/pii/S0264999315000413

Marimoutou et al., 2010. The "distance-varying" gravity model in international economics: is the distance an obstacle to trade?. Retrieved from https://halshs.archives-ouvertes.fr/halshs-00536127/document

Mazumder, S. 2018. Determinants of Remittances: A Study in Cachar District of Assam. Retrieved from https://journals.sagepub.com/doi/full/10.1177/0972150918811524

Meyer, D & Shera, A. 2016. The impact of remittances on economic growth: An econometric model. Retrieved from https://www.sciencedirect.com/science/article/pii/S1517758016300753

Montgomery, D., Peck, E., & Vining, G. (2001). Introduction to Linear Regression Analysis. Wiley, New York. 3rd Edition.

Mundlak. (1978). On The Pooling of Time Series and Cross Section Data. Econometri, 46(1). 69-85.

Nayef. 2022. Economic and Political Drivers of Remittance Transfer. Retrieved from https://sciendo.com/pdf/10.2478/jeb-2022-0004

Naufal & Genc. 2017. Impact of Remittance Outflows on Sending Economies. The Case of the Russian Federation. Retrieved from https://www.unescap.org/sites/default/files/Day%201.5%20-%20Impact%20of%20Remittance%20Outflows.pdf

Nikkei Asia. 2022. Philippines 'modern-day heroes' sent record remittances last year. Retrieved from https://asia.nikkei.com/Economy/Philippines-modern-day-heroes-sent-record-remittances-last-yr

OECD. 2006. International Migrant Remittances and their Role in Development. Retrieved from https://www.oecd.org/els/mig/38840502.pdf

Oregon State University. N.d. Pangaea to the Present Lesson #2. Retrieved from https://volcano.oregonstate.edu/pangaea-present-lesson-2#:~:text=About%20180%20million%20years%20ago,upper%20zone%20of%20the%20mantle

Philippine Statistic Authority. 2020. Domestic Remittances are Just as Important as International Remittances (Results from the 2018 National Migration Survey). Retrieved from https://psa.gov.ph/content/domestic-remittances-are-just-important-international-remittances-results-2018-national

Philippine Statistics Authority. 2017. Migrant Stock. Retrieved from https://psa.gov.ph/content/migrant-stock-1

Philippine Statistics Authority. 2022. 2020 Overseas Filipino Workers (Final Results). Retrieved from https://psa.gov.ph/statistics/survey/labor-and-employment/survey-overseas-filipinos

Philippine Statistics Authority. 2023. PH posts highest GDP growth in 46 years as PBBM steers country toward recovery. Retrieved from https://pia.gov.ph/press-releases/2023/01/26/ph-posts-highest-gdp-growth-in-46-years-as-pbbm-steers-country-toward-recovery

Pierce, D. 1975. "Forecasting in Dynamic Models with Stochastic Regressors,' Journal of Econometrics, vol. 3, pp. 349-74.

Ramirez,M. 2017. Do Remittances Promote Labor Productivity Growth in Mexico? An Empirical Analysis, 1970-2014. Retrieved from https://ideas.repec.org/p/tri/wpaper/1702.html

Radu, M. 00115 Political Stability - A Condition for Sustainable Growth in Romania?. Retrieved from https://www.sciencedirect.com/science/article/pii/S2212567115013246

Santos, A. 2014. Where in the world are the Filipinos?. Retrieved from https://www.rappler.com/moveph/60705-filipinos-ofws-world-infographic/

Seriño, N. 2012. Effects of International Remittances on the Philippine Economy: A Cointegration Analysis. https://www.dlsu.edu.ph/wp-content/uploads/2019/10/EffectsofInternationalRemittancesonthePhilippineEconomy_ACointegrationAnalysis.pdf

Stampfli & Verard. 2013. The formation of Pangea. Retrieved from https://www.researchgate.net/publication/241002325_The_formation_of_Pangea

Tan, E. 2019. Prospects of Philippine Migration. Retrieved from https://econ.upd.edu.ph/dp/index.php/dp/article/view/1521

Technical Education and Skills Development Authority. 2022. TESDA LURES OFWS TO ENROLL IN TRAINING, LIVELIHOOD COURSES ONLINE. Retrieved from https://www.tesda.gov.ph/Media/NewsDetail/20168

The World Bank. 2018. Political stability and absence of violence/terrorism. Retrieved from https://tcdata360.worldbank.org/indicators/b89c1cd1?country=PHL&indicator=40270&viz=line_chart&years=2013,2018

Trading Economics. 2022. Philippines - International Migrant Stock, Total. Retrieved from https://tradingeconomics.com/philippines/international-migrant-stock-total-wb-data.html

orld Bank. N.d. Metadata Glossary. Retrieved from https://databank.worldbank.org/metadataglossary/jobs/series/SM.POP.TOTL.ZS#:~:text=Short%20definition,that%20in%20which%20they%20live

United Nations Department of Economic and Social Affairs (UN DESA) (2009). Trends in the International Migrant Stock: The 2008 Revision. UN DESA, Population Division, New York.

Villar. 2021. Economic growth and political stability. Retrieved from https://businessmirror.com.ph/2021/11/29/economic-growth-and-political-stability/

Wooldridge, J. (2002). Econometric Analysis of Cross Section and Panel Data.

Wooldridge, J. (2012). Introductory Econometrics a Modern Approach. Retrieved from https://economics.ut.ac.ir/documents/3030266/14100645/Jeffrey_M._Wooldridge_Introductory_Econometrics_A_Modern_Approach__2012.pdf

Xinhua. 2022. Philippine remittances hit all-time high in 2021. Retrieved from https://english.news.cn/asiapacific/20220215/4d554216a61747819562fc9b217ee638/c.html

Yang et al,. 2022. The Impact of the COVID-19 Pandemic on Migrant Remittances in the Philippines. Retrieved from https://g2lm-lic.iza.org/publications/pb/the-impact-of-the-covid-19-pandemic-on-migrant-remittances-in-the-philippines/

Yoshino, N., Taghizadeh-Hesary, F., & Otsuka, M. 2019. Determinants of International Remittance Inflows in Middle-Income Countries in Asia and the Pacific. Retrieved from https://www.adb.org/publications/determinants-international-remittance-inflows-asia-pacific