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| RESEARCH ARTICLE

Impact of Foreign Direct Investment, Inflation, Labor Force, and Population on Improving Living Standards in the Philippines

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| ABSTRACT
Vast amount of literature has well-established FDI as an important determinant of technology acquisition and modernization, economic development, capital accumulation, and employment. Economists are too engrossed in how FDI positively affects the economic growth of both the home and host countries; only a few have been associated with investigating how FDI actually improved the living standards of the people. This paper examined the impact of FDI, Inflation, Labor Force, and Population on improving living standards in the Philippines from 1985 to 2021 using the different econometric tests which are: (1) Augmented Dickey-Fuller Test, (2) Jarque-Bera Normality Test, (3) Variance Inflation Factor, (4) Breusch-Pagan Heteroskedasticity test, (5) Breusch-Pagan-Godfrey Autocorrelation test, (6) RAMSEY Reset test, (7) Correlation Matrix, (9) OLS Multiple Regression, (10) Johansen Cointegration and (11) Granger Causality. The findings in the various tests revealed that FDI, Inflation, Labor Force Participation, and Population have cointegrating relationships with Self-Rated Poverty Rate within the time series. Moreover, the OLS regression model has shown that Labor Force Participation and Inflation have significant relationships with living standards while the country's FDI and Population are insignificant. Granger Causality also revealed that Inflation, Labor Force, and Population Granger caused living standards in the Philippines and only FDI not. With all of the results of the tests, it is evident that the dependent variables affect the living standards in the Philippines, it just varies on how little or extensive it is. This study supports the loosened restrictions to foreign ownership as the results affirmed the significant effects of most of the dependent variables on the Self-Rated Poverty Incidence; however, must still take precautionary measures as some variables exhibit insignificance in the long run. The paper recommends implementing policies that are moderately reliant on Foreign Direct Investment, Population, Inflation, and Labor Force Participation rate because all of the variables are proven to be related to the Self-Rated Poverty Incidence, which is the variable used to measure the living standards in the Philippines. However, the Philippine government should focus and be meticulous on policy clauses that would benefit not just the corporate but also its employees to help attain prosperity for the country and its countrymen and to help alleviate poverty.

| KEYWORDS
Foreign Direct Investment, Inflation, Labor Force, Population, Self-rated Poverty Incidence

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1. Introduction

1.1 Background of the Study

Prior to the Asian financial crisis, developing countries like the Philippines became the destination of FDI and became heavily reliant on world integration. In the early 1980s, the Philippines was faced with severe economic problems related to its volatile economic growth. After its fluctuations in economic performance over the past decades, the Philippine government adopted a policy of economic liberalization with a focus on trade and investment (Agbola, 2014). The number of foreign investors soared that raised the country's gross domestic product (GDP) from 4% in the mid-1980s to 19.5% in 1996 (IMF, 2007). In the year 2021, Former

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President Rodrigo Duterte has signed Republic Act (R.A.) 11595 which amends the Retail Liberalization Act of 2000 as a measure to loosen restrictions on foreign ownership and lower corporate income tax rates. During his inauguration, Ferdinand Marcos Jr. vowed to continue this move of the previous administration to further liberalize the economy and welcome more foreign investments. In 2023, the *Bangko Sentral ng Pilipinas* oversees that there are more inflows of Foreign Direct Investment in the Philippines after it plunged in 2022 after achieving an all-time high in 2021 due to the global pandemic and the high inflation rate (Agcaoili, 2023). This increased scope for mutually beneficial investments aims to open more job opportunities and a better quality of life for Filipinos. It also expects the Philippine economy to graduate from its status as an upper-middle-income country by the coming years as it increased its income range according to the World Bank (Devonshire-Ellis, 2022). However, several studies have established that massive foreign direct investments do not necessarily equate to improved living standards.

The paper examines whether the benefits of Foreign Direct Investment through improved wages and increased employment enabled the Filipino people to sustain their daily expenses with the current inflation and population in the Philippines. This study specifically investigates the nature of the relationship between the self-rated poverty incidence rate as a proxy measurement of living standards, Foreign direct investment (FDI), Inflation, Labor Force, and Population during the period 1985-2021.

To be able to consider someone to be part of the poor population in the Philippines, a family of five should live below the poverty threshold of 12,030 pesos per month. This criteria is the poverty incidence, which is the percentage of Filipinos whose income per capita does not adequately attain the basic food requirements, and non-food requirements. In a span of 6 years, the poverty incidence in the Philippines have not been stagnant, and significant changes could be seen. In 2015, the poverty incidence is at 23.5%, while in 2018 it became lower at 16.7%, but in 2021 it rose again at 18.1%. Translating this, the 19.99 million Filipinos live below the poverty threshold in 2019. (Philippine Statistics Authority, 2022).

Self-Rated Poverty Incidence Rate is a national survey conducted by the Social Weather Stations (SWS). It is measured by the proportion of Filipino respondents rating their family as poor. This SWS survey indicator, however, has been volatile over the years. It can change, either upwards or downwards, in a short period of time. Following that, the proportion of Filipinos who still fall under the poverty threshold was still at an estimated 16.6% despite the rise of FDI from less than 1% in 2010 to around 3% in 2018, surpassing Malaysia, Thailand, and Indonesia (PSA, 2019). Foreign direct investments boost the overall economic growth of the country; increase employment by creating new production capacity and jobs; bring capital as it leads linkages to the global marketplace; enhance technology through spillovers (Bevan and Estri, 2000). FDI is presented as an important source of technology acquisition and modernization, economic development, employment, and consequently poverty reduction. It is unquestionable that the policies in developing countries are pushed to attract considerable attention among foreign investors, however, there is still no study that has presented its impact on Filipino living standards. Inflation has been found to be one of the main determinants of the rate of return of income and investment as frequent changes in price levels may be costly for consumers, thus, reducing the optimal level of income they hold. With increased job opportunities and higher wages, the labor force participation rate is effective at reducing poverty. Lastly, the total population is based on the number of all residents regardless of legal status or citizenship and has statistically significant effects on per capita income as it boosts human capital accumulation.

Economists are too engrossed in how FDI positively affects the economic growth of both the home and host countries, only a few have been associated with investigating how FDI actually improved the living standards of the people. Identifying the unclear effects of FDI on improving living standards in the Philippines would help the citizens, economists, and the government to a certain extent. This paper could serve as a measurement of future policy incentives to attract FDI at the same time favorable to Filipino citizens, reducing poverty.

1.2 Statement of the Problem

Whilst a vast amount of literature has established the positive effect of FDI on overall economic performance, the contribution of FDI to improving living standards in the Philippines is still not tackled in detail. Numerous studies explained that FDI is good at the aggregate level but leads to increased inequality in every individual's income (Sumner 2005; Nguyen, Sun, & Beg 2019; Velde & Morrissey 2010). FDI's positive contributions depend largely on the policies of host countries and the behavior of the transnational corporations (Aldaba, 1994). Moreover, inflation has a negative impact on living standards as it increases daily expenses. Population growth also negatively affects the living standards, but its effect varies for each country most especially for those in rapid growth which tends to increase poverty. Labor force participation is the relative amount of an economy's labor resources whereas a high percentage of civilians actively looking for work would have a significant impact on poverty reduction; however, their relationship depends greatly on the job opportunities offered in the country's labor market. This study aims to investigate whether FDI, Inflation, Labor Force Participation, and Population really have significant and positive impacts on Filipino living standards. Via the injection of FDI which improves wages, increases employment, and boosts gross domestic product in the host country, the paper aims to answer whether this global integration was able to help the people with their cost of living given the inflation and population in the Philippines. To obtain all the essential information, the research sought to answer the following questions:

- Do FDI, Inflation, Labor Force, and Population have any cointegration with improved living standards in the Philippines?
- Is there a significant relationship between living standards with FDI, Inflation, Labor Force, and Population?
- Does the Philippines' FDI, Inflation, Labor Force, and Population cause improved living standards?
- Overall, do FDI, Inflation, Labor Force, and Population help improve living standards in the Philippines?

1.3 Objectives of the Study

The objectives of this research are as follows:

- To determine whether FDI, Inflation, Labor Force, and Population have any correlation on improving the living standards in the Philippines
- To examine whether FDI, Inflation, Labor Force, and Population have any significance on the Self-Rated Poverty Incidence Rate
- To assess whether the existence of FDI and its effects cause improved living standards in the long run
- To investigate whether FDI, Inflation, Labor Force, and Population can collectively help improve living standards

1.4 Formulation of Hypothesis

In order to address the problems, the study considers the following hypotheses:

Hypothesis 1:
H0: FDI, Inflation, Labor Force, and Population do not have a cointegration with improved living standards
H1: FDI, Inflation, Labor Force, and Population do have a cointegration with improved living standards

Hypothesis 2:
H0: There is no significant relationship between living standards with FDI, Inflation, Labor Force, and Population
H1: There is a significant relationship between living standards with FDI, Inflation, Labor Force, and Population

Hypothesis 3:
H0: Philippines' FDI, Inflation, Labor Force, and Population do not cause improved living standards
H1: Philippines' FDI, Inflation, Labor Force, and Population cause improved living standards

Hypothesis 4:
H0: Overall, FDI, Inflation, Labor Force, and Population do not help improve living standards in the Philippines
H1: Overall, FDI, Inflation, Labor Force, and Population help improve living standards in the Philippines

1.5 Significance of the Study

The purpose of the study is to assess the impact of FDI presence in improving Filipino living standards using FDI, Inflation, Labor Force, and Population as independent variables and Self-Rated Poverty Incidence as the dependent variable. The findings of this paper would be beneficial to the following:

- *Labor force* – Through this study, people employed either in domestic or foreign firms would have an insight into whether FDI presence would be beneficial in the improvement of their living standards.
- *Government* – This research could serve as a measurement on future policy incentives to attract FDI at the same time benefiting the Filipino labor force.
- *Economists* – This study would serve as a reference for the unclear effects of FDI on living standards in the Philippines.
- *Students* – This paper could serve as a backbone for future research and a means to broaden their knowledge regarding FDI and its effect on the people.
- *National Economic and Development Authority (NEDA)* – This paper could serve as a point of reference by NEDA in terms of formulating and suggesting economic policies to the government.
- *Department of Labor and Employment (DOLE)* – As there is a variable of the labor force, DOLE officials could use the result of this study to create policies that could ensure foreign and domestic employment opportunities and income equality.

1.6 Scope and Delimitations of the Study

The study was conducted to find out the relationship between FDI, Inflation, Labor Force, and Population on improving the living standards in the Philippines using Self-Rated Poverty Incidence as a proxy variable. All data are taken from Social Weather Stations (SWS) Indicators, World Development Indicators, and Philippine Statistics Authority (PSA) OpenSTAT using the annual time-series

data spanning the period 1985 to 2021. The study's time frame is limited to 37 observations because the data for some of the variables contain missing values that may produce complications from econometric tests. It started in the year 1985 as there was political instability in the Philippines during this time with threats from revolutions and several economic reforms done by past Marcos and Aquino administrations; thus, it was during this time that poverty was rampant, and the existing foreign regulations were liberalized. Lastly, this paper will be based on the condition of the overall wages and not on specific foreign and domestic firm wages.

2. Review of Related Literature

2.1 Review of Related Literature

2.1.1 Foreign Direct Investment

Foreign direct investment has been proven by several studies as an important vehicle for achieving economic growth at the same time poverty reduction, but the strength of its association is much stronger in developing countries compared to developed ones. Khan, N.H., Ju, Y., & Hassan, S.T. (2019) discussed that considering urbanization, foreign direct investment (FDI), and trade, GDP has a positive and significant impact on the Human Development Index (HDI) with both Internet and mobile penetration. Hence, FDI significantly contributes to the HDI in a developing country like Pakistan. Likewise, Magombeyi, M. T., and Odhiambo, N. M. (2017) discovered that there is a relationship between FDI and poverty reduction, but it is dependent on the proxy used to measure the extent of poverty reduction in Tanzania. During the period of 1985-2014 in Uganda, the study of Wakyereza, R. (2019) shows that an increase in foreign direct investment means an increase in economic growth and employment opportunities, and also reduces poverty, which is why boosting FDI would aid in making Uganda's economy healthy. With regards to the study of Chindengwike, J. (2022) in East Africa, he was able to find out that FDI is positively connected with poverty alleviation, and that there is a need to maximize FDI in order to reduce poverty. Also, it was stated by Edrees, A. E. S. (2017) that there is a need for the policymakers in Africa to improve the business sector of Africa to increase the inflows of foreign direct investment, to further improve the economy, and reduce poverty.

Furthermore, from the study of DeLay, S.B. (2018), it was stated that through employment at New Horizons, an FDI whose stated goal was a holistic enhancement of the local community of Nampula, Mozambique, which has improved the employees' quality of life. Through the injection of FDI, employees of foreign-owned firms were both able to increase their revenue and improve the quality of life of themselves and their families. However, a one percent increase in FDI presence causes domestic firms to cut average wages by 2.03 percent (Nguyen, D.T.H., Sun, S. & Beg, A.B. 2019). Despite FDI firms on average pay 2.25 times that of domestic firms, they put a downward pressure on domestic firms' wages. With the paper of Nguea, S. M., Noumba, I., & Noula, A. G. (2020), the authors used Auto Regressive Distributed Lags bounds test to analyze the effect of FDI with regards to poverty reduction in Cameroon. It was found out that the relationship between FDI and poverty reduction will depend on the proxy used to measure it, when infant mortality is used in Cameroon, it is negative and significant in the long run, while a positive and significant impact on poverty reduction is registered in the short run.

The study of Ganic, M. (2019) revealed that the relationship of FDI and poverty reduction will depend on the status of the country. It was stated that poorer countries have a much stronger effect when it comes to poverty reduction with the increase in FDI, but in wealthier countries, specifically in the Central European region, the relationship is weak. In addition, the paper of Ahmad, F., Draz, M. U., Su, L., Ozturk, I., Rauf, A., & Ali, S. (2019) examined the effect of FDI with respect to poverty alleviation in the Asian region, and it was found out that FDI net inflows and poverty reduction have a strong positive relationship in Asian regions, however, it would depend if it is South Asia, or Southeast Asia countries. Also, less developed countries in Asia which include the South Asian Association for Regional Cooperation (SAARC) countries show that FDI helped them reduce poverty. In the country of Indonesia, FDI is an important component in their economic growth. This is because the entry of foreign firms in Indonesia provides higher value-added than domestic firms. Further, FDI helps Indonesia in structuring its economy in a better place, and this includes improving the living standards of the country.

On the other hand, Couto (2018) discussed that a rise in the Gini coefficient or income inequality across numerous developed and developing countries are partially caused by the impacts of FDI. She even mentioned that the most affected by this implication are the middle-income countries as it does not really affect the low-income countries while a weak association for the high-income. This inequality was also evident in a developed country like China through the widened wage gap between foreign and domestic firms (Chen, Zhao, & Zhou, 2017) and in developing country like Vietnam due to constraints on the level of institutions and education (Le, Do, Pham, & Nguyen, 2021). However, a one percent increase in FDI presence causes domestic firms to cut average wages by 2.03 percent (Nguyen, D.T.H., Sun, S. & Beg, A.B. 2019). Despite FDI firms on average pay 2.25 times that of domestic firms, they put a downward pressure on domestic firms' wages. Bodea and Ye (2017) also stated that bilateral investment treaties (BITs) only increase income inequality in developing countries instead of reducing it as these not only constraint the host country's government from implementing redistributive policies but also ensure that the attractive policies favor foreign over domestic firms and investors, hindering sustainable development and worsening labor practices.

In the Philippines setting, Cheng, R. & Rabena, J. (2017) argued that the Philippine government still needs to be wary of its possible negative effects because the Foreign Investments Act of 1991 does not provide enough protection for MSMEs. Although vast literature has proven the positive impact of FDI on economic growth and poverty reduction in developing and poor countries, studies about its impact in the Philippines are limited and outdated.

2.1.2 Inflation

Inflation has a profound impact on an individual's cost of living by eroding their purchasing power which increases their daily expenses (Oberai, J. & Sharma, D., 2021). It did highly affect the living standard of the people, compelling them to get loans and to do overtime work to meet their family expenditures. Inflationary pressures negatively impact the living standards of the people specifically of the poor as their income is just sufficient for their daily needs and even a minimal price increase can have huge implications on their consumption (Nuguer & Parrado, 2021).

In Bangladesh, Inflation had a positive and statistically significant impact on income inequality over the period 1990 to 2015, negatively affecting poverty reduction (Muhibbullah, M. & Das, M.R., 2019). According to the research conducted by Afandi, Wahyuni, & Sriyana (2017) in Indonesia, they found that the growth of the economy of the country does not necessarily help reduce poverty and inflation has a significant effect on the level of poverty, especially on the short run. This result was consistent with Yolanda (2017) wherein the relationship between inflation with HDI and poverty in Indonesia is positive and significant in the long term. This only shows that inflation is an economic problem that deters the said country's growth. In Mexico, Inflation is also a non-negligible aspect of poverty reduction and the more that there is an increase in the inflation rate, the more that it is detrimental to the poor regardless if they are in urban or rural areas (Iniguez-Montiel, A. J., & Kurosaki, T., 2018). Additionally, in India, there is an adverse relationship between inequality and poverty, and one of the possible reasons behind this is the high inflation that the country is experiencing. It has worsened the plight of low-income consumers and made the poor become poorer with the inflation rates; however, its impact still varies on the commodities and areas (Paul and Sharma, 2019). This is why Sehrawat, & Giri (2018) suggested that in order to address poverty, the negative implication of inflation should be given consideration. Among these extensive studies in foreign countries, unfortunately, no study has taken place to determine the relationship between the two variables in the Philippine scenario.

2.1.3 Labor Force Participation

Many developed and developing countries continue to try and increase their labor force participation rate in order to help alleviate poverty, as job opportunities provide a source of income. This employment entails additional wages which may have more than a simple monetary effect in better meeting employees' living costs; it can also improve well-being through subjective perceptions of valued freedoms to do with job satisfaction, equity, and security (Yao, C., Parker, J., Arrowsmith, J. & Carr, S.C., 2017). Wages have an impact on an individual's well-being wherein an increased income has the capacity to deliver improved work and living conditions. In the European region, the government would like to improve and revamp their economy towards a better place, and the solution that they see is to create more jobs for their depressed labor market. This is because they acknowledge the fact that more job opportunities would help reduce poverty and increase the living standards of their citizens (Di Cataldo, M., & Rodríguez-Pose, A., 2017). On the other hand, most poor people are self-employed and this is because there are fewer opportunities for them especially in developing countries. This results in poor people not escaping poverty (Fields, G. S., 2019). Primary and secondary sectors are two main components of the labor market, the primary sector includes jobs that are ideal for every citizen, while the secondary sector includes jobs that are considered to be unjust. In this case, the poor are mostly employed in the secondary sector, some of them do not even have jobs, and if they have access to good-paying jobs, it is more likely that they will not be considered poor anymore (Piore, M. J., 2018).

According to Rehman, A., Jingdong, L., Khatoon, R., Iqbal, M. S., & Hussain, I. (2019), poor citizens in developing countries usually engage in jobs that are related to agriculture, like farming, this is because they do not have enough leverage and they have fewer skills to sell into employers. With that, the author suggested that to further reduce poverty, the opportunities on the agricultural sector should grow. Furthermore, Mbuyisa, & Leonard (2017) studied the relationship between Information and Communication Technology (ICT), Small Medium Enterprises (SMEs) in accordance with poverty reduction. It was revealed that the industry of ICT provides more job opportunities, thus, helping achieve poverty reduction. Additionally, Saifuloh, N. I., Ahmad, A. A., & Suharno, S. (2019) revealed in the results of their study that in Central Java Indonesia from 2013-2017 open employment and the increase in labor force participation rate is significant in poverty rate.

With the onset of the COVID-19 pandemic, many people lost their jobs. It instilled fear even in developed countries in Europe about the long-term economic consequences of leaving millions of people unemployed (Buheji, M, et al., 2020). Furthermore, the study by Jain, R., Budlender, J., Zizzamia, R., & Bassier, I. (2020) in India states that there was an increase in poverty when people lost their jobs. The income loss is a clear indicator of poverty in a developing country like India and a new source of poverty creation in developed countries like Europe.

Macroeconomic factors such as gross domestic real product, export, wage rate, welfare, and inflation are helpful in Lampung Province with regards to decreasing the unemployment rate, and reducing poverty (Nugroho, Y. C., Subiyantoro, H., & Priadana, M. S., 2018, February). In Indonesia, Supriyadi and Kausar (2017) strongly recommended policies to increase the country's tourism sector as a solution for job creation and poverty reduction as these variables hold a positive association with each other. In Bulgarian Rural areas, the creation of employment opportunities is slow, and this results in a higher risk of poverty in the area (AREAS, I. B. R., 2017). Correspondingly, from the report of Posso, A. (2019), having a strong policy in accordance with the private sector is important as it is a main driver for favorable economic outcomes. The creation of pro-growth policies and the entrance of businesses into the economy helps alleviate poverty as it gives more job opportunities to the people.

2.1.4 Population

The benefits and outcomes of the increase of population towards different economic factors have been an area of study ever since there was an abrupt increase in population in the 20th century. It has been revealed that in the United States, the increase in urban density is significant towards economic growth and that there is a positive relationship between urban density, employment, and income (Hummel, 2020). However, the study of Butler, J., Wildermuth, G. A., Thiede, B. C., & Brown, D. L (2020) stated that the relationship between income inequality and the change in population varies from one county to another, but it is true that for most, the decrease in income inequality is because of a decline in population. High population growth is a barrier to the economic development of regions Mubarak, M. S., & Nugroho, S. B. M. (2020). Also, the trend of the population is an important factor when it comes to poverty levels. Oftentimes, the more that the population increases, the more many people are living in poverty which is why many countries would like to control their population growth, and as suggested by ASROL, A., & Ahmad, H. (2018), the Indonesian government should control it by a family planning program as it affects the overall poverty rate. With regards to Africa, poverty has always been present and continues to rise, and the main culprit of it is the rise of population growth (Beegle, K., & Christiaensen, L. (Eds.)., 2019.) In Nigeria, Hassan, O. M., Abu, J., & Adayi, J. O. (2018) conducted a study that analyzes the population-poverty cycle, and it was found that the increase in population results in an increase in poverty and also affects the welfare of the environment. Poverty is not just the outcome of rapid population growth, it also includes malnutrition and other diseases (Adeyeye, S. A. O., Ashaolu, T. J., Bolaji, O. T., Abegunde, T. A., & Omoyajowo, A. O. 2021).

However, an increase in population could also lead to poverty reduction, especially if there is an increase in the working population as it provides higher per capita income (Cruz, M., & Ahmed, S. A., 2018). According to Peterson (2017), population growth can be positively associated with the growth of economic output. Although in low-income countries, overpopulation or rapid population growth is seen to be detrimental in the short and medium run as this would entail a large number of dependent children. However, this would only mean a higher demographic dividend for these countries as these young people become working adults in the long run. On the other hand, low population growth also causes negative economic implications as it would mean a higher percentage of the elderly than the working population. The burden of supporting a large number of retired people, and the problem of inherited wealth which concentrates riches and contributes to greater income inequality can be eased through higher population growth. Large families would only mean a lesser wealth inequality as inheritances will be divided into more children. In high-income countries, Yameogo, C. E. W., & Omojolaibi, J. A. (2021) conducted a study about trade liberalization, economic growth, and poverty level in the Sub-Saharan region, they used different robustness tests to analyze the data from 1990-2017, and it was revealed that the different variables of trade liberalization, institutional quality, and population growth were helpful in poverty reduction if seen in the long-run.

In the Philippine setting, overpopulation is an issue, and the catholic church continues to intervene to solve the problem, as they deem to do something because overpopulation continues to put Filipinos in poverty, and it is a known fact that the larger the size of the family is, the more prone they are in becoming poor (Tolentino, E., 2019). Moreover, the study of AKIMA, S. (2019) in the Philippines exhibited the fact that most of his respondents believe that the major cause of poverty in the Philippines was overpopulation and the government implemented the Reproductive Health program in order to address overpopulation and its effects. Truly, the Philippines is experiencing overpopulation and it has many adverse effects on the country's welfare, most specifically, poverty (Mañago, C. K. P., 2021).

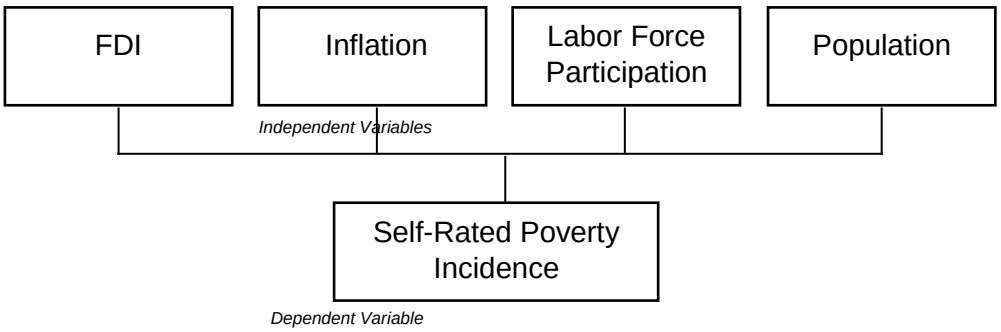
2.2 Synthesis

With the Philippines being a developing country, it is unquestionable why the government made numerous moves on attracting and easing foreign ownership in the country to improve the living of many Filipinos below the poverty line. This is why in this study, the researchers would like to examine if the variables of Foreign Direct Investment, Inflation, Labor Force Participation Rate, and Population have an impact on improving the living standards of Filipinos like what the government ought them to do. The proxy variable that was used to measure the living standards is the Self-Rated Poverty Incidence Rate, a survey conducted by the Social Weather Stations wherein the household head would be tasked to rate their household income in a showcard featuring the words "*Poor" and "Not Poor,"* which would then have follow-up questions based on their answer. The researchers used the said variable in this study because if the poverty rate in the country decreased, this would mean that the standards of living improved

as more Filipino households were able to make ends meet. With that being said, there are many related literatures that back up the idea that Foreign Direct Investment, Inflation, Population, and Labor Force Participation Rate truly affect the standard of living; however, its impact still varies for every country. Moreover, most of the related literature that backups this idea was done internationally, and there are very little studies conducted in the Philippine setting. This study would create a difference in the Philippines and its policymakers, especially because all of the variables that were used to determine if the living standards in the Philippines improved and if poverty was reduced have limited number of literature and are mostly outdated. Thus, a new perspective will be garnered from the results.

2.3 Theoretical Framework

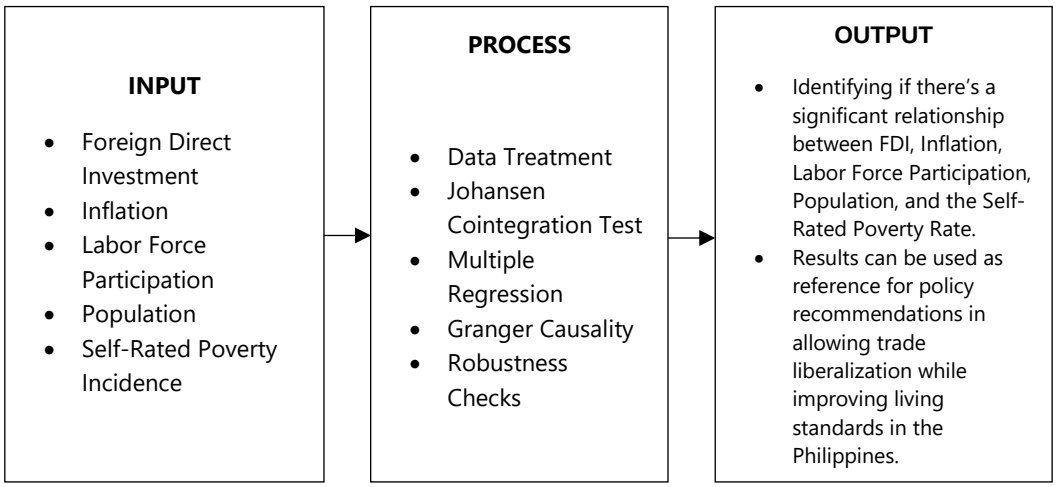
Figure 1: Theoretical Framework



The paper used four different theories to emphasize the linkages of the independent variables to the dependent variable. Firstly, the exogenous growth theory of Robert Solow (1956 and 1957) explains the positive relationship of FDI and Labor Force Participation with the standard of living. This growth theory reveals that FDI can impact income growth directly through capital accumulation and indirectly through labor force participation with the inclusion of new inputs and foreign technologies which increases the production function, generates new production capacity and jobs, and increases the wages of the employees in the host country. Furthermore, through the income-expenditure approach of John Maynard Keynes, it is unquestionable that the population which increases demand and supply in goods and services affect changes in income. This assumption with the relationship of Population and Living Standards was also supported by Edwin Cannan's Optimum Theory of Population in his book *Wealth* wherein he explained that there is an optimum level of population that would yield the highest income per capita in a country, given the limited resources it possesses. Lastly, Theory of Demand-Pull Inflation which was also coined by Keynes explains how inflation indirectly affects per capita income. Inflation is being driven by excessive demand. It can be seen in the average increase of price level in selected goods and services and a high level of inflation induces frequent changes in price lists which may be costly for consumers, thus, reducing the optimal level of income they hold. Inflation has been found to be one of the main determinants of the rate of return of income and investment. With these aforementioned theories, FDI, Inflation, Labor Force Participation, and Population are expected to have an impact on improving living standards in the Philippines.

2.4 Conceptual Framework

Figure 2: Conceptual Framework



The Input-Process-Output (IPO) Model was used in describing the conceptual framework of the study. As shown in Figure 2, the input consists of all the five variables to be discussed—FDI, Inflation, Labor Force Participation, and Population as the independent variables and Self-Rated Poverty Incidence Rate as the dependent variable. The process shows the steps of conducting the different statistical hypothesis tests to attain the results of the study. The researchers conducted the stationarity test and normality test in order to treat the data before running the Johansen Cointegration Test, Multivariate Regression, and Granger Causality Test to address all the research questions. After identifying the relationship between the variables, robustness checks were administered to check the validity of the model. Given the flow of the data, the last is the output which contains the objectives that the researcher aims to achieve at the end of this research.

2.5 Definition of Terms

- *Foreign Direct Investment* – an investment involving a long-term relationship and reflecting a lasting interest and control by a resident entity in one economy (foreign direct investor or parent enterprise) in an enterprise resident in an economy other than that of the foreign direct investor (FDI enterprise or affiliate enterprise or foreign affiliate).
- *Inflation* – a continuous and persistent rise in the overall price of goods and services in the economy over a period of time.
- *Living standards* – the level of welfare available to individuals or to the group of people; concerns goods and services people are able to consume and the resources they have access to.
- *Labor Force Participation Rate* **–** The percentage of the total labor force that corresponds with the total population ages 15 and above.
- *Self-Rated Poverty Incidence Rate* **–** It is measured by the proportion of Filipino respondents rating their family as poor.
- *Human Development Index* – It is composed of the achievement of a country with regards to the three aspects of human development which are standards of living, health, and knowledge.
- *Bilateral Investment Treaties (BITs)* – It is the terms and conditions that is set for private investors or businesses from one country to another.
- *Redistributive policies* – The part of strategy that is needed to ensure that inequality is lessened, and that it promises sustainable development economically.

3. Research Methodology

3.1 Initial Empirical Model

$$\boldsymbol{SRPR = \beta_0 + \beta_1 FDI + \beta_2 INFR + \beta_3 LFPR + \beta_4 POPU + \mu}$$

This econometric model would examine the relationship between FDI, Inflation, Labor Force Participation, Population and the living standards in the Philippines. The components are specified whereas SRPR represents the Self-Rated Poverty Rate; FDI stands for the Foreign Direct Investment Percent of GDP; INFR is the Inflation Rate; LFPR is the Labor Force Participation Rate and POPU is the population growth rate. $\beta_1, \beta_2, \beta_3, \beta_4$ are the beta coefficients for the variables, respectively; and, μ is the disturbance term for the model. As such, changes in one of the components will cause a movement in the constant.

3.2 Variables Description

Table 1: List of Variable Description

Variable	Label	Description	Measurement
Self-Rated Poverty Rate	SRPR	A percentage of self-rated poor on a sample of 1,200 statistically representative households quarterly	Annual %
Foreign Direct Investment	FDI	Net inflows, % of GDP	Annual %
Inflation Rate	INFR	Consumer price index	Annual %
Labor Force Participation Rate	LFPR	Percentage of population 16 years and above that is currently working or actively looking for job	Annual %
Population Growth Rate	POPU	Increase in the number of all residents regardless of legal status or citizenship	Annual %

3.3 Assumptions

- As FDI increases, the standard of living also increases. (+)
- As Inflation increases, the standard of living decreases. (-)
- As Labor Force increases, the standard of living also increases. (+)
- As the Population increases, the standard of living decreases. (-)

3.4 Research Design

The research design is the systematic plan integrated with this study to effectively address the research problem. In this paper, the researcher used a correlational research design to assess the relationship between the independent variables (FDI, Inflation, Population, and Labor Force Participation Rate) and the dependent variable (Self-Rated Poverty Incidence Rate). It seeks to ascertain relationships whether an increase or decrease in one variable corresponds to an increase or decrease in another variable. Findings from a correlational study enable researchers to determine whether or not – as well as the degree to which – two variables change together. In a positive correlation, two variables change together in the same direction. Conversely, in a negative correlation, two variables change together in the opposite direction. Two variables may also have no relationship with each other, in which case they may be said to have zero correlation (Tan, 2014).

3.5 Research Procedure

There are two procedures conducted to acquire the needed data in this study. The first procedure was to find a complete time series of data which is composed of at least 30 observations. However, this study used 37 observations in total. All data are taken from different reliable data sources such as the World Development Indicators, Philippine Statistics Authority OpenStat, and Social Weather Stations. The data are within the timeframe of 1985-2021. After securing the completeness of the data, the second step was to run the data using the EViews software and determine its existing relationship with each other.

3.6 Statistical Treatment

This study was conducted to determine whether FDI presence improves the living standards in the Philippines using the Self-Rated Poverty Incidence Rate as a proxy measurement. In order to address the research problem, the following statistical hypothesis tests are used: (1) Augmented Dickey-Fuller Test, (2) Jarque-Bera Normality Test, (3) Variance Inflation Factor, (4) Breusch-Pagan Heteroskedasticity test, (5) Breusch-Pagan-Godfrey Autocorrelation test, (6) RAMSEY Reset test, (7) Correlation Matrix, (9) OLS Multiple Regression, (10) Johansen Cointegration and (11) Granger Causality.

The XY Scatterplot was first administered to give an illustration of the trend and the relationship of the dependent variable among all independent variables.

The Summary Statistics was also conducted to summarize and provide information about the characteristics of each data set.

After familiarizing with the data, the researchers moved to the data treatment. The Augmented-Dickey Fuller Test (ADFT) was performed to determine whether the data used was stationary or not. It was also used to determine the individual correlations between the variables, whether there is collinearity or absence of correlation. It is one of the commonly used stationarity tests and compared to the Dickey-Fuller Test, ADFT can also be applied to a larger dataset of time series models.

Next step is to test for normality of regression residuals. As other normality tests are not reliable when the number of observations is large, the researchers used the Jarque-Bera Normality since it is usually used for large data sets. It is a function of the measures of skewness and kurtosis computed from the sample.
After passing the initial regression tests, the Ordinary Least Squares (OLS) further investigates the overall correlation between the variables. Johansen Cointegration Test was also performed to test the cointegrating relationship between the variables in the long run. There are two prominent cointegration tests and while the other is meant for single equation, Johansen Cointegration is well-known when dealing with multiple equations. Moreover, correlation does not equate causality; thus, the researchers conducted the Granger Causality Test which is used to verify the usefulness of one independent variable to forecast the dependent variable.

After conducting the multiple regression output of the transformed variables and identifying their relationships, it is now time for robustness tests to check if the new model fulfills the CLRM assumptions.

Variance Inflation Factors was used to detect the severity of multicollinearity in the OLS regression analysis. This also measures how the independent variable is influenced by its correlation with other independent variables.

Breusch-Pagan-Godfrey Test or sometimes shortened to the Breusch-Pagan test is a test for heteroscedasticity of errors in regression.

Breusch-Godfrey is a test of autocorrelation that is general in the sense that it allows for (1) non stochastic regressors, such as the lagged values of the regress and; (2) higher-order autoregressive schemes.

Lastly, Ramsey's RESET Test to check the model specification error or model specification bias.

3.7 Ethical Considerations

This research was conducted with full honesty and integrity to ensure the validity and accuracy of the results. The researcher was also meticulous during the data gathering and data analysis to ensure that no data nor result was tampered.

4. Results and Discussion

4.1 Adjusted Empirical Model

$$L\_SRPR = \beta_0 + \beta_1 FDI + \beta_2 ln\_INFR + \beta_3 ln\_LFPR2 + \beta_4 POPU1 + \mu$$

After initial regression results, presented above is the adjusted empirical model of this study whereas SRPR represents the Lagged form of Self-Rated Poverty Rate in an attempt to pass the autocorrelation test in the initial model; FDI stands for the Foreign Direct Investment Percent of GDP; ln_INFR is the log form of Inflation Rate; ln_LFPR2 is the 2nd difference of the log form of Labor Force Participation Rate and POPU1 is the first difference of population growth rate. $\beta_1, \beta_2, \beta_3, \beta_4$ are the beta coefficients for the variables, respectively; and, μ is the disturbance term for the model.

4.2 Hypothesis 1

Table 2: Johansen Cointegration Test for Hypothesis 1

Date: 12/05/22 Time: 01:35
Sample (adjusted): 1989 2021
Included observations: 33 after adjustments
Trend assumption: Linear deterministic trend
Series: SRPR FDI LN_INFR LN_LFPR2 POPU1
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.557403	69.52123	69.81889	0.0528
At most 1	0.433429	42.62306	47.85613	0.1420
At most 2	0.365808	23.87400	29.79707	0.2058
At most 3	0.207636	8.845693	15.49471	0.3798
At most 4	0.034701	1.165466	3.841465	0.2803

Trace test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.557403	26.89817	33.87687	0.2688
At most 1	0.433429	18.74906	27.58434	0.4341
At most 2	0.365808	15.02830	21.13162	0.2869
At most 3	0.207636	7.680227	14.26460	0.4121
At most 4	0.034701	1.165466	3.841465	0.2803

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Johansen cointegration estimates both long-run and short-run models and p-values higher than 0.05 would mean that the null hypothesis is rejected; thus, there is a cointegrating relationship between the variables. The table above shows that all the variables attained p-values greater than 0.05. Hence, it is concluded that a long-run relationship exists among the five variables whereas the series are related and can be combined in a linear fashion. This implies that even if there are fluctuations in the short run that may affect individual datasets, the variables will still converge in the long run. This cointegrating relationship was further proven by the XY Scatterplot (Appendix A & B) which has shown a linear trendline pattern in each variable, and the theories discussed in the theoretical framework. To further prove the short-run and long-run cointegration of the variables within the time series, a perfect example of this in the Philippines is the recession the country experienced as an after-effect of Martial Law, which left the Philippines with an enormous amount of debt, and even if not all debts are bad, the recovery of the economic recovery of the country took about two decades (Mendoza, R. U., Bulaong Jr, O., & Mendoza, G. A. S., 2022). Such fluctuations are seen in the short-run with the recovery, but all of the variables still have a cointegrating relationship as they were used for the recovery in the long-run.

4.3 Hypothesis 2

Table 3: OLS Regression for Hypothesis 2

Dependent Variable: SRPR
Method: Least Squares
Date: 12/05/22 Time: 10:05
Sample (adjusted): 1987 2021
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.02815	5.532811	1.993227	0.0557
FDI	0.988363	0.889434	1.111228	0.2756
LN_INFR	5.104428	0.989055	5.160914	0.0000
LN_LFPR2	-153.0120	35.16728	-4.350976	0.0002
POPU1	4.106148	11.62582	0.353192	0.7265
SRPR(-1)	0.625221	0.094062	6.646890	0.0000

R-squared	0.813451	Mean dependent var	55.60000
Adjusted R-squared	0.781287	S.D. dependent var	7.535016
S.E. of regression	3.523884	Akaike info criterion	5.511809
Sum squared resid	360.1149	Schwarz criterion	5.778441
Log likelihood	-90.45667	Hannan-Quinn criter.	5.603850
F-statistic	25.29096	Durbin-Watson stat	1.706117
Prob(F-statistic)	0.000000		

The table presented in Hypothesis 2 is the adjusted simple regression between the dependent variable Self-Rated Poverty Rate, and the independent variables FDI, Inflation Rate, Population Growth, and Labor Force Participation Rate. The probability value in the results is an index of the individual significance of each independent variable to the dependent variable. From the results for FDI and Population, the p-values are 0.2756 and 0.7265 respectively, which means that the said variables have insignificant relationships with the standard of living. The p-values for Inflation and Labor Force Participation, on the other hand, are at 0.0000 and 0.0002 consecutively which means that these variables are significant to the living standards in the Philippines. These results were further illustrated in the direction of the trendline that appeared on the Adjusted XY Scatterplot (Appendix B). To support the significance of each relationship discussed, the study of Cudia, C. P., Rivera, J. P. R., & Tullao, T. (2019) stated that the rise of Entrepreneurship in the Philippines is helpful in alleviating poverty in the Philippines as it provides employment opportunities. This is coherent with the significance of the variable between Self-Rated Poverty Rate and Labor Force Participation Rate. Furthermore, Dela Peña (2022) stated that as inflation rate in the Philippines continues to increase, the poor population in the Philippines will increase and will have more difficult times. This backs up the result that inflation is a significant variable for Self-Rated Poverty Rate. On the other hand, the results stated that FDI is not that significant to the dependent variable, and this is consistent with the study of Uttama (2015), where it was stated that there was a negative linkage between FDI inflows and poverty reduction in the Philippines as the high level of poverty in the country cannot be catered by the benefits of the FDI inflows alone. Lastly, as the population is not considered a significant variable with the independent variable, it is aligned with the study of Alonzo (2004) where it was stated that rapid population growth alone does not explain poverty.

4.4 Hypothesis 3

Table 4: Granger Causality for Hypothesis 3

Pairwise Granger Causality Tests
Date: 12/05/22 Time: 10:06
Sample: 1985 2021
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
INFR does not Granger Cause FDI	36	3.33347	0.0769
FDI does not Granger Cause INFR		0.02397	0.8779
LFPR does not Granger Cause FDI	36	0.01529	0.9024
FDI does not Granger Cause LFPR		7.66356	0.0092
POPU does not Granger Cause FDI	36	1.00822	0.3226
FDI does not Granger Cause POPU		0.02602	0.8728
SRPR does not Granger Cause FDI	36	3.46914	0.0714
FDI does not Granger Cause SRPR		0.01722	0.8964
LFPR does not Granger Cause INFR	36	4.57282	0.0400
INFR does not Granger Cause LFPR		0.01572	0.9010
POPU does not Granger Cause INFR	36	10.7111	0.0025
INFR does not Granger Cause POPU		0.15221	0.6989
SRPR does not Granger Cause INFR	36	0.46009	0.5023
INFR does not Granger Cause SRPR		4.43207	0.0430
POPU does not Granger Cause LFPR	36	4.61141	0.0392
LFPR does not Granger Cause POPU		0.19014	0.6656
SRPR does not Granger Cause LFPR	36	2.77072	0.1055
LFPR does not Granger Cause SRPR		7.92072	0.0082
SRPR does not Granger Cause POPU	36	3.55418	0.0682
POPU does not Granger Cause SRPR		17.1192	0.0002

Correlation in the long-run and short-run does not equate to causality; thus, Granger Causality is also conducted. If the p-value is less than 0.05, then the null hypothesis must be rejected and the causal relationship between the variables is detected. In addressing whether the Philippines' FDI, Inflation, Labor Force, and Population cause living standards, the researchers will only have to look at the results which answer the said third problem in the study. As seen in the fifth row of the table, the paper cannot reject that FDI does not Granger cause SRPR as it attained 0.8964 p-value which is higher than the 5% critical value. On the other hand, the remaining three independent variables namely Inflation, Labor Force, and Population garnered p-values of 0.0430, 0.0082, and 0.0002 respectively. This rejects the null hypothesis which appears that the Granger Causality runs from the three variables to the Self-Rated Poverty Rate; thus, Inflation, Labor Force, and Population Granger cause the living standards in the Philippines. With that being said, the study of Gatpolintan, J. N., & Avila, E. C. (2019) is coherent with the results, as their study revealed that public secondary teachers in the municipality of Ragay, Camarines Sur had changes in their spending habits due to inflation, and that it is making their lives even harder. Moreover, with the on-set of COVID-19, the unemployment rate in the Philippines became higher, and Biana, H. T. (2020) stated in her study that many poor Filipinos depend on subsidies from the government as they do not have a job, and enough savings to survive. One instance where the population is a factor in the increasing poverty incidence is in Marinduque, where it was revealed by Salvacion, A. R. (2020) that the population growth of the island greatly influences the increase in poverty incidence.

4.5 Hypothesis 4

Table 5: OLS Regression for Hypothesis 4

Dependent Variable: SRPR
Method: Least Squares
Date: 12/05/22 Time: 10:05
Sample (adjusted): 1987 2021
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.02815	5.532811	1.993227	0.0557
FDI	0.988363	0.889434	1.111228	0.2756
LN_INFR	5.104428	0.989055	5.160914	0.0000
LN_LFPR2	-153.0120	35.16728	-4.350976	0.0002
POPU1	4.106148	11.62582	0.353192	0.7265
SRPR(-1)	0.625221	0.094062	6.646890	0.0000

R-squared	0.813451	Mean dependent var	55.60000
Adjusted R-squared	0.781287	S.D. dependent var	7.535016
S.E. of regression	3.523884	Akaike info criterion	5.511809
Sum squared resid	360.1149	Schwarz criterion	5.778441
Log likelihood	-90.45667	Hannan-Quinn criter.	5.603850
F-statistic	25.29096	Durbin-Watson stat	1.706117
Prob(F-statistic)	0.000000		

The table presented in Hypothesis 4 is the adjusted simple regression between all the variables, and its r-squared value represents the percentage of the variance of the dependent variable that can be collectively explained by the independent variables. The results show that it has an r-squared of 0.813451 which simply implies that the independent variable accounts for 81.51% of the variability in the dependent variable. There are still 18.49% of other variables that could affect the dependent variable, which means that there are still other variables that can affect the living standards in the Philippines. With the study of Rivera, J. P. (2021), it was explained that agriculture could also be a vital factor in terms of alleviating poverty in the Philippines, and this is in line with the results of there are 18.49% other variables that could affect the living standards in the Philippines.

4.6 Synthesis

The model conducted for the following tests performed in this chapter is already transformed after the initial models (Appendix H) failed some robustness checks (Appendix J). The results in Johansen Cointegration convey that there are cointegrating relationships between all the variables. Hence, it is concluded that a long-run relationship exists among the five variables whereas the series are related and can be combined in a linear fashion. This implies that even if there are fluctuations in the short run that may affect individual datasets, the variables will still converge in the long run. This cointegrating relationship was further proven by the Initial and Adjusted XY Scatterplot (Appendix A & B) which both have shown trendline patterns, and the theories discussed in the theoretical framework. Moreover, the OLS regression model revealed that only Labor Force Participation and Inflation have significant relationships with living standards while the country's FDI and Population are insignificant. Granger Causality also revealed that Inflation, Labor Force, and Population Granger caused the living standards in the Philippines. Also, as the r-squared is at 0.813451, it means that this study proves that there are still 18.49% other variables that could either positively or negatively affect the standards of living in the Philippines.

5. Summary, Conclusions, and Recommendations

Vast amount of literature has well-established FDI as an important determinant of technology acquisition and modernization, economic development, capital accumulation, and employment. Economists are too engrossed on how FDI positively affects the economic growth of both the home and host countries, only a few have been associated with investigating how FDI actually improved the living standards of the people. This paper examined the impact of FDI, Inflation, Labor Force Participation, and Population on improving living standards in the Philippines from 1985 to 2021 using the different econometric tests which are: (1) Augmented Dickey-Fuller Test, (2) Jarque-Bera Normality Test, (3) Variance Inflation Factor, (4) Breusch-Pagan Heteroskedasticity test, (5) Breusch-Pagan-Godfrey Autocorrelation test, (6) RAMSEY Reset test, (7) Correlation Matrix, (9) OLS Multiple Regression, (10) Johansen Cointegration and (11) Granger Causality. The results of this study revealed that FDI, Inflation, Labor Force Participation, and Population have cointegrating relationships with Self-Rated Poverty Rate within the time series. Even if long-run cointegration is found, it should be understood that in the short-run there may be events in the Philippines that could affect the long-run findings. Moreover, the OLS regression model has shown that Labor Force Participation and Inflation have significant relationships with living standards while the country's FDI and Population are insignificant. Granger Causality also revealed that Inflation, Labor Force, and Population Granger caused living standards in the Philippines and only FDI not. With all of the results of the test, it is evident that the dependent variables affect the living standards in the Philippines, it just varies on how little or extensive it is.

This study supports the loosened restrictions to foreign ownership as the results affirmed the significant effects of most of the dependent variables on the Self-Rated Poverty Incidence; however, must still take precautionary measures as some variables exhibit insignificance in the long run. In order to fully improve the living standards of Filipinos, the government should weigh on what variable should be put to priority first, and the results of this study could be a source of reference to it. With its cointegration with Self-Rated Poverty Incidence, inflation should still be under control as the rise in price levels of goods and services contributes to the poverty rate of Filipinos. FDI should also be ensured not to be a source of income inequality and that equal opportunities must be given to both foreign and domestic firms in order to promote healthy competition in the market. When it comes to population and labor force participation rate, it is recommended that the government maximize the increasing number of population and make use of the human capital in a way that is beneficial to the economy, as the increase in labor force participation rate helps in poverty reduction. Furthermore, the recommendation would boil down to changing policies in the Philippines, and it is expected that economists, the National Economic Development Authority (NEDA), and the Department of Labor and Employment (DOLE) would be the ones to initiate suggestions and change to the government by using the results of thesis papers like this.

Overall, the paper supports the concept of the domino effect between the variables used. Such an increase in foreign direct investment results in creating economic opportunities and capital accumulation for the rising population, which could help reduce the poor people of the country, and then improve the living standards. However, as the Philippines is still considered a developing economy, the results of the study could be used to give recommendations based on factors that need further attention to improve the living standards of Filipinos. The paper recommends implementing policies that are moderately reliant on Foreign Direct Investment, Population, Inflation, and Labor Force Participation rate because all of the variables are proven to be related to the Self-Rated Poverty Incidence, which is the variable used to measure the living standards in the Philippines. The Philippine government should focus and be meticulous on policy clauses that would benefit not just the corporate but also its employees to help attain prosperity for the country and its countrymen and to help alleviate poverty.

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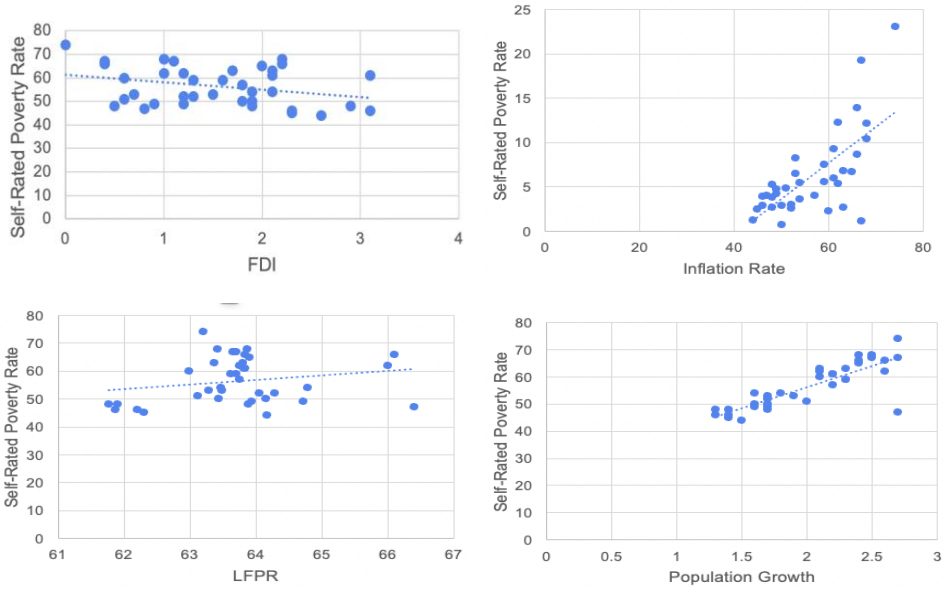
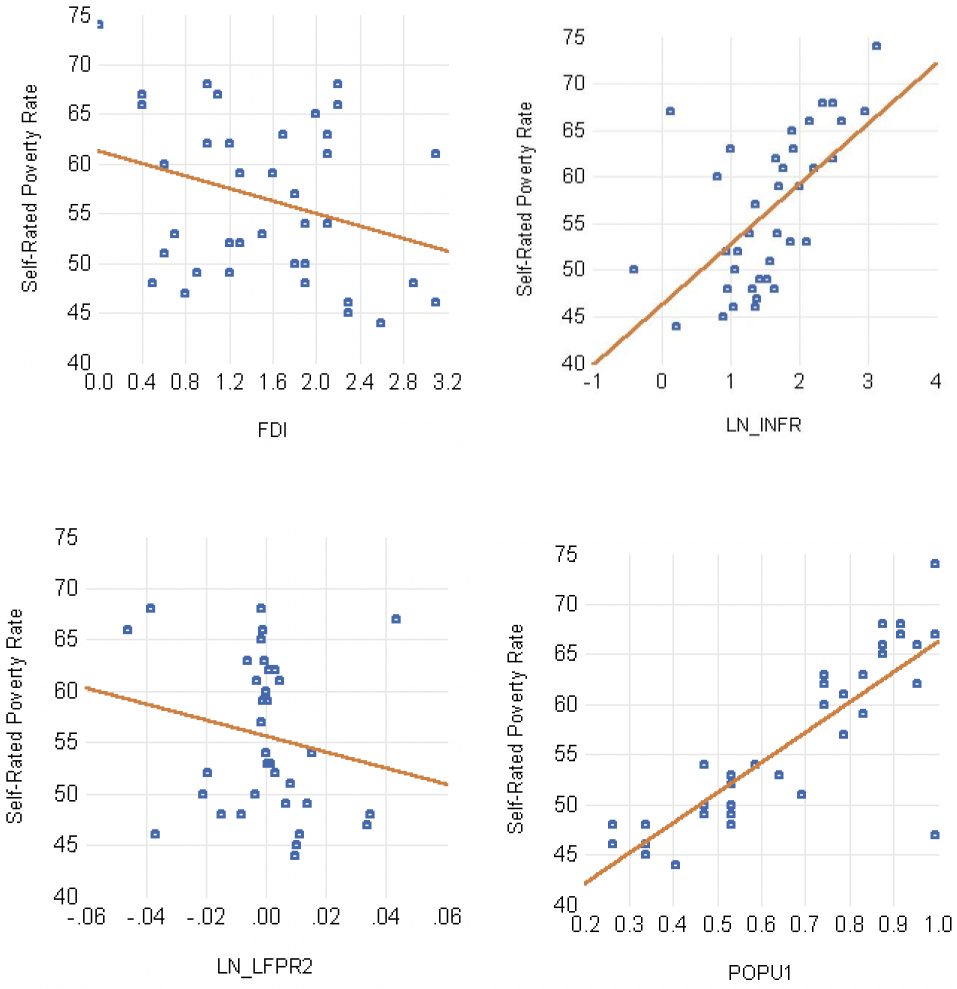
Appendices

Appendix A. Initial Scatterplot



There are four scatterplots that are presented above and all scatterplots use Self-Rated Poverty Incidence Rate as the dependent variable. The independent variables of the scatterplots are: (1) Foreign Direct Investment, (2) Inflation, (3) Labor Force Participation Rate, and (4) Population Growth. It is evident with the scatterplots that there is a relationship between the different independent variables and dependent variables due to the fact that there is a steep trendline and a pattern, the relationship would just differ if it is positive or negative. For FDI to Self-Rated Poverty Incidence Rate, a slightly negative relationship is seen. On the other hand, Inflation to Self-Rated Poverty Incidence Rate exhibits a strong positive relationship. Labor Force Participation Rate to Self-Rated Poverty Incidence Rate also exhibits a positive relationship. Lastly, Population Growth and Self-Rated Poverty Incidence Rate reveal a strong positive relationship.

Appendix B. Adjusted Scatterplot



All of the four scatterplots presented above the Appendix B are adjusted, meaning, these were the ones that were used in the empirical model. It is evident from the scatterplots that there is a relationship between the different independent variables and dependent variables due to the fact that there is a steep trendline and a pattern, the relationship would just differ if it is positive or negative. For FDI to Self-Rated Poverty Incidence Rate, a negative relationship is seen. On the other hand, Inflation to Self-Rated Poverty Incidence Rate exhibits a strong positive relationship. Labor Force Participation Rate to Self-Rated Poverty Incidence Rate also exhibits a slightly negative relationship. Lastly, Population Growth and Self-Rated Poverty Incidence Rate revealed a strong positive relationship.

Appendix C. Initial Descriptive Statistics

Date: 12/05/22 Time: 04:29
Sample: 1985 2021

	FDI	INFR	LFPR	POPU	SRPR
Mean	1.548649	6.215823	63.71811	2.008108	56.40541
Median	1.600000	4.829211	63.75000	2.100000	54.00000
Maximum	3.100000	23.10311	66.40000	2.700000	74.00000
Minimum	0.000000	0.674193	61.77000	1.300000	44.00000
Std. Dev.	0.786914	4.842499	1.025025	0.439936	8.122190
Skewness	0.102306	1.780312	0.531228	0.006449	0.237037
Kurtosis	2.297447	6.250591	4.148726	1.726966	1.867294
Jarque-Bera	0.825480	35.83510	3.774594	2.498706	2.324475
Probability	0.661834	0.000000	0.151481	0.286690	0.312786
Sum	57.30000	229.9854	2357.570	74.30000	2087.000
Sum Sq. Dev.	22.29243	844.1927	37.82437	6.967568	2374.919
Observations	37	37	37	37	37

Appendix C summarizes the characteristics of the original dataset from 1985-2021, and the total number of observations is 37. The results of the skewness are as follows: (1) Foreign Direct Investment is at 0.10231 which means that it is moderately skewed, (2) Inflation Rate is at 1.78031 which is means that it is highly skewed, (3) Labor Force Participation Rate is at 0.53123 which means that it is moderately skewed too, (4) Population Growth is at 0.0064490 which is fairly symmetrical, and lastly, (5) Self Rated Poverty Rate is at 0.23704 which is highly skewed.

Appendix D. Stationarity Test

Augmented Dickey-Fuller Test

Variables	*Constant and Linear Trend*
FDI	0.0236
INFR	0.0000
LFPR	0.1111
POPU	0.1401
SRPR	0.0011
LN_INFR	0.0009
LN_LFPR2	0.0000
POPU1	0.0000

The unit root test is conducted to determine whether the data is stationary or non-stationary. In conducting the unit-root test, the Augmented Dickey-Fuller Test (ADFT) is chosen to analyze the data of the study. The decision rule is to reject the null hypothesis once the p-values are less than the 0.05, otherwise it is not rejected which means that there is a unit root in the given data set and implies non-stationary.

As presented in the table, the tested variables namely FDI, Inflation, Labor Force Participation Rate, Population, and Self-Rated Poverty Incidence Rate are not stationary when tested at level form with constant and trend, for most of the values are above 0.05. Therefore, all the variables are transformed to match the results. The new results attained p-values less than 0.05 which opted to be significant and thus reject the null hypothesis. This signifies that all the variables are stationary and does not have a unit root at level form.

Appendix E. Normality Test

Jarque-Bera Normality Test

Variables	*Jarque-Bera test*	*P-Value*
FDI	0.825480	0.661834
INFR	35.83510	0
LFPR	3.774594	0.151481
POPU	2.498706	0.286690
SRPR	2.324475	0.312786
LN_INFR	0.544174	0.761788
LN_LFPR2	2.583724	0.274759
POPU1	1.457191	0.482586

The Jarque-Bera is a goodness of fit test, for it is conducted to determine whether the variables are normally distributed or not. The p-value should be greater than 0.05 so that the null hypothesis would be accepted, and the variables would be considered as normally distributed. With the results presented above, the p-value of FDI is at 0.661834, while Inflation Rate has a p-value of 0, Labor Force Participation Rate with a p-value of 0.151481, Population with p-value of 0.286690, and Self-Rated Poverty Incidence Rate has a p-value of 0.312786. Four variables passed the Jarque-Bera test except for Inflation Rate, revealing that not all the variables are normally distributed. However, as Inflation Rate was transformed, its p-value accounted at 0.761788, which means that all the transformed variables are now normally distributed.

Appendix F. Adjusted Descriptive Statistics

Sample: 1985 2021

	SRPR	FDI	LNINFR	LNLFPR2	POPU1
Mean	55.60000	1.625714	1.563068	-8.70E-05	-0.040000
Median	54.00000	1.700000	1.574683	0.000150	0.000000
Maximum	68.00000	3.100000	2.958106	0.043653	0.100000
Minimum	44.00000	0.400000	-0.394240	-0.046041	-0.100000
Std. Dev.	7.535016	0.734984	0.681597	0.018193	0.055307
Skewness	0.178339	0.205751	-0.438412	-0.234011	0.127004
Kurtosis	1.661735	2.268552	3.702005	4.246055	2.029586
Jarque-Bera	2.797334	1.027177	1.839878	2.583724	1.467409
Probability	0.246926	0.598345	0.398543	0.274759	0.480127
Sum	1946.000	56.90000	54.70739	-0.003045	-1.400000
Sum Sq. Dev.	1930.400	18.36686	15.79555	0.011253	0.104000

The table summarizes the characteristics of the logged dataset from year 1985-2021, and the total number of observations is 37. The results of the skewness are as follows: (1) foreign direct investment is at 0.2057 which means that it is moderately symmetric and is positively skewed, (2) both inflation and labor force participation are approximately skewed and negatively skewed with values of -0.4384 and -0.2340, respectively, (3) self-rate poverty rate is at 0.1783 which means that it is moderately symmetric and is positively skewed as well, and (4) population is at 1.27 which means it is highly skewed. After having a brief summary of the new dataset, the model is now ready for Ordinary Least Squares Regression to identify the strength of the relationships between the variables used.

Appendix G. Correlation Matrix

Adjusted Correlation Matrix

	C	LNINFR	LNLFPR2	POPU1	FDI	SRPR(-1)
C	30.61199	0.524601	32.71221	1.780061	-2.540920	-0.478155
LNINFR	0.524601	0.978230	-0.338155	1.649399	0.045062	-0.036672
LNLFPR2	32.71221	-0.338155	1236.738	-95.04052	-0.360697	-0.627959
POPU1	1.780061	1.649399	-95.04052	135.1597	2.013862	-0.039751
FDI	-2.540920	0.045062	-0.360697	2.013862	0.791093	0.022507
SRPR(-1)	-0.478155	-0.036672	-0.627959	-0.039751	0.022507	0.008848

The correlation matrix was utilized to assess if there is a significant relationship between the dependent and independent variables in their transformed forms. The results have shown that Inflation, Population, and Labor Force Participation exhibited positive relationships with Self-Rated Poverty Incidence, while only FDI has a negative relationship. Both Population and Labor Force Participation have strong positive correlation with the dependent variable in their transformed forms, while Inflation has a negatively weak correlation. FDI, on the other hand, garnered a negative value of 2.5409 which implies that it has a negatively strong correlation with Self-Rated Poverty Rate.

Initial Correlation Matrix

Covariance Analysis: Ordinary
Date: 12/05/22 Time: 00:44
Sample: 1985 2021
Included observations: 37

Correlation Probability	FDI	INFR	LFPR	POPU	SRPR
FDI	1.000000 ---				
INFR	-0.247336 0.1400	1.000000 ---			
LFPR	-0.257236 0.1243	0.180917 0.2839	1.000000 ---		
POPU	-0.420816 0.0095	0.602419 0.0001	0.518698 0.0010	1.000000 ---	
SRPR	-0.305223 0.0662	0.685849 0.0000	0.211828 0.2082	0.835519 0.0000	1.000000 ---

Appendix H. Initial Regression Models

Dependent Variable: SRPR
Method: Least Squares
Date: 12/05/22 Time: 01:03
Sample (adjusted): 1987 2021
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	44.81692	3.411514	13.13696	0.0000
FDI	-0.602121	1.337946	-0.450034	0.6559
LN_INFR	7.695831	1.419680	5.420822	0.0000
LN_LFPR2	-108.6374	53.92720	-2.014520	0.0530
POPU1	6.915179	18.14577	0.381090	0.7058

R-squared	0.529245	Mean dependent var	55.60000
Adjusted R-squared	0.466478	S.D. dependent var	7.535016
S.E. of regression	5.503773	Akaike info criterion	6.380309
Sum squared resid	908.7457	Schwarz criterion	6.602501
Log likelihood	-106.6554	Hannan-Quinn criter.	6.457009
F-statistic	8.431851	Durbin-Watson stat	0.598324
Prob(F-statistic)	0.000110		

Model 18: OLS, using observations 1986–2021 (T = 36)
Dependent variable: SelfRatedPovertyRate

	coefficient	std. error	t-ratio	p-value	
const	187.189	54.2526	3.450	0.0016	***
d_Populationgrow~	1.89110	13.6777	0.1383	0.8909	
l_FDI	1.25181	1.41469	0.8849	0.3830	
CPI	-0.207273	0.0248406	-8.344	2.00e-09	***
LFPR	-1.81791	0.834944	-2.177	0.0372	**

Mean dependent var	55.91667	S.D. dependent var	7.665787
Sum squared resid	573.0542	S.E. of regression	4.299491
R-squared	0.721379	Adjusted R-squared	0.685428
F(4, 31)	20.06554	P-value(F)	3.04e-08
Log-likelihood	-100.8961	Akaike criterion	211.7922
Schwarz criterion	219.7098	Hannan-Quinn	214.5556
rho	0.177297	Durbin-Watson	1.644113

Model 10: OLS, using observations 1987–2021 (T = 35)
Dependent variable: SelfRatedPovertyRate

	coefficient	std. error	t-ratio	p-value	
const	44.8408	3.41158	13.14	5.55e-14	***
l_InflationRate	7.68688	1.41921	5.416	7.19e-06	***
d_d_LFPR	-1.68965	0.838431	-2.015	0.0529	*
d_Populationgrow~	6.85997	18.1380	0.3782	0.7079	
FDI	-0.609659	1.33805	-0.4556	0.6519	

Mean dependent var	55.60000	S.D. dependent var	7.535016
Sum squared resid	908.6673	S.E. of regression	5.503536
R-squared	0.529286	Adjusted R-squared	0.466524
F(4, 30)	8.433225	P-value(F)	0.000110
Log-likelihood	-106.6539	Akaike criterion	223.3078
Schwarz criterion	231.0845	Hannan-Quinn	225.9923
rho	0.701496	Durbin-Watson	0.595792

Excluding the constant, p-value was highest for variable 8 (d_Populationgrowth)

Appendix J. Robustness Checks

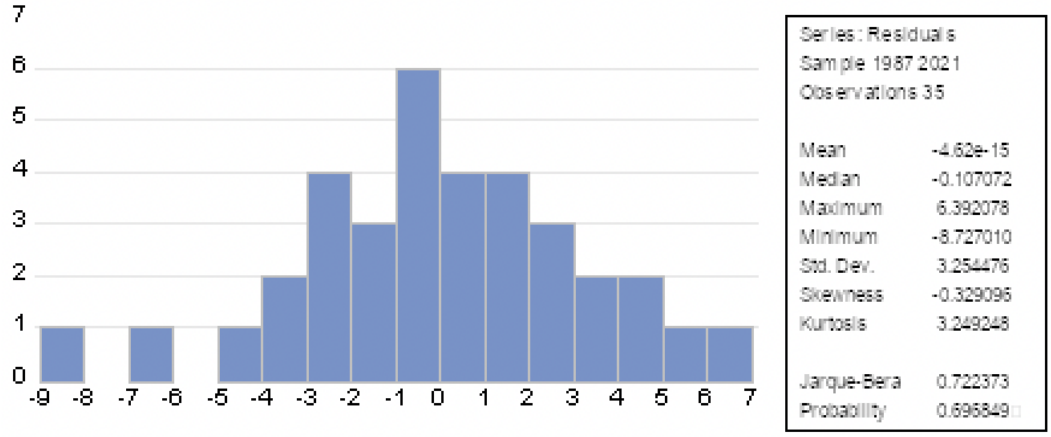
Variance Inflation Factors

Variance Inflation Factors
Date: 12/05/22 Time: 01:08
Sample: 1985 2021
Included observations: 35

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	30.61199	86.28127	NA
FDI	0.791093	7.063146	1.170089
LN_INFR	0.978230	7.980625	1.244321
LN_LFPR2	1236.738	1.120802	1.120776
POPU1	135.1597	1.741502	1.131976
SRPR(-1)	0.008848	80.15735	1.393372

The Variance Inflation Factors (VIF) were used to measure the multicollinearity in the regression model. The VIF values above ten may indicate collinearity problems. The results show that all the variables are less than 10.00; thus, there is no evidence of multicollinearity problem in the model.

Normality of Residuals



In order to find out whether the data and model are normally distributed, the value of the p-value should be above 0.05. With that being said, the results above show a p-value of 0.696849, therefore stating that the data and model are normally distributed.

Heteroskedasticity

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

F-statistic	0.803952	Prob. F(5,29)	0.5561
Obs*R-squared	4.260832	Prob. Chi-Square(5)	0.5125
Scaled explained SS	3.289740	Prob. Chi-Square(5)	0.6554

The Breusch-Pagan-Godfrey Test was utilized to determine whether heteroskedasticity is present in the model. At 5% level of significance, the null hypothesis states that the data exhibits homoskedasticity. Based on the results presented above, the p-values of all variables are greater than 0.05; thus, the null hypothesis is accepted, and the model is homoscedastic.

Autocorrelation

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

F-statistic	0.073668	Prob. F(1,28)	0.7881
Obs*R-squared	0.091843	Prob. Chi-Square(1)	0.7618

The Breusch-Godfrey Serial Correlation LM test was conducted to detect if there's any serial correlation present. Using 1 lag order for the test, the null hypothesis assumes that there is no autocorrelation in the regression model. All the p-values presented are greater than 0.05, which means that the null hypothesis is accepted and the no autocorrelation assumption of the CLRM was satisfied.

Ramsey RESET

Ramsey RESET Test
Equation: UNTITLED
Omitted Variables: Squares of fitted values
Specification: SRPR C FDI LN_INFR LN_LFPR2 POPU1 SRPR(-1)

	Value	df	Probability
t-statistic	0.270539	28	0.7887
F-statistic	0.073192	(1, 28)	0.7887
Likelihood ratio	0.091370	1	0.7624

The Ramsey RESET test was used to detect whether there are any specification errors in the model. A p-value greater than the 5% level of significance implies that there is no problem with the data. In this case, the p-value yielded for f-statistic is above 0.05 which signifies that the model is correctly specified and that necessary re-specifications are no longer needed.

Appendix G. Data

Year	FDI	InflationRate	LFPR	Populationgrowth	Self-Rated Poverty Rate
1985	0	23.1031072	63.2	2.7	74
1986	0.4	1.14813778	63.7	2.7	67
1987	0.8	4.06976744	66.4	2.7	47
1988	2.2	13.8600692	66.1	2.6	66
1989	1.2	12.2429907	66	2.6	62
1990	1	12.1773522	63.42	2.5	68
1991	1.1	19.2614585	63.66	2.5	67
1992	0.4	8.65100358	63.84	2.4	66
1993	2	6.71631104	63.91	2.4	65
1994	2.2	10.3864734	63.87	2.4	68
1995	1.7	6.83199611	63.81	2.3	63
1996	1.6	7.47610378	63.7	2.3	59
1997	1.3	5.5902594	63.62	2.3	59
1998	3.1	9.23493432	63.82	2.2	61
1999	2.1	5.93904902	63.83	2.2	61

2000	1.8	3.97712503	63.75	2.2	57
2001	1	5.34550196	63.75	2.1	62
2002	2.1	2.72277228	63.37	2.1	63
2003	0.6	2.28915663	62.99	2.1	60
2004	0.6	4.82921084	63.12	2	51
2005	1.5	6.51685393	63.29	1.9	53
2006	2.1	5.48523207	63.47	1.8	54
2007	1.9	2.9	63.43	1.7	50
2008	0.7	8.26044704	63.48	1.7	53
2009	1.2	4.21903052	63.94	1.6	49
2010	0.5	3.78983635	63.89	1.7	48
2011	0.9	4.71841705	64.72	1.7	49
2012	1.2	3.02696391	64.29	1.7	52
2013	1.3	2.58268766	64.05	1.7	52
2014	1.9	3.59782344	64.78	1.6	54
2015	1.8	0.67419254	64.16	1.6	50
2016	2.6	1.2536988	64.17	1.5	44
2017	3.1	2.85318773	61.87	1.4	46
2018	2.9	5.21160461	61.77	1.4	48
2019	2.3	2.48027859	62.3	1.4	45
2020	1.9	2.63522885	61.9	1.3	48
2021	2.3	3.927180221	62.2	1.3	46