
RESEARCH ARTICLE

Macroeconomic Determinants of International Migration of Overseas Filipino Workers

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ABSTRACT

This study focuses on the econometric analysis of determinants of international migration of overseas Filipino workers across different countries. The number of overseas Filipino workers as the regressand, while the regressors are remittances, unemployment, and wage rate, using time-series data from years 1990 to 2019. The selected variables are considered as a few of the major economic factors why Filipino workers migrate. Other determinants or factors of migration were not examined by the researchers. This study discovered that remittances, wage rate, and unemployment rate are statistically significant and positively correlated to the parameters of overseas Filipino workers in the Philippines. It is determined that remittances are positively correlated with the number of overseas Filipino workers. In addition, it was discovered that the unemployment rate and the number of overseas Filipino workers are negatively correlated in the absence of the wage rate and remittances in the simple linear regression. However, due to the influence of the wage rate and remittances in the model, the relationship of the unemployment rate with the number of overseas Filipino workers proves to be positively correlated. The obtained r^2 value of the model suggests that 91.21% of the variability in overseas Filipino workers can be explained by the variability of all independent variables. Furthermore, as indicated by the diagnostic tests' result, including the Pearson R correlation coefficient, the overall model is significant and shows no evidence of multicollinearity, serial correlation, heteroscedasticity, and irregular distribution of residuals.

KEYWORDS

Macroeconomic Determinants; Migration; Overseas Filipino Workers; econometric analysis

ARTICLE DOI: [10.32996/jefas.2022.4.1.30](https://doi.org/10.32996/jefas.2022.4.1.30)

1. Introduction

1.1 Background of the Study

Poverty and income inequalities have been major issues that need to be addressed globally. These unfortunate situations are common in developing countries, and the Philippines is not excluded from them. It can be agreed upon that there are a lot of opportunities in countries of origin; however, if a family is considered poor in terms of the low income, it receives. People tend to look for an opportunity outside of their home countries to improve their living standards. This is why migration has been a trend, especially in developing countries. Migration refers to the relocation of an individual or group from their home country to another, with which they are not familiar. There are economic factors that contribute to migration: to have higher wages, to improve their standard of living, and to have better job opportunities. In spite of these, migration offers multiculturalism and other economic opportunities.

The economics of migration centres on the expectation of a better or a higher income when working abroad (Castelli, 2018, p. 6). There are also applicable variables that cause people to leave. The Push-Pull theory is the most widely used approach in migration. Different factors such as political, social, environmental, and economic are deemed to cause people to leave their home countries. The economic push factors, or factors that force people to leave their home countries, including but not limited to, are low wage rates and high unemployment rates. With regard to migration to the receiving countries, factors are demand for labor and higher exchange rates. These are identified as pull factors (Luni & Prakash, 2016, pp. 50-51). Any type of migration, whether it is documented or undocumented, can be defined in terms of push-pull factors (Amaral, 2018, p. 12).

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Migrant workers greatly benefit their country of origin through remittances, especially in terms of economic growth. Not only because these remittances give subsidies to their families, but also the Philippines heavily relies on remittances as it greatly contributes to the country's gross domestic product. The Philippines, being the fourth in the top five remittance recipient countries in the world as of 2019, having 35.2 billion percent to US dollars with a great difference from the Arab Republic of Egypt, which ranks number five, with 26.8 billion in percent US dollars (World Bank, 2020), this rate contributes to the Philippines' gross domestic product (GDP) for about 10% for decades until today (Villanueva, 2021). With the continuous economic growth in the Philippines, unemployment still disrupts the development of the country, having a rate of 2.15% as of 2019. Fortunately, it continues to decrease over the years from 2014 to 2019 (Statista, 2020). On the other hand, migration affects the labor supply in recipient countries since it increases the number of workers in different fields. Also, migration is likely to increase the demand for labor because migrants expand the consumer demands for goods and services. Therefore, even if migration may increase competition for existing jobs in recipient countries, it can subsequently create new jobs, which lessen unemployment in origin countries (Ruhs & Silva, 2021). The push factor of the wage rate in the Philippines has also been deemed to play an important role in migration. Since migrants, including the low-skilled workers, earn a much higher income than domestic wage and thus, help their families increase their standard of living (Tan, 2019).

With the aforementioned statements regarding the selected determinants of why Filipinos decide to work overseas, the present study will provide useful parameters in understanding the significance and degree of relationship between the number of overseas Filipino workers (OFW) to the unemployment rate, wage, rate, and remittances in the Philippines.

1.2 Statement of the Problem

There is no doubt that the OFWs greatly contribute to the Philippine economy. The remittances received from them have protected the economy during the time it experienced the Asian Financial Crisis in the late 1990s (Ang, 2019). And also, having higher immigration is not associated with higher unemployment. In fact, when unemployment is low, immigration is high, vice versa (Bier, 2016). Along with that, it has also been generally recognized that the economic benefit of migrating is to gain higher wages despite the fact that average wage rates of their home countries increase every year (Özden et al., 2017).

However, with the different economic factors that could affect remittances, unemployment, and wage rates, such data and statistical analysis are still needed in order to prove the related literature stated above. Furthermore, if these are proven in the results, the degree of associations between the variables will also be applied in order to know the correlational impact of the dependent on the independent variables.

In line with the statements mentioned above, the researchers aim to answer the following research questions:

1. Is there a significant relationship between the number of overseas Filipino workers and remittances?
2. Is there a significant relationship between the number of overseas Filipino workers and the unemployment rate?
3. Is there a significant relationship between the number of overseas Filipino workers and the wage rate?
4. What is the measure of the relationship strength between overseas Filipino workers to the remittances, unemployment, and wage rate?
5. Are there any considerable changes that occurred concerning the selected variables from 1990 to 2019 in the Philippines?

1.3 The Hypotheses of the Study

The null hypotheses of this study are the following:

H_{o1}: There is no significant relationship between the number of overseas Filipino workers and remittances.

H_{o2}: There is no significant relationship between the number of overseas Filipino workers and the unemployment rate.

H_{o3}: There is no significant relationship between the number of overseas Filipino workers and the wage rate.

The alternate hypotheses of this study are the following:

H_{a1}: There is a significant relationship between the number of overseas Filipino workers and remittances.

H_{a2}: There is a significant relationship between the number of overseas Filipino workers and the unemployment rate.

H_{a3}: There is a significant relationship between the number of overseas Filipino workers and the wage rate.

1.4 Scopes and Limitations of the Study

This study focuses on the econometric analysis of determinants of international migration of Filipino workers across different countries. The regressand or dependent variable of the study is the number of overseas Filipino workers, while the regressor or independent variables are remittances, unemployment, and wage rate. These are the selected variables since these are considered as some of the major economic factors why Filipino workers migrate. Other determinants or factors of migration were not examined by the researchers.

The total number of overseas Filipino workers was gathered from the data presented by Official World Bank Data, Philippine Overseas Employment Administration, and Philippine Statistics Authority (PSA) through Survey on Overseas Filipinos (SOF). The OFWs covered in this report were those aged 15 years old and over, working abroad. It includes overseas contract workers (OCWs) and those who had no working visa or work permits but were still presently employed and working full time in other countries (PSA, 2019).

The determinants, remittances, unemployment, and wage rate were gathered from the official data of the World Bank and Philippine Institute for Development Studies. Remittances were measured by personal remittances, received by percent of gross domestic product (GDP). The unemployment rate is calculated by the percent of the total labor force (modeled ILO estimate). Lastly, the wage rate is determined using wage and salaried workers, percent of total employment (modeled ILO estimate).

The observations from each variable were gathered annually or by time-series style from 1990 to 2019. The year 2020 and 2021 were not included due to the COVID-19 pandemic, and the economy across different countries was greatly affected, thus creating huge fluctuations in the data. Furthermore, reliable sources such as the World Bank and Philippine Statistics Authority (PSA) did not have updated data when this paper was established.

1.5 Significance of the Study

Analyzing the relationship between the selected determinants or variables are significant to the following:

Philippine Overseas Employment Administration (POEA). The role of POEA is to connect to the world and promote the preservation of decent jobs for Filipino migrant workers. One of the key goals of this study is to provide POEA with possible improvements in the existing policies or develop new policies to protect the rights of the migrants and increase the standard of living of their families.

Overseas Filipino Workers (OFWs). OFWs are considered to be modern-day heroes in the Philippines. Not only because of their contributions to the Philippine economy but also the sacrifices and challenges they have withstood throughout their service. This study will serve as a recognition of their efforts and also will provide an analysis of their great contribution to our society.

Households. Even if this quantitative study focuses on the macroeconomic perspective, its results and findings can also help households to contribute to society and, at the same time, offer an alternative solution to uplift their standard of living.

Future Researchers. The purpose of this paper is to contribute knowledge concerning studies affecting overseas Filipino workers (OFWs). It will serve as a reference or related literature to help future researchers who will tackle relative international migration studies.

2. Review of Related Literature

2.1 Cross-Country Studies

With the increasing number of migrants in European countries over the recent years, Cohen (2017) explored the association between unemployment and immigration, specifically in the leading immigration destinations: Germany, Greece, and the United States. This study attempts to identify and indicate a correlation between immigration trends and changes in the unemployment rate of destination countries. The findings of this paper state that the economies mentioned above exhibit a correlation with the distinct welfare and employment policies implemented in their country. Each country culminates in different features of the correlation. Germany implements a conservative approach to encourage employment; a negative correlation was identified between these two indicators. In Greece, a positive correlation was identified between the welfare and employment policy that encourages idleness. On the contrary, implementing a liberal immigration policy in the United States resulted in an inconclusive association among the indicators.

Abdulla (2020) analyzed data from Brazil, Mexico, and Venezuela to discover the performance of immigrants in low-income economies. This paper proposed new evidence on the theory of human capital accumulation. The results demonstrate that recent

documentation in developed countries declares that over time, immigrants improve their occupation and that their earnings have grown and exceeded that of natives. Discussed by Abdulla (2020) are three possible explanations for these evaluations: (1) immigrants take over more human capital than natives; (2) not being able to entirely hand over their skills resulting in restoration of the value of source-country human capital; (3) selection based on their ability is an advantage of immigrants over natives, making them more productive. In addition, the researcher also investigated the labor market outcomes of immigrants in low-income countries and has ascertained that immigrants work in better-paid professions and are earning more than natives. The gap in the income and occupational distribution among immigrants and natives narrows over time. It was observed that the results are consistent with the predictions of human capital accumulation.

Many low- and middle-income economies consider remittances to be an essential source of financing. Cazachevici et al. (2020) conducted a meta-analysis that used 95 studies with results approximating that 40% of the studies concluded a positive effect, 40% reported no effect, and 20% reported a negative effect. The researchers used developed techniques that indicated the impact of remittances on growth being positively correlated yet economically small. It was also found that remittances are significant in growth in Asian countries but not in the African region. The study suggests that to estimate the effects of remittances on growth more accurately, it is vital to control foreign aid and foreign direct investment for low- and middle-income countries (Cazachevici et al., 2020).

Chowdhury (2016) examined how remittances influence economic growth bound by the levels of financial development. This paper uses a dynamic panel of estimation of the significant remittance recipient developing countries from 1979 to 2011. The study verifies the positive correlation between remittances and economic growth from the 33 economies that are remittance-receiving. It was also found that financial development indicators do not impact the remittance growth nexus. The influence of financial variables was also found insignificant, although remittances are proven to be effective for economic growth. The research concluded that developed financial systems might indeed attract increased remittances; nevertheless, the interactivity of financial development and remittances is not growth strengthening.

In a study involving the Middle East and North Africa (MENA) countries over the period of 1984 to 2011, Kratou and Gadzar (2016) explored the short-run and long-run relationship between remittances and economic growth. The local financial development and institutional environment influence a country's ability to benefit from remittances was addressed in this paper. The researchers used the Pooled Mean Group (PMG), Mean Group (MG), and Dynamic Fixed Effect (DFE) estimation to explore the short-run and long-run relationship between remittances and economic growth. The findings show that remittances and economic growth have a positive effect in the long run; however, a negative effect in the short run. It was also found that remittances and financial development are complementary; it was revealed that economic growth promoted remittances are only conventional in countries with stable financial systems. Therefore, it was concluded that remittances enhance economic growth in countries with robust financial systems.

Meyer and Shera (2017) employed the annual panel data from 1999 to 2013 of Albania and five other countries for the purpose of exploring the impact of workers' remittances on their respective economic growth. The study used multiple regression analysis and different diagnostic tests to ensure the robustness of the results. Eventually, the yielded results illustrate that a positive and significant contribution of workers' remittances in the economic growth was indicated. Furthermore, it was suggested by Meyer and Shera (2017) that the productive use of remittances is in the form of investment and consumption that would maintain and improve economic growth.

Arlan et al. (2016) assessed international migration to the OECD economies in the 21st century. In this paper, the full picture of international bilateral migrant stock for 33 OECD destination countries and 223 origin countries from the 2010 consensus round was analyzed. Critical dimensions, which include migrant skills, age, education, gender, among other factors, were deliberated from a historical perspective. The most important patterns in international migration were highlighted in this paper, including (1) the continued surge of migration to the OECD, it was found that there is an increase of 40% rate between years 2000 and 2010; (2) the rapid rise in high-skilled migration, an increase of around 76% percent; (3) the inevitable increase in female migration and the migration of high-skilled females with an increase of 88%.

A general equilibrium framework was developed by Chatterjee and Tunovsky (2018) to understand better the dynamic absorption of remittances in a two-sector small open economy in 56 developing countries that are characterized by a large informal sector that are also dependent on remittance inflows from foreign countries with a time of 1990 to 2014. It was done by incorporating several important informal sector features that characterize the correlation between international transfers and the informal economy. The results show that the effect of remittances is dependent on their effect on the recipient economy. The Dutch Disease effect was also identified in this paper, as well as the conditions under which remittances are associated with an expansion of the informal sector (Chatterjee and Tunovsky, 2018).

2.2 Regional Studies

Yoshino et al. (2020) assessed the determinants of international remittances from selected middle-income countries in the Asia Pacific Region, for which most are migrant-sending countries. The dataset included 22-Asia Pacific countries using surveys over the period of 2002 to 2015. In this study, the researchers used an empirical model based on the theoretical determinants of remittances, in which they first used the supply and demand equations. In order to be able to evaluate the stationarity of all series, the researchers used the Fisher-type, Levin-Lin-Chu, and Phillips-Perron-Fisher Chi-square unit root tests (Yoshino et al. 2020). In the presence of a unit root for the variables shown in the results, the results suggest rejecting the null hypothesis. To evaluate the determinant of remittances, Yoshino et al. (2020) also used the panel generalized method of moments (GMM) with fixed effects. Also considered in the study was the Hansen test for the overidentified restrictions. In this case, the researchers failed to reject the null hypothesis, given that the instruments were valid during the estimation. In conclusion, the researchers have found that more remittance inflows in middle-income countries are due to the large gap in GDP per capita between migrant-sending countries and receiving countries. Remittance inflows are important resources for developing economies. The researchers have noted that the lower the economic level, the greater the role of remittance inflows for economic growth.

Jena and Sethi (2020) also studied South Asian economies over the time period of 1993 to 2017. The researchers empirically investigated whether inward remittance leads to export performance in certain South Asian countries. In this paper, stationarity tests were used to check the variables using the Levin-Lin-Chu test, Breitung t-statistic test, Im-Pesaran-Shin test, Fisher-type ADF, and PPF panel unit root tests. To verify the short-run causality, the researchers tested the panel data with the use of Granger Causality. The Pedroni, Kao, and Johansen-Fisher panel cointegration approach was adapted to assess the long-run relationship between the variables (Jena and Sethi, 2020). On the other hand, Panel VECM was applied to validate the long-run relationship between the variables. The researchers found that panels of FMOLS and DOLS showed a negative relationship between remittance inflows and the export performance of the specified South Asian countries for the duration of the study. The existence of short-run and long-run relationships among the variables was confirmed by the Granger Causality and VECM tests. It was concluded by the researchers that inward remittance affects the export performance during the investigation period. Additionally, inward remittances play a vital role in development finance in most countries in South Asia.

On the other hand, Adams & Klobodu (2016) examined the effect of remittances and regime durability on economic growth for the Sub-Saharan African Region, covering 33 countries over the time period of 1970 to 2012. The Generalized Moment Method (GMM) was used to assess the relationship between remittances and economic growth. The moderating role of regime durability and type was also investigated by controlling the political economy dynamics. The study results found that regime durability is significantly yet negatively related to economic growth, while a significant positive relationship exists between regime type and economic development. In addition, the growth effect of remittances was identified to be stimulated in the presence of stable and democratic governments. The researchers then suggest that SSA economies should adopt policies to create a democratic and stable atmosphere that will further benefit from remittances.

On the contrary, Lim and Basnet (2017) pointed out that studies investigating the long-run impact of remittances on economic growth in both West Africa and the Caribbean revealed that remittances are not growth-enhancing. Contrary to the permanent income hypothesis, the researchers argue that the transitory income remitted by short-term migrants is invested in an attempt to generate future income when they return. A panel data of five South Asian countries for the period of 1975 to 2011 were examined by Lim and Basnet (2017) using panel cointegration and PMG estimation of dynamic heterogeneous panels. It was found that for every 1% increase in remittance receipt per person, per-capita income increases by approximately 0.23%. In addition, it was revealed that there are significant long-run impacts of migrants' remittances on income; however, the impact on consumption is not significant. In conclusion, evidence was discovered for the relationship between consumption and remittances and income and remittances, respectively, although it stipulates more robust evidence when remittances are significantly associated with the investment. The researchers affirmed that remittances could positively impact development in the reduction of poverty and inequality.

Ozden, Packard, and Wagner investigated international Migration and Wages in 2017. The researchers analyzed the determinants of migration flows and the selection of migrants in consideration of their great importance in our society. This paper used a micro-level wage data panel with a large sample of source and destination countries. The impact of bilateral variables and source and destination was identified with the use of a two-step estimation strategy, at the same time manipulating for the obscured country-specific attributes and the multilateral migration resistance (Ozden et al., 2017). The study revealed the importance of geography and wage differentials in determining migration flows and the differential selection of low and high-skilled migrants.

To examine the policy of the developing, labor-exporting country to promote migrant work in a rich, labor-importing economy, Lim (2021) employed a macro-dynamic model of two small open economies in South Asia. The researcher adapted used models by Lim and Morshed (2017) and Chatterjee and Tunovsky (2018) and modified the models by instigating the collateral effect of

remittances in the borrowing constraint of the labor-exporting country. By calibrating the models, the results showed that the remittances received from the migrant workers positively impact the developing country's economy through its collateral impact. Despite that, income diminishes in the long run due to the loss of labor given the policy that hinders capital accumulation in developing countries. Subsequently, welfare increases are attributable to the increase in consumption influenced by the increase in remittances (Lim, 2021).

On another note, Dorn and Zweimüller (2021) documented patterns of migration in Europe for the last two decades. Worker-level microdata has been analyzed by the researchers that provided little evidence for wage rates' international convergence and modest static gains out of migration. Compared to the United States, migration rates within the European labor market are significantly lower. The European labor market possesses obstacles that hinder its quality as a more integrated labor market due to Europe's heterogeneity in languages and cultures (Dorn and Zweimüller, 2021). The findings show that it is unlikely that the European labor market will fundamentally grow over the next decade.

Using a Keynesian small open economy model with unemployment fluctuation, Rhee and Song (2017) studied the eligibility of real wage flexibility and its impact on welfare for each exchange rate regime in the EU. The researchers have summarized the conclusion into two-fold. The initial findings suggested that more minor fluctuations in the output gap are achieved due to the increased flexibility of real wages; it also reduces welfare losses despite exchange rate regimes. Destabilizing effects on domestic price and real wage inflation may, however, have a negative effect on welfare for both exchange rate regimes due to the increase in real wage flexibility, making the increase in real wage welfare-reducing. Furthermore, the researchers have found that in the presence of real wage inelasticity, smoothing the exchange rate fluctuations may contribute to the welfare loss (Rhee & Song, 2017).

2.3 Country-Specific Studies

One of the most important livelihood options for the people in developing countries is migration. (Piya and Joshi, 2016). The rising figure of migrants and the amount of remittances inflows has been prominent in recent years for its impact on the economy of Nepal. As Piya and Joshi (2016) emphasized, remittances have acted as a cornerstone for the sustenance of the country's macroeconomic stability. In history, stagnation in the economy of Nepal failed to provide livelihood opportunities for its people, aside from many other reasons that compelled its citizens to leave the country. For these reasons, the number of migrants moving overseas is vastly increasing, contributing to the maintenance of their national economy despite the critical macroeconomic indicators. Identically, it has also contributed to reducing poverty and smoothening consumption at a household level. Nevertheless, despite the positive effects of both migration and remittance in the country, concerns need to be addressed immediately to prevent Nepal from suffering the Dutch disease.

Asad et al. (2016) examined the relationship between workers' remittances and economic growth simultaneously with labor migration in Pakistan using time series data from 1975 to 2010. It also investigated the relationship between remittances and unemployment while capturing the interaction between unemployment and economic growth. The researchers applied Johansen and Juselius's (1990) cointegration method and the recursive simultaneous equations model. Results show that a long-term relationship between workers' remittances and economic growth in Pakistan exists. In relation, a long-run relationship was also distinguished among economic growth, labor migration, and unemployment. A long-run relationship between the remittances of workers, unemployment, and human capital was also identified in this study. In addition, a unidirectional causality was found between labor migration and unemployment to economic growth. An identical unidirectional causality was also found between workers' remittances to Pakistan's unemployment level. Lastly, the OLS results of this study demonstrated that remittances have a significant positive impact on consumption. On the other hand, consumption equally has significant positive effects on economic growth (Asad et al., 2016).

Kadozi (2019) also examined the impact of remittance inflows on economic growth in Sub-Saharan African countries and Rwanda in particular, between 1980 and 2014. The conditionality of the institutional and development factors of the growth effect in SSA countries was also examined in this paper. The researcher used the national account model and the endogenous growth model as the two theoretical approaches on the remittance-growth effect; it was revealed that although the models were not mutually exclusive in elucidating the growth effect of remittances, the theories are complementary, nevertheless. The paper has a four-stage analysis: a panel of random-effect research was used to examine the impact of remittances on economic growth in SSA countries in the first stage using a simple log-linear Cobb-Dougllass production function. In the second stage, to address the problem of endogeneity, instrumental variable techniques were introduced. Also, using a generalized method of moment (GMM) estimator and two-stage least squares (2SLS) estimation models. Several interaction variables were introduced to examine empirically which conditions affect the remittance-growth effect in SSA countries in the third stage. Lastly, in the fourth stage, cointegration and error correction model estimation methods were applied to examine further the long-run relationship between remittances and economic growth and the direction of the long-run causality between remittances and economic development in Rwanda. As a result of the cross-sectional analysis of SSA countries, remittances have no significant impact on the economic growth in the SSA

region, which implies that the effect of remittances on economic growth varies within the SSA countries (Kadozi, 2019). The study concludes that the impact of remittances on economic growth is positively influenced by the country's level of development and other several factors but also affected by the quality of institutional variables in the region with detrimental effects. On the contrary, at a country level, it was shown that remittances have a positive and significant impact on economic growth in Rwanda. As remittance inflows in Rwanda increase, the marginal effect of remittances to GDP per capita also increases. Furthermore, plausible evidence of a long-run relationship between remittances and GDP per capita was also revealed.

Tan (2019) surveyed current migration policies in major destinations of Filipino migrants and assessed their effect on migration flows for the past two decades. Family unification and workers' privileges covered by restrictive immigration have been improved by most Western Organization for Economic Co-operation and Development (OECD) economies.

The restriction, however, is that highly-skilled/ highly-educated workers are in favor of admission. In spite of these strict policies, emigration to the Western OECD has inflated for the past thirty years. Nevertheless, emigration to the United States has been diminishing yet, emigration to other countries has increased. Saudi Arabia adopted the Nitaqat policy that imposes a higher national to foreign labor despite private sectors, which may explain the decline in the flow of labor to the Gulf Cooperation Council (GCC) in 2015 and 2016. Although this decline could just be momentary fluctuation given that the state could not easily provide a sufficient number of skilled citizens as a substitute to foreign labor, GCC states' dependence on foreign labor is predicted to continue (Tan, 2019). This study recognizes that due to the increased restrictions of immigration policies, potential countries for permanent emigration do not seem so promising for Filipino migrants. Subsequently, Tan (2019) finds that labor migration to the GCC countries is presumed to remain colossal yet on a downward trend. In addition, permanent emigration to nations outside the OECD and the distribution of new hires outside the GCC have heightened. In conclusion, it was highlighted that the acceleration of economic growth in the past decade is visible; its sustenance will help provide more opportunities to compensate for higher wage rates. Similarly, like other economies in East Asia, the migration rate of their people is reduced with sustained growth.

Ang (2019) considered the present issues concerning the role of workers' remittances and their effect on the Philippines' economic growth and development. This paper analyzes to which degree remittances serve as a stimulant to the country's growth and development. In addition, the researcher also sought into the following accounts: (a) *remittance and overall growth*, (b) *linkages between remittances and microfinance*, (c) *tracing the contribution of remittances to countryside development*, and (d) *relationship between worker remittances and structural reform policies* (Ang, 2019, p.1). Using data correlation and simple regression analysis, it was revealed in this study that, at a national level, economic growth is positively and significantly influenced by remittances. It was noted in the paper that, while remittance may contribute to economic growth, correct policies and nurturing environment is needed for it to be an effective engine of development. Another observation by Ang (2019) is that remittances may cause a rapid reduction in agricultural production because it has become unprofitable, hence, the positive relationship between remittances and national and regional unemployment rates. In conclusion, the researcher suggests that remittances require a further representation of value-added activities and investments to affirm its contribution to the growth and development of the Philippines.

The income effect of minimum wage in China from 2003 to 2012 has been studied by Xie and Chen (2017), which primarily focused on the employment policy effect due to its theoretical inference. The researchers seek to answer the question: whether the income effect can increase the income of the underclass or not? Highlighted in this study is the establishment of minimum wage in order to compensate for the conflict between the capitalists and the laborers. The researchers have built a theoretical model to explore the income effect of the minimum wage and establish another standpoint on this policy's economic implications. Proposed by Xie and Chen (2017), limitation of the firms' demand on overtime work can impede the labor degradation process and simultaneously protect the labor productivity of the workers from its decrement given the extractive nature of the labor process in the capitalist mode of production which may induce a Pareto improvement to the economy. The outcome that has been found is that with every 10% increase in the minimum wage rate, the individual family income of the underclass can also increase by the same amount. Finally, it was identified that taking into account the impact of minimum wage on overtime work and considering the implications of the policy on workers' de facto wage rates. It is noteworthy that the underclass in China benefits more from these positive effects.

Paqueo et al. (2016) studied the impact of legal minimum wages on employment, income, and poverty incidence in the Philippines. Higher legal minimum wages are mandated as assistance for the poor to obtain a steady income to satisfy their basic needs. It is also a tool to protect minimum wage workers against exploitation. Given these beliefs, it stimulates and justifies the intermittent demands in increasing legal minimum wages. The researchers sought to address the empirical evidence behind legal minimum wages in the Philippines. As a result, they have identified that higher legal minimum wages in the Philippines: (1) are anticipated to lessen the work hours or average workers; (2) adversely affect the groups that LMWs are intended to protect; (3) reduce the chances of employment of the youth, women, less knowledgeable, and unskilled workers; and (4) most likely increase the household poverty rate and decrease average income (Paqueo et al., 2016). The findings demonstrate the effect of the rapid

increase in LMWs can be ineffective. The researchers suggest that to protect those below the poverty line, thorough thought should be considered in terms of LMWs' use and other programs to achieve decent wages.

One of the most prolonged central issues in macroeconomics is the cyclical behavior of real wages. These standard cycles in longitudinal microdata were investigated directly using a Bayesian dynamic latent factor model by Otrok & Pourpourides in 2017. The model used has allowed the researchers to analyze the nature and degree of real wage in the entire population together with, although separately, for skilled and unskilled laborers in the US. It was identified that there is a relationship between the comovement of real wages and a common factor that is significant but with imperfect correlation with the national unemployment rate in the US. The findings suggest that macroeconomic conditions impact real wages and that different factors influence even skilled and unskilled wages; these factors cannot explain a significant portion of wage variability (Otrok & Pourpourides, 2017). Nevertheless, the results obtained are not in coherence with the neoclassical models of labor markets.

Hendricks & Schoellman (2017) used new data on the wages of pre-and post-migration in the United States in order to measure the wage gains at migration. In addition, an extended development accounting framework was introduced to construe the influence of human capital against the country to account for cross-country income differentials. The researchers have found that there is a 62% rate of human capital that accounts for cross-country income differences. It was also discovered that immigrants are selected on observable and unobservable characteristics at a high level. The forms of selection are both found to have a negative correlation with development. Additionally, skill transfer through occupational changes of immigrants was also investigated. As a result, evidence showed that immigrants tend to settle on lower-paying jobs upon arrival to destination countries. Hendricks & Schoellman (2017) provided calculations that demonstrate reasonable corrections for the imperfect skill transfer that lowers the human capital involved in development that accounts to around one-half to two-thirds.

Correspondingly, the migration dynamics on the global scale were also applied in the paper by Villen (2017) analysis of the trends of the current Brazilian immigration conditions. As opposed to the rates of central countries and other regions of the Middle East, immigrant labor in Brazil nowadays is not as significant as it was long ago due to restrictive policies implemented with regard to the international population movements by the national states that are vital factors hereof. Therefore, it was noted by the researcher that these policies have low impacts on the Brazilian labor market. The theoretical framework of the polarized configuration that was used in this study offers a variety of issues. One of which is the complexity of the working conditions and occupational categories in the Brazilian economy's public and private sectors. The analytical perspective offered by Villen (2017) in this study is helpful to reveal the inflows that are designated to appear in the official statistics categorized as selected skilled or specialized inflows of immigrants and the limits to understanding the realization of Brazil immigration. The current economic and political crisis at the forefront of Brazil is resulting in a decreasing trend of these inflows in consideration of both poles of its immigration.

2.4 Theoretical Framework

2.4.1 Everett Lee's Push-Pull Theory

According to Xu et al. (2018), the population of migrants, including workers, both internal and international, has been increasing for the past few decades. According to their recent data collection in 2013, there were more than 232 million international migrants while 740 million internal migrants. An individual's decision consists of several intercorrelated factors, including geographic patterns, age, length of stay, and reasons for migration. These are common situations today, especially in poor countries, since people tend to move from less developed to more developed places or countries. Furthermore, there is what we call upward social mobility, where people tend to move from a lower position in society to a higher one (e.g. rural people moved to the industrialized sector for a higher wage and job opportunity). There are also geographic movements that exist in migrating, such as involuntary migration due to natural disasters, war, or migration for the purpose of marriage.

The push-pull theory of Everett Lee has been widely used in political, social, environmental, and economic research to identify and analyze factors that influence an individual's decision to migrate. Also, this theory focuses on the interplay between sending and receiving place factors, be it internal or international, that govern the migration process. This theory focuses on the interplay between sending and receiving place factors, be it internal or international, that govern the migration process. The push factors are considered as the unsatisfied conditions of an individual (e.g. heavy taxation, increasing unemployment, war, and natural disasters) in the sending places or countries that force people to migrate. On the other hand, pull factors are the advantageous conditions (e.g. safety and stability, clean environment, higher wage) in receiving places or countries (Xu et al., 2018).

2.4.2 Gary Becker's Human Capital Theory

Wuttaphan (2017) states that human resources are considered an indispensable asset capital that the firm has invested in. Becker's human capital theory explains the phenomena of human resources using the economic point of view. The human capital theory explains the importance of labor maximization and how a firm or organization can gather workers equipped with knowledge, skills,

and abilities that are viewed as an invisible asset to create a sustainable firm or organization. The human capital theory states that a different level of education and training contribute to a different level of wages and salaries; the more knowledge, skill, and ability, the more you are likely to get a better job and higher wage.

According to Kooiman et al. (2018), in the human capital theory founded by Gary Becker, migration is considered as an investment in the economy which requires the concept of costs and returns. An individual will decide to migrate only if the expected future returns exceed the expected costs of migration. Through migration, people can have opportunities that they currently do not have or cannot acquire. These opportunities may be jobs that are directly beneficial to higher financial returns or educational attainment in which people improve their human capital that, gives higher returns in the long run.

Lastly, an individual's motives also provide a possible explanation on why there should be a wide range of economic opportunities. The research conducted by Korpi and Clark (2017) states that when employment is present in a situation, employment may enter the decision-making factor, but it is not necessarily the primary motivation. There could be some other factors such as income gains.

2.5 Conceptual Framework

With the different factors affecting migration, using Everett Lee's push-pull and Gary Becker's human capital theory, we can account for remittances, unemployment, and wage rate affecting the number of overseas Filipino workers. Using the Criterion-Predictor model, we will be able to come up with a conceptual framework that analyzes its effect/s on one another and have a comprehensive understanding of the phenomenon. This model is used in regression as a statistical method to determine the relationship between a dependent variable or the criterion and one or more independent variables or also known as predictors. The change in the predictors shall predict the change in the criterion variable to create a conclusion (Carter, 2019). In this study, here is the researcher's criterion-predictor model:

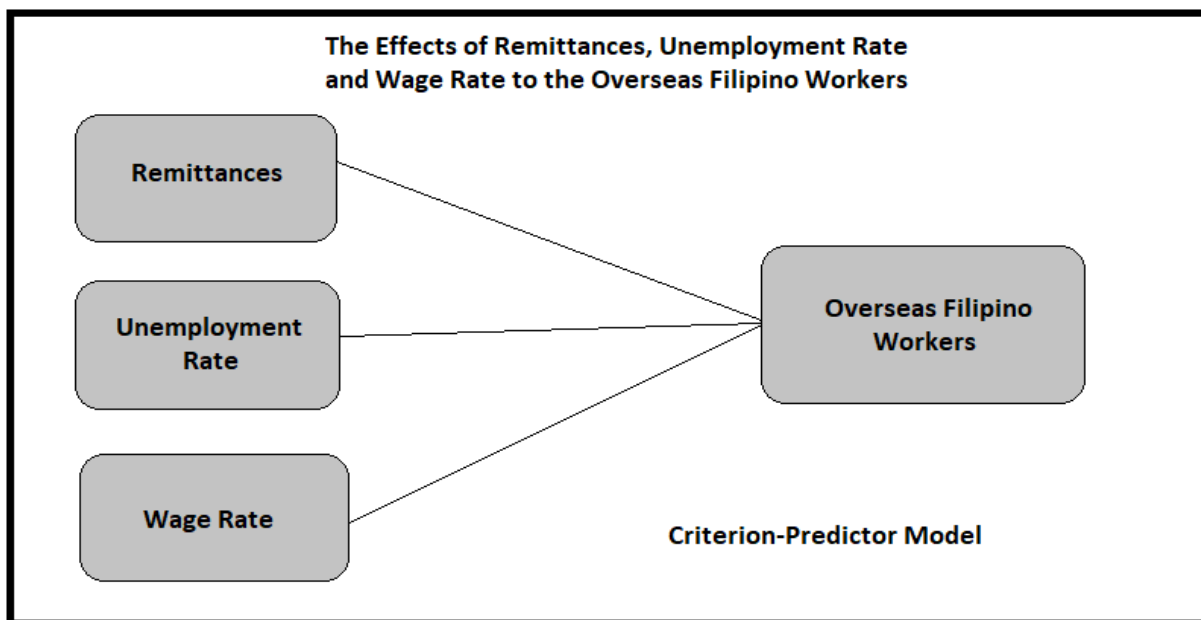


Figure 1. Criterion-Predictor Model

2.6 Synthesis

The majority of the related studies and theories discussed in this chapter provided sufficient evidence that the regressors used in this study, which are remittances, unemployment rate, and wage rate, are fundamental determinants of the migration of overseas Filipino workers regardless of their individual influence in the overall model.

In the Philippines, it was revealed that at a national level, remittances positively and significantly influence economic growth (Ang, 2019). Subsequently, it was also found that there is a positive relationship between remittances and unemployment rates. However, a more profound assessment shall be made to affirm its contribution to the development and growth of the country's economy.

Taking into account Everett Lee's Push-Pull Theory, most empirical studies support that the push factors of migration are the unsatisfied factors of migrant workers in the home country while the beneficial conditions, including higher wages and better working conditions in the host country, are the pull factors of the rising number of migrating overseas Filipino workers.

In addition, in Gary Becker's human capital theory, it was stated that migration is an investment in the economy (Kooiman et al., 2018). It also attributes the concept of costs and returns in which the potential transcends of future returns than the expected costs of migration greatly influences the migration decision of an individual. In the long run, human capital offers higher returns for opportunities, and higher educational attainment is anticipated in migration.

3. Methodology

3.1 Research Design

The researchers considered establishing this paper for the following reasons: (1) to prove the significant relationship among the selected variables, (2) to analyze the degree or strength of its relationships, and (3) to determine if there are significant changes in the trend to the following variables. In this case, the researchers applied multiple linear regression and quantitative non-experimental correlational research design. A quantitative correlational design is used to empirically analyze the statistical strength or degree of relationship among two or more variables. Furthermore, it does not only describe what exists among the variables but also systematically analyzes its relationships (Hall, 2018, p. 64).

3.2 Research Locale

The data of the selected variables were gathered in a time-series form from 1990 to 2019. The majority of the data were gathered from the Official World Bank Data while others years were gathered separately from government official data.

- **1990-1992 Overseas Filipino workers** were gathered from the official data of the Philippine Overseas Employment Administration.
- **1993-1994 Overseas Filipino workers** were gathered from the official data of the Philippine Statistics Authority.
- **1995-2019 Overseas Filipino workers** were gathered from the Official World Bank Data.
- **1990-2019 Remittances** were gathered from the Official World Bank Data.
- **1990 Wage Rate** was gathered separately from the Philippine Institute for Development Studies.
- **1991-2019 Wage Rate** were gathered from the Official World Bank Data.
- **1990-2019 Unemployment Rate** were gathered from the Official World Bank Data

3.3 Sampling Techniques

Dependent Variable or Regressand

- Overseas Filipino workers -- the total number of overseas Filipino workers (in thousands)

Independent Variables or Regressor

- Remittances -- personal remittances, received (percent of GDP)
- Wage rate -- wage and salaried workers, total (percent of total employment) (modeled ILO estimate)
- Unemployment rate -- unemployment, total (percent of the total labor force) (modeled ILO estimate)

Econometric Model

Since there are two or more independent variables, the researchers will use the multiple linear regression to explain how overseas Filipino workers are affected by remittances, unemployment, and wage rate.

This study adopts a multiple linear regression model presented as:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n + \epsilon$$

Equation 1. Multiple linear regression model

where β_1 β_2 β_3 are the parameters and ϵ is the error term.

The adopted multiple linear regression model describes how overseas Filipino workers (OFW) are affected by the regressors, remittances, wage rate, and unemployment rate (R, WR, and UR):

$$OFW = \beta_0 + \beta_1 R + \beta_2 WR + \beta_3 UR + \epsilon$$

Equation 2. The econometric model of the study

whereas:

OFW = overseas Filipino workers
R = remittances
WR = wage rate
UR = unemployment rate

Table 1: Assumptions for each variable		
Independent Variables	Assumption	Expected Sign
Remittances	As remittance increases, overseas Filipino workers increase, vice versa.	+
Wage Rate	As the wage rate increases, overseas Filipino workers increase, vice versa.	+
Unemployment Rate	As the unemployment rate increases, overseas Filipino workers increase, vice versa.	+

3.4 Instrumentation

The researchers analyzed the data gathered using Econometric Views (EViews) and Microsoft Excel to conduct the multiple linear regression and Pearson R Correlation in order to answer the research questions. The specified analysis and diagnostic testing in multiple linear regression and coefficients of determination; individual hypothesis testing using *P*-values; Pearson R correlation; test for multicollinearity using Variance Inflation Factor (VIF); test for serial correlation using the Breusch-Godfrey test; test for heteroscedasticity using the Breusch-Pagan test; test for Normality using the Jarque-Bera test.

3.4.1 Coefficient of Determination

This treatment is also known as the r^2 , used to measure the impact of the variability of the independent variables, R, WR, UR, on the dependent variable, OFW. This statistical instrument aims to assess the variables and the accuracy of the econometric model. The generally accepted value of r^2 is approximately greater than 80% to conclude the goodness of fit of the model. The coefficient of determination or r^2 is computed using Eviews, where it can be automatically calculated.

3.4.2 Individual Hypothesis Testing

In testing the significance of individual parameters, we use the marginal significance level of the coefficient or *p*-value. Opportunely, using the statistical tool Eviews as mentioned in the instrumentation of the study, the *p*-value is automatically calculated. The generated *p*-value shall be less than the desired level of significance in order to determine if the independent variables are statistically significant to the dependent variable.

3.4.3 Pearson R Correlation

In order to measure the strength of the relationship among the variables, we use this statistical instrument. With the use of Microsoft Excel as the statistical tool, the coefficients will be automatically generated.

Size of Correlation	Interpretation
.90 to 1.00 (-.90 to -1.00)	Very high positive (negative) correlation
.70 to .90 (-.70 to -.90)	High positive (negative) correlation
.50 to .70 (-.50 to -.70)	Moderate positive (negative) correlation
.30 to .50 (-.30 to -.50)	Low positive (negative) correlation
.00 to .30 (.00 to -.30)	negligible correlation

Table 2: Correlation coefficient value table

Source: Malawi Medical Journal.

The researchers will use the correlation coefficient value table (Table 2) as the basis to interpret the figures generated from the Pearson R correlation.

3.4.4 Test for Multicollinearity

The presence of multicollinearity in an econometric model is a crucial issue that has to be addressed to prevent bias. In checking for the presence of multicollinearity in the model, the Variance Inflation Factor (VIF) will be administered. The r^2 is calculated by administering an auxiliary regression of each independent variable. The computed value for VIF shall not be greater than 10 to affirm the absence of multicollinearity.

3.4.5 Test for Serial Correlation

One of the violations of the assumptions of the Classical Linear Regression Model is the presence of autocorrelation or serial correlation. With the use of the Breusch-Godfrey Serial Correlation LM test, we aim to address this issue. Results obtained from this statistical test shall be greater than the level of significance, which will be calculated using Eviews.

3.4.6 Test for Heteroscedasticity

Another violation of the assumptions of the Classical Linear Regression Model is the occurrence of heteroscedasticity; it is when the residuals are formulated from a distribution with fluctuating variance, often resulting in unreliable estimation. The researchers use the Breusch-Pagan test to ensure that the model is homoscedastic by aiming for a p -value that is greater than the level of significance 0.05.

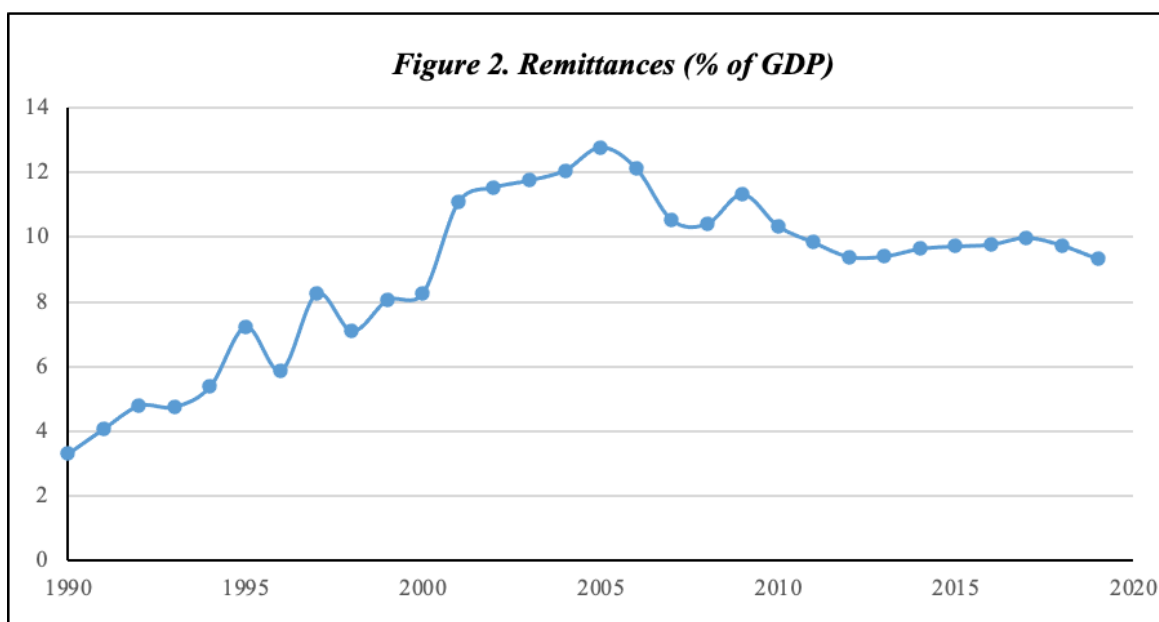
3.4.7 Test for Normality

In order to verify the assumption of the Classical Linear Regression Model that the error term is normally distributed, the Jarque-Bera statistical measurement was employed. The probability value obtained from this test shall be greater than the level of significance of 0.05 or 5% in order to know if the residuals or error term is normally distributed.

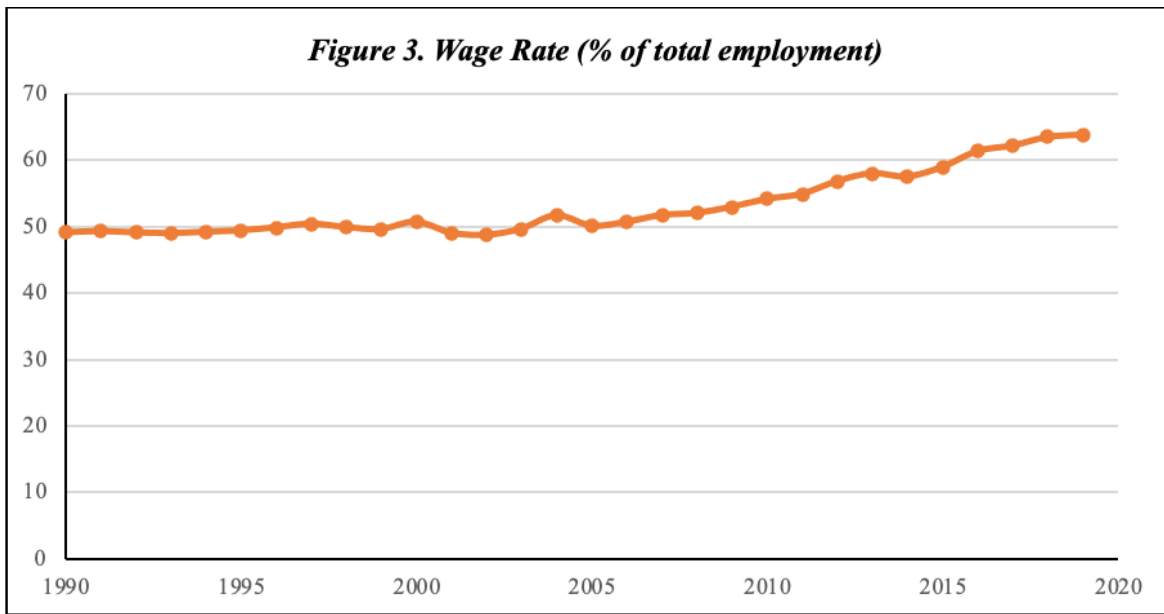
4. Results and Discussion

In this chapter, the trends of each variable are presented, and their implications are discussed. Furthermore, the findings and results of the study of multiple linear regression and Pearson R Correlation are interpreted with statistical treatments applied.

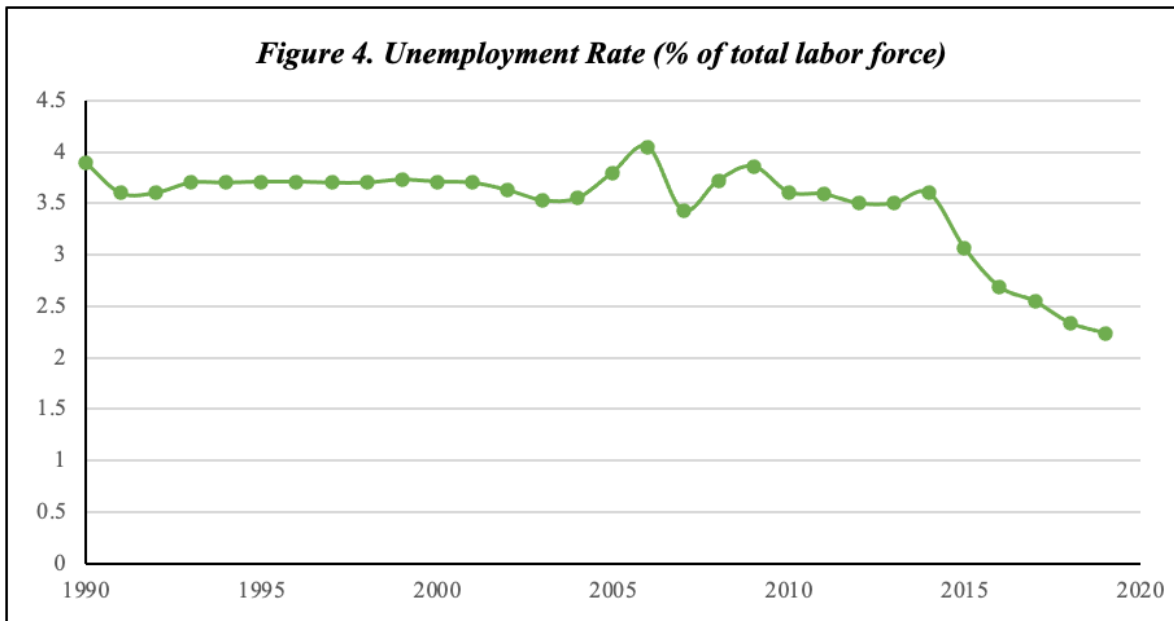
4.1 Trends of the Variables



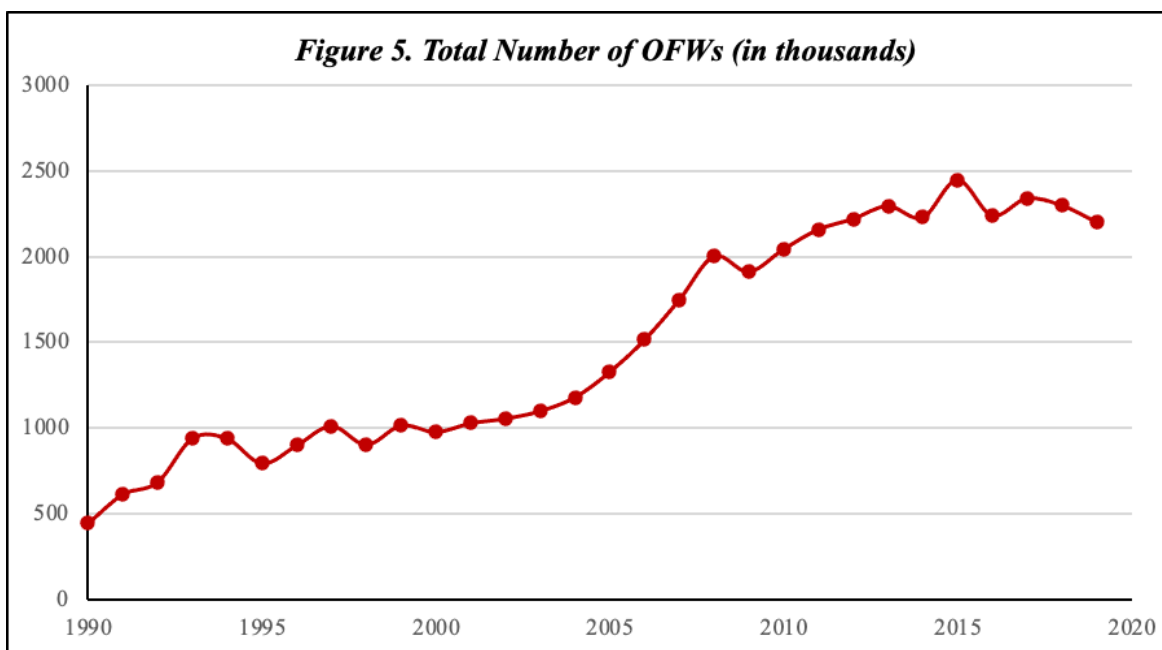
As illustrated in Figure 2, the personal remittances received in the Philippines as presented by a percentage of GDP show a fluctuating trend for the first decade (1990 to 2000) and a significant increase in the trend from 2001 to 2005 with the highest remittances recorded at 12.7839875817886 in 2005. The decrease in remittances started in 2006 and incrementally fluctuated in 2009. The continuance of the decrease in remittances can be seen from 2010 to 2019.



As shown in Figure 3, the wage rate as a percentage of total employment from 1990 to 2019 exhibits an increasing trend with an average rate of 53.12%. After a distinguishable rise of the wage rate in 2004, we noticed its decline shortly the year after. Similarly, in the same year, the steady growth of the wage rate significantly continued to increase over the years.



The unemployment rate as a percentage of the total labor force in the Philippines from 1990 to 2019 is displayed in Figure 4. An incremental decrease in the unemployment rate is visible from 1990 to 2005. In 2006, the unemployment rate increased at 4.05% and significantly decreased to 3.43% in 2007, the lowest in the first two decades (1990 to 2010). The trend incrementally fluctuated from 2008 to 2014 and incrementally decreased from 2015 to 2019, wherein the lowest unemployment rate in the time period was recorded at 2.24%.



The total number of Overseas Filipino Workers in thousands is presented in Figure 5, wherein a fluctuating trend is observed for the first decade (1990 to 2000) of the time period. Furthermore, an increasing trend was observed in this figure from 2001 to 2008 as the total number of OFWs continued to rise. After a minimal decrease in the total number of OFWs in 2009, the number continued to increase from 2010 to 2013. Over the years 2014 to 2017, a gradual fluctuation in the trend was observed. Subsequently, an incremental decrease from 2018 and 2019 was regarded.

4.2 Regression Results

Variables	Coefficients	Standard Errors
Intercept	-10685.49	1393.305
Remittances (R)	64.40905	15.61559
Wage Rate (WR)	167.6504	16.50425
Unemployment Rate (UR)	770.5510	171.4390

In substitution of the generated coefficient values from the multiple linear regression as shown in Table 3, the econometric model (Eq. 1):

$$OFW = \beta_0 + \beta_1 R + \beta_2 WR + \beta_3 UR + \epsilon$$

be converted as:

$$OFW = -10685.49 + 64.41 R + 167.65 WR + 770.55 UR$$

4.3 Coefficient of Determination

Table 4: Regression Statistics of the Econometric Model	
r^2	0.912145
Adjusted r^2	0.902008

Analyzing the generated r^2 value from the multiple linear regression, the econometric model indicates that the variability of personal remittances received, wage and salaried workers total, and the unemployment rate total illustrates 91.21% of the variability in the total overseas Filipino workers. This suggests the robustness of the overall econometric model given the favorable r^2 figure. In terms of the adjusted r^2 , it implies that variability of personal remittances received, wage and salaried workers total, and the unemployment rate total essentially affects the variability in total overseas Filipino workers by 90.20% given the adjustments of the degrees of freedom.

4.4 Hypothesis Testing

Table 5: Probability Results	
Independent Variables	P-values
Remittances (R)	0.0003
Wage Rate (WR)	0.0000
Unemployment Rate (UR)	0.0001

Hypotheses:

- a. **H₀₁**: There is no significant relationship between OFW and R
- b. **H_{A1}**: There is a significant relationship between OFW and R
- c. **H₀₂**: There is no significant relationship between OFW and WR
- d. **H_{A2}**: There is a significant relationship between OFW and WR
- e. **H₀₃**: There is no significant relationship between OFW and UR
- f. **H_{A3}**: There is a significant relationship between OFW and UR

With the intention to test the relationship and the level of statistical significance of the independent and dependent variables, we distinguish the *P*-values. In order to determine if the variables are statistically significant, the researchers used the generally accepted significant level, which is 0.05 or 5%. Assuming that the *p*-value is equal to or less than 0.05, indicating that the coefficient is statistically significant thus, the null hypothesis must be rejected. Otherwise, if the *p*-value is greater than 0.05, the null hypothesis must not be rejected.

Presented in Table 5 are the *p*-values of the independent variables obtained from the multiple linear regression. R acquired a value of 0.0003, therefore indicating that *H₀₁* should be rejected. *H₀₂* should also be rejected, given the generated *p*-value of WR at 0.0000. Furthermore, 0.0001 is the *p*-value of UR, which then again suggests that *H₀₃* should be rejected. The results garnered, as shown in Table 3, clearly show that R, WR, and UR are strongly significant at a 5% level in relation to OFW. Thus, the null hypothesis of the study is rejected.

4.5 Pearson R Correlation

For the purpose of answering the research question, the researchers needed to estimate the measure of the relationship strength between the variables through Pearson R Correlation. The strength of the relationship between the variables is interpreted as associated with the size of correlation using the correlation coefficient value table (Table 2). The direction of the association as interpreted in the table is specified by the positive and negative signs of the value. A positive number indicates that the relationship

between the two variables is positively correlated. Otherwise, if it is a negative number, then it is a negative relationship. Thus, Table 2 will be used as a basis to interpret the degree of relationship between two variables.

	R	WR	UR
OFW	0.54418	0.86543	-0.58802

Hypotheses:

- H₀₁**: There is a positive correlation between OFW and R
- H_{A1}**: There is a negative correlation between OFW and R
- H₀₂**: There is a positive correlation between OFW and WR
- H_{A2}**: There is a negative correlation between OFW and WR
- H₀₃**: There is a positive between OFW and UR
- H_{A3}**: There is a negative correlation between OFW and UR

Degrees of correlation:

- OFW and R**: Moderate positive correlation. Therefore, the null hypothesis is not rejected.
- OFW and WR**: High positive correlation. Therefore, the null hypothesis is not rejected.
- OFW and UR**: Moderate negative correlation. Therefore, the null hypothesis is rejected.

In pursuance of understanding the correlation between the regressand and a regressor, Pearson R Correlation is used in this study. Following the results are shown in the degree of correlation, OFW and R have a moderate positive correlation which indicates a direct relationship between OFW and R. We interpret that whenever the remittances of the Philippines increases, the number of OFWs increases, and vice versa.

Similarly, the variables OFW and WR possess a high positive correlation as well. This proves that, at a confidence level of 95%, WR does, in fact, positively correlate with the OFWs. It determines that whenever WR increases, OFW increases, and vice versa. On the contrary, this is not the case for OFW and UR. Differentiating the regression results and Pearson R Correlation results, the results in Table 3 show that the coefficient of UR is 770.5510, which indicates a positive correlation. While the value attained in Table 6 under UR is -0.58802, revealing a negative correlation given the negative sign. To address the confusion, the researchers affirm that only the relationship between UR and OFW is taken into account in Table 6. The confounding effects of WR and R are yet to be considered in this result.

Nevertheless, if we were to consider other variables such as R and WR, this only proves that there are factors that affect the relationship between UR and OFW, may it be WR or R or both. In consideration that a simple regression was used, the UR's relationship with OFW would indeed be a negative relationship. In other words, the econometric model certainly influences the changes in the relationship between UR and OFW.

4.6 Test for Multicollinearity

Independent Variables	Centered VIF
Remittance (R)	1.151213
Wage Rate (WR)	4.538954
Unemployment Rate (UR)	4.245697

Hypothesis:

H₀: There is no multicollinearity between the variables

H_A: There is multicollinearity between the variables

Results in Table 7 show that R, WR, and UR's centred VIF are 1.151213, 4.538954, and 4.245697, respectively. As generally stated, if the VIF is less than 10, then there is no multicollinearity in the data. Therefore, the null hypothesis of having no multicollinearity is not rejected.

4.7 Test for Serial Correlation

Table 8: Breusch-Godfrey test (Serial Correlation)	
Number of Lags	Prob. Chi-Square
1	0.1076
2	0.2638
3	0.4443

Hypotheses:

- a. **H₀1**: no serial correlation at up to 1 lags.
H_A1: serial correlation at up to 1 lags.
- b. **H₀2**: no serial correlation at up to 2 lags.
H_A2: serial correlation at up to 2 lags.
- c. **H₀3**: no serial correlation at up to 3 lags.
H_A3: serial correlation at up to 3 lags.

Prob. Chi-squares (*p*-value)

- a. **p-value of 1 lag** = 0.1076
- b. **p-value of 2 lags** = 0.2638
- c. **p-value 3 lags** = 0.4443

The researchers used the Breusch-Godfrey LM Test to assess the presence of serial correlation in the data. The results show that the *p*-value of the lags (1, 2 and 3) are greater than 0.05, implying that there is no serial correlation up to 3 lags. Thus, we do not reject the null hypothesis.

4.8 Test for Heteroscedasticity

Table 9: Breusch-Pagan test (Heteroscedasticity)	
Obs*r²	Prob. Chi-Square
14.30950	0.8259

Hypothesis:

H₀: residuals are homoscedastic.

H_A: residuals are not homoscedastic.

Breusch-Pagan test is used to determine whether the data is heteroscedastic. It is generally stated that if the *p*-value (prob. chi-square) of the variables is less than the level of significance, which is 0.05, it means that the residuals of the regression are heteroscedastic. Otherwise, if the residuals of the regression are greater than 0.05, the data is homoscedastic. Given the *p*-value of 0.8259, we do not reject the null hypothesis.

4.9 Test for Normality

Jarque-Bera	Probability
1.941202	0.378855

Hypothesis:

H₀: residuals are normally distributed.

H_A: residuals are not normally distributed.

The test of normality is used to determine if the residuals are normally distributed or not. If the probability value of the Jarque-Bera test is less than 0.05 or 5%, then the null hypothesis is rejected, vice versa. Given the results of the Jarque-Bera test, it shows that the probability of the data is 0.378855. In our case, the null hypothesis is not rejected, affirming that the residuals are normally distributed.

5. Summary, Conclusion, and Recommendations

5.1 Summary

This study aims to analyze the trends and relationship between the macroeconomic determinants, namely remittances, wage rate, and unemployment, that affect the variability in the total number of overseas Filipino workers. With the use of time-series data gathered from 1990 to 2019 (30 observations), the intention of this study is achieved through the use of multiple linear regression with the total number of overseas Filipino workers (in thousands) as the dependent variable and personal remittances received (percent of GDP), wage and salaried workers total (percent of total employment) (modeled ILO estimate), and unemployment total (percent of the total labor force) (modeled ILO estimate) as the independent variable. With the pursuit to determine if each regressor is a significant parameter of the regressand and the significance of the overall model, *p*-values are utilized. Furthermore, in order to test if the model is not biased and contains no issues of the classical assumptions, several diagnostic tests are applied, namely, test for multicollinearity (Variance Inflation Factor), test for serial correlation (Breusch-Godfrey test), test for heteroscedasticity (Breusch-Pagan test), and test for normality (Jarque-Bera test).

5.2 Conclusion

This study finds that remittance, wage rate, and unemployment rate are statistically significant and positively correlated to the parameters of overseas Filipino workers in the Philippines, which supports the related studies mentioned in chapter 3 and especially the theoretical involvement of Everett Lee's Push-Pull Theory and Gary Becker's Human Capital Theory. It is determined that remittance is positively correlated with the overseas Filipino workers implying that the increasing remittance in the Philippines motivates Filipinos to work overseas. It is also worth mentioning that, with the continuously increasing wage rate, the Filipinos still seek wages higher than what they already earn in the Philippines. It is also stated by Abdulla (2020) that immigrants improve their occupation and that their earnings have grown and exceeded that of natives, which strengthens the argument for the Human Capital theory. In terms of the results of the unemployment rate and overseas Filipino workers, it was discovered that they are negatively correlated when the wage rate and remittances are excluded, which is agreeable to Bier (2016)'s argument that having higher unemployment is not associated with higher immigration. In fact, when unemployment is low, immigration is high, vice versa. However, due to the influence of the wage rate and remittance in the model, the unemployment rate's relationship with overseas Filipino workers becomes positively correlated. In that sense, when the unemployment rate in the Philippines escalates, Filipinos are forced to find job opportunities outside their origin country. When taking Everett Lee's Push-Pull Theory into account, it is also determined that the wage and unemployment rate is under the push theory, while remittance under the pull theory, as the results of the coefficient of these independent variables, are positively correlated with the drive to migrate to another country.

The r^2 of the model suggests that 91.21% of the variability in overseas Filipino workers can be explained by the variability of all independent variables. Furthermore, as indicated by the result of the diagnostic tests used, including Pearson R correlation, the overall model is significant and shows no evidence of multicollinearity, serial correlation, heteroscedasticity and irregular distribution of residuals.

5.3 Recommendations

Given the findings along with the problems encountered by the researchers in making this study, recommendations for future development of this empirical study in order to attain better results and further affirm the claims are: (1) consideration of more accurate data within the variables, (2) incorporation of other macroeconomic indicators or variables, (3) administration of rightful government policies to protect the interests of the overseas Filipino workers, and (4) implementation of financial policies to essentially consider remittances as an effective agent in the growth and development of the country.

The researchers attest that the findings of this study are a long way from being conclusive; indications suggest that there is a need to further investigate and identify how the number of overseas Filipino workers and the attributed macroeconomic factors can be harnessed for future development purposes.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

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Appendices

A. Raw Data

n	Year	R	WR	UR	OFW
1	1990	3.31	49.10	3.90	446
2	1991	4.07	49.30	3.60	615
3	1992	4.79	49.10	3.60	686
4	1993	4.76	49.00	3.70	941
5	1994	5.39	49.20	3.70	939
6	1995	7.23	49.41	3.71	795
7	1996	5.88	49.86	3.71	900
8	1997	8.26	50.41	3.70	1013
9	1998	7.10	49.90	3.70	904
10	1999	8.06	49.61	3.73	1016
11	2000	8.28	50.72	3.71	978
12	2001	11.10	49.05	3.70	1029
13	2002	11.55	48.74	3.63	1056
14	2003	11.76	49.66	3.53	1100
15	2004	12.07	51.70	3.55	1180
16	2005	12.78	50.10	3.80	1327
17	2006	12.14	50.71	4.05	1515
18	2007	10.54	51.72	3.43	1747
19	2008	10.41	52.04	3.72	2002
20	2009	11.33	52.97	3.86	1912
21	2010	10.35	54.16	3.61	2043
22	2011	9.84	54.92	3.59	2158
23	2012	9.40	56.84	3.50	2220
24	2013	9.41	58.03	3.50	2295
25	2014	9.64	57.54	3.60	2228
26	2015	9.72	58.98	3.07	2447
27	2016	9.77	61.37	2.69	2240
28	2017	9.99	62.20	2.55	2339
29	2018	9.75	63.49	2.34	2299
30	2019	9.33	63.85	2.24	2202

Note:

- **1995-2019** Overseas Filipino workers - the total number of overseas Filipino workers (in thousands) were gathered from the Official World Bank Data (<https://databank.worldbank.org/source/world-development-indicators>).
- **1993-1994** Overseas Filipino workers - the total number of overseas Filipino workers (in thousands) were gathered separately from the official data of the Philippine Statistics Authority(<https://psa.gov.ph/sites/default/files/1993-1995%20Survey%20on%20Overseas%20Filipinos.pdf>).
- **1990-1992** Overseas Filipino workers - the total number of overseas Filipino workers (in thousands) were gathered separately from the official data of the Philippine Overseas Employment Administration
- **1990-2019** Remittances - personal remittances received (percent of GDP) were gathered from the Official World Bank Data (<https://databank.worldbank.org/source/world-development-indicators>).

- **1991-2019** Wage Rate - wage and salaried workers, total (percent of total employment) (modeled ILO estimate) were gathered from the Official World Bank Data (<https://databank.worldbank.org/source/world-development-indicators>).
- **1990** Wage Rate - wage and salaried workers, total (percent of total employment) (modeled ILO estimate) was gathered separately from the Philippine Institute for Development Studies (<https://core.ac.uk/download/pdf/20116633.pdf>).
- **1990-2019** Unemployment Rate - unemployment, total (percent of the total labor force) (modeled ILO estimate) were gathered from the Official World Bank Data (<https://databank.worldbank.org/source/world-development-indicators>).

B. Regression Results

Dependent Variable: OFW

Method: Least Squares

Date: 11/14/21 Time: 11:29

Sample: 1990 2019

Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-10685.49	1393.305	-7.669166	0.0000
R	64.40905	15.61559	4.124663	0.0003
WR	167.6504	16.50425	10.15801	0.0000
UR	770.5510	171.4390	4.494608	0.0001
R-squared	0.912145	Mean dependent var	1485.733	
Adjusted R-squared	0.902008	S.D. dependent var	643.6970	
S.E. of regression	201.5005	Akaike info criterion	13.57303	
Sum squared resid	1055663.	Schwarz criterion	13.75985	
Log likelihood	-199.5954	Hannan-Quinn criter.	13.63279	
F-statistic	89.98118	Durbin-Watson stat	1.342804	
Prob(F-statistic)	0.000000			

C. Person R Correlation Results

	<i>R</i>	<i>WR</i>	<i>UR</i>	<i>OFW</i>
<i>R</i>	1			
<i>WR</i>	0.28787	1		
<i>UR</i>	-0.13973	-0.86679	1	
<i>OFW</i>	0.54418	0.86543	-0.58802	1

D. Multicollinearity Test Results

Variance Inflation Factors
 Date: 11/14/21 Time: 12:14
 Sample: 1990 2019
 Included observations: 30

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	1941299.	1434.371	NA
R	243.8467	15.53271	1.151213
WR	272.3902	572.5025	4.538954
UR	29391.32	268.8550	4.245697

E. Heteroscedasticity Test Results

Heteroskedasticity Test: Breusch-Pagan-Godfrey
 Null hypothesis: Homoskedasticity

F-statistic	0.267474	Prob. F(3,26)	0.8482
Obs*R-squared	0.898151	Prob. Chi-Square(3)	0.8259
Scaled explained SS	0.669024	Prob. Chi-Square(3)	0.8805

F. Serial Correlation Test Results

Breusch-Godfrey Serial Correlation LM Test:
 Null hypothesis: No serial correlation at up to 1 lag

F-statistic	2.360997	Prob. F(1,25)	0.1370
Obs*R-squared	2.588718	Prob. Chi-Square(1)	0.1076

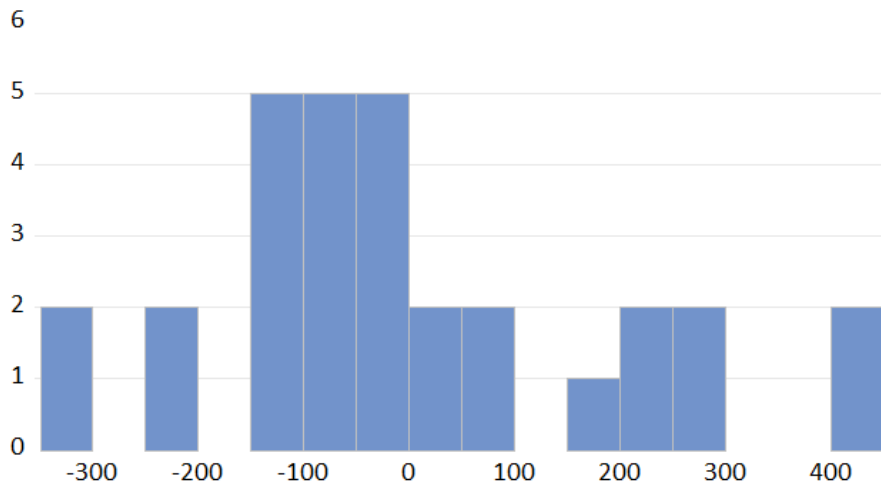
Breusch-Godfrey Serial Correlation LM Test:
 Null hypothesis: No serial correlation at up to 2 lags

F-statistic	1.170173	Prob. F(2,24)	0.3274
Obs*R-squared	2.665507	Prob. Chi-Square(2)	0.2638

Breusch-Godfrey Serial Correlation LM Test:
 Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.750901	Prob. F(3,23)	0.5330
Obs*R-squared	2.676192	Prob. Chi-Square(3)	0.4443

G. Normality Test Results



Series: Residuals	
Sample 1990 2019	
Observations 30	
Mean	-4.39e-12
Median	-14.68753
Maximum	439.8671
Minimum	-318.2409
Std. Dev.	190.7936
Skewness	0.623034
Kurtosis	2.983435
Jarque-Bera	1.941202
Probability	0.378855